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INTERNATIONAL CONFERENCE ON BEST INNOVATIVE TEACHING STRATEGIES



BITS Pilani Pilani Campus



PROCEEDINGS OF THE

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Organized by Teaching Learning Centre BITS Pilani - Pilani Campus



International Conference on Best Innovative Teaching Strategies

International Conference on Best Innovative Teaching Strategies

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Message from the Vice Chancellor, BITS Pilani

Dear Conference Delegates,

Heartiest welcome to the International Conference on Best Innovative Teaching Strategies (ICON-BITS 2021) being organised by the Teaching Learning Centre, BITS Pilani (Pilani Campus). We at BITS Pilani cherish quality teaching and explore further direction in innovation and research to keep itself abreast of the latest developments in science, technology, research and academic innovations. In consonance with this, research in pedagogical practices and development and effective use of Edu-Tech continues to bring frontiers of research findings into the classroom for better learner engagement and outcomes at BITS.



Since the last several decades, an interdisciplinary approach has been deeply embedded in the academic and research culture at BITS. This has helped us build a synergy between variegated fields such as academia, corporates, entrepreneurships, civil services, and social arena, literary fields and defense services. BITS Pilani always strives for excellence from the inception of programmes. It has created a world-class curriculum for UG and PG programmes with emphasis on developing analytical skills along with hands-on laboratory exposure and industry exposures through unique Practice School programme.

The last two years, however, have presented not just BITS, but the entire academic fraternity the world over, with an unprecedented challenge. The raging Coronavirus pandemic, ensuing lockdowns and restrictions have forced us all to revisit and revamp our academic strategy so that we can continue to impart quality education to the young and talented population of our country and help them translate their dreams into reality despite the widespread environment of uncertainty and apprehension.

Envisaged at such critical times, I am delighted that the Teaching Learning Centre of BITS Pilani has come up with the idea of offering a niche platform to researchers, academicians, industry members, and our distinguished alumni who are actively engaged in the field of education to exchange and share their experiences, research results, innovative ideas, and discuss the practical challenges encountered and the solutions that can successfully negotiate them.

It is an honour for BITS Pilani that the internationally acclaimed experts and researchers from the University of North Texas, National Taiwan University, Carnegie Mellon University, Texas A&M University and University of Oklahoma have agreed to deliver Keynote addresses and researchers and practitioners from 11 different countries along with 60 state and central universities, IITs, NITs, and IIMs from India will be engaging in academic deliberations and exchange of ideas at this conference. I hope that this three-day long conference renews your spirits and provides you with ample opportunities to engage with your peers and discuss your research ideas and collaborate for future projects.

I congratulate the Teaching Learning Centre, BITS Pilani (Pilani Campus) for taking the initiative to organise such a useful and timely conference. I wish the conference to be a grand success.

Prof. Ranendra N Saha
Acting Vice Chancellor
BITS Pilani

Message from the Director, BITS Pilani (Pilani Campus)

It gives me immense pleasure that the Teaching Learning Centre, BITS Pilani (Pilani campus) is organising the inaugural edition of International Conference on Best Innovative Teaching Strategies (ICON-BITS 2021) from 29 to 31 July, 2021 in the online mode.

It has become commonplace to acknowledge that the COVID-19 Pandemic has altered the way we think about the teaching-learning process. As educators and researchers, it is our responsibility to reflect on the changes that are still underway with an aim to actively intervene in the present moment and shape the future.

I believe that the Teaching Learning Centre at Pilani campus has taken a very timely step in this regard by organising a conference that provides a forum for various stakeholders to reflect and deliberate on the variegated nuances of teaching learning.

The thrust areas of the conference cater to different aspects of teaching learning such as pedagogy, use of technology, the role of education policy, and the link between educational institutions and the industrial requirements. I am delighted to see a galaxy of our international guests; Prof. Kinshuk (University of North Texas), Prof. Nian-Shing Chen (National Yunlin University of Science and Technology), Prof. Chun-Yen Chang (National Taiwan Normal University), Prof. M. Cynthia Hipwell (Texas A&M University), Prof. Kim J. Hyatt (Carnegie Mellon University), Prof. Farrokh Mistree (University of Oklahoma), and Prof. Janet Allen (University of Oklahoma), would be enriching our delegates with their erudite keynote addresses.

I believe that the keynote addresses, the presentations and the panel discussions will lead inform, enrich and enlighten all of us during the conference. This abstract booklet as well as the conference proceedings which are being brought out by the organisers, will be a valuable resource for educators, researchers and policymakers.

I welcome you all to this international conference and also congratulate the Teaching Learning Centre for taking this initiative. I hope that this edition is only the beginning and will be taken forward in the coming years.

I wish the ICON-BITS 2021 all the success!



Prof. Sudhirkumar Barai
Director
BITS Pilani (Pilani Campus)

Message from Conference Chairs

It is my pleasure to welcome you to the International Conference on Best Innovative Teaching Strategies (ICON-BITS 2021). I would like to express my gratitude to all the researchers, academicians, industry members, our distinguished alumni and our sponsors for their contribution and support. To create and uphold excellence in teaching at BITS Pilani, a Teaching Learning Centre (TLC) was established across the institute, in all four campuses in 2015. The Teaching Learning Centre promotes sharing of teaching-learning experience, encourages innovation in teaching-learning methodologies, and creates a platform for learning from the best practitioners and each other. It also conducts pedagogical research and actively seeks strategies/interventions in specific target contexts. TLC organises workshops to train academicians in the use of the latest technology and develop various approaches and techniques for effective teaching and learning. It also creates a platform to address the various pedagogical challenges by conducting national/international conferences, lecture series, workshops, and training programs for academicians and scholars.



Although the conference is online this year, we are committed to creating spaces for connecting with colleagues from across disciplines and pedagogues and researchers across the globe. The ICON-BITS 2021 will consist of world-class keynote addresses, industry-led presentations, as well as extensive networking opportunities. The aim of the conference is to provide an opportunity to academicians and professionals from various educational fields with cross-disciplinary interests to bridge the knowledge gap, promote research and learn the best pedagogical practices from internationally renowned experts. We have received an overwhelming response to our Conference Call for Paper. We received 176 submissions out of which 101 papers have been accepted for presentation. There will be eight Invited Plenary Sessions with nine Keynote speeches, one panel discussions and two Education industry sessions during these three days. You can look forward to rich and interesting discussions from different points of view on the chosen themes. The live sessions are designed to be interactive experiences with opportunities for you to find community through breakout group activities, chat comments, and shared documents.

Our conference programme is being updated regularly. Please be sure to visit our conference webpage for more details.

Hope these three days' deliberations and discussions will etch very fond memories and meaningful learnings.

Welcome to ICON-BITS 2021!

Prof. Pushp Lata
Faculty In-charge, Teaching Learning Centre
Professor, Department of Humanities & Social Sciences,
BITS Pilani (Pilani Campus)

Message from Conference Chairs

On behalf of the entire organising committee, I welcome you all to the inaugural International Conference on Best Innovative Teaching Strategies (ICON-BITS 2021). It is indeed a great pleasure to witness your high level of enthusiasm, which has been the key to making this conference successful.

We sincerely believe that this inaugural conference, organised by the Teaching Learning Centre of BITS Pilani (Pilani Campus), has not only provided all of us with a much needed platform to exchange our ideas for a better teaching and learning environment, but also highlighted the prevailing keenness of the teaching community to work cohesively, especially during this time of the pandemic.

We are indebted to our invited speakers – stalwarts in their fields – for kindly agreeing to share their insights with all of us during the conference. The advisory committee – comprising of veteran academicians and administrators from India and abroad – have always extended their helping hand to guide us toward successful organisation of the conference. The active participation of registered authors, attendees and reviewers coming from various institutes of repute around the world has ensured that the conference is truly international in nature. We thank you for being a part of this team and for being our companion as we start this new journey.

After being conceptualised almost a year ago, the ICON-BITS 2021 team has worked diligently with support and guidance from the leadership team of the institute to ensure that the conference is organised without any hassles, irrespective of the pandemic situation. Therefore, this inaugural version of the conference is being hosted online. However, we look forward to welcoming all of you and your peers physically in the future editions of the conference.

We have carefully selected only the papers aligned with the theme of the conference. We expect all these papers to be of interest to the academicians and researchers. This book of abstracts bears testimony to the scholarly work carried out by the participants of ICON-BITS 2021. We are sure that anyone reading these abstracts will be interested to know more about the papers. Hence, we have partnered with Macmillan to publish the articles in both hard and soft copy. The articles will also be available perpetually in the online platform of Social Science Research Network (SSRN) – a subsidiary of Elsevier. We will make sincere efforts to publish an edited book based on the papers from this conference and will like to facilitate our authors to take their papers to a higher level so that the papers can be published in reputed journals.

We hope that our association with you will continue to be stronger in the coming years. Let us be enlightened with our collective knowledge during the three days of this conference and in future!

Dr Nirankush Dutta
Member, Teaching Learning Centre
Assistant Professor, Department of Management
BITS Pilani (Pilani Campus)



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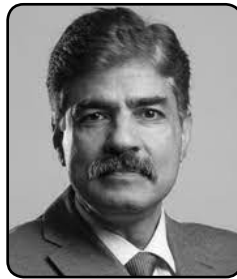
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University of Houston, USA
Former Director, IIT Patna

Guest Of Honour



Prof. Pankaj Jalote
Founding Director
Indraprastha Institute of Information Technology, Delhi

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Prof. Amitava Mitra
Executive Director
MIT, USA



Prof. Kinshuk
University of North Texas



Prof. Nian-Shing Chen
National Yunlin University of Science and Technology



Prof. Chun-Yen Chang
National Taiwan Normal University



Prof. M Cynthia Hipwell
Texas A&M University



Prof. Janet K Allen
University of Oklahoma



Prof. Farrokh Mistree
University of Oklahoma



Prof. Kim J Hyatt
Carnegie Mellon University.



Dr Vinnie Jauhari
Microsoft Corporation India Ltd.

Valedictory Chief Guest



Mr Venkataramanan Sriraman
Executive Director, eVidyaloka

Innovative Pedagogical Practices

Design Education for First Year University Undergraduates

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ABSTRACT

Technology-driven active learning pedagogy strategies are currently adopted by various educational institutions to ignite students' passion for authentic and life-long learning. For an effective learning process, it is essential for students to grasp the fundamental concepts taught in the class and subsequently apply them to real-life scenarios. At the Singapore University of Technology and Design (SUTD), design education is an integral part of the university curriculum and has been incorporated in almost all the courses over the years. From the first year, students are introduced to design thinking in different modules at SUTD through hands-on activities, case studies and group projects. Some of these projects are developed by the faculty using an interdisciplinary approach to enable students to make connections across the various Science and non-Science subjects that are offered within a teaching term. This paper will present students' learning experience of immersing in various design-centric learning exercises cutting across single as well as multiple disciplines in their first year at SUTD. The rubrics used to evaluate such design-based learning activities will be discussed in the paper as well. The purpose of this paper is to share how design thinking concepts are integrated using a team-based approach into selected courses for first year undergraduates at SUTD. Such active learning pedagogical techniques are expected to allow our students to apply concepts learnt in the classroom to real-life situations thereby enhancing their critical thinking skills.

Keywords: design thinking, design centric, team-based, active learning

Introduction

The perspective of teaching and learning in higher education is gradually changing across the globe to foster twenty-first century skills such as communication, collaboration, critical thinking and innovation to name a few. To adapt to these contemporary requirements, universities worldwide are implementing a wide variety of active learning approaches in their existing curriculum, with one of them being design-centric projects. At SUTD, "Technology" and "Design" go hand in hand. Undergraduate students here are required to engage in design projects, in almost all of their courses, starting from their first year termed as the "Freshmore Year" (Sockalingam 2018). In the first year, such projects could be within a course (1D), or interdisciplinary cutting across courses in the same term (2D). While teaching design is an essential component of engineering and architecture education, it is quite challenging at the Freshmore level owing to the limited technical knowledge of the students. Despite this critical challenge, students are nurtured in design thinking and prototyping skills from the first semester of the Freshmore year through 1D and 2D projects. This paper provides selective examples of 1D and 2D projects that are catered to the undergraduates in their first year.

Literature Review

Building on the Social Constructivist learning theory of expanding knowledge by connecting new ideas in collaborative learning environments (Gibbs 2013), SUTD pioneers Professor Pey Kin Leong and Professor Kristin Wood introduced the idea of design projects, often referred to as designettes at SUTD. Designettes are authentic problems replicating real-life situations where students apply design thinking tools to provide a feasible solution to the problem.

1D Projects: Designettes Within a Course

1D projects are designettes offered within a single course, which may range from Virtual Lab simulations in the classroom to building prototypes using concepts from a particular course. Projects may also be in the form of a laboratory activity where students run experiments followed by a detailed analysis of the data collected. While enough guidance is provided to students in the first term of the Freshmore year, such projects become more open-ended in the successive terms.

(A) Guided 1D Projects

Selected 1D projects for certain courses in the first year are described in Table 1.

Table 1. Selected 1D Designettes in the First Year

Courses and Year(s)	Topic	Description
<i>10.003 Chemistry: From Atoms to Crystal (2012–2014)</i>	Design and Fabrication of Microfluidic Device for Lab-on-a-Chip Chemistry	Developed a microfluidic device with a Y-shaped channel by combining three different polymers and perform chemical reactions
<i>10.006 Chemistry and Biology: The Natural World:(2015)</i>	Design and Fabrication of Microfluidic Device for Lab-on-a-Chip Chemistry	Developed a microfluidic device with a Y-shaped channel of different dimensions to perform chemical reactions as well as biological assays
<i>10.006 Chemistry and Biology: The Natural World: (2016–2019)</i>	Semi-quantitative and Quantitative Assays of Reducing Sugars and Proteins	Used colourimetric assay and optical spectrometry to quantify sugar and protein; analysed the data by plotting a calibration curve and using Least Squares regression procedure

(B) Open-ended 1D Projects

In order to enhance the design and critical thinking skills of our students, 1D projects become open-ended as they progress to the subsequent terms. Some such open-ended designettes are highlighted in Table 2.

Table 2. Selected Open-ended 1D Designettes in the First Year

Courses and Year(s)	Topic	Description
<i>10.011 Introduction to Physical Chemistry (2020)</i>	Electrochemistry Designette (Anariba 2020)	Designed, assembled, and optimised a voltaic device capable of powering on 4 LEDs in-series configuration
<i>10.008 Engineering in the Physical World (2016)</i>	Application of Seebeck Effect	Used Peltier Chips to convert heat to electricity to power up some device
<i>10.016 Science for a Sustainable World (2021)</i>	Life-cycle Analysis (LCA) of a Face Mask in the Light of COVID-19 Pandemic	Performed LCA of a face mask, explored structures and properties of the materials used and proposed new solutions applying design thinking tools

2D Projects: Designettes Involving Multiple Courses

The next level of projects is 2D which integrates concurrent courses of a term. For instance, one of the 2D projects involved designing a rocket powered by a biofuel. To execute this project, students were required to apply concepts

in Physics, Chemistry, Maths as well as Humanities and Social Sciences, all of which were offered in a single term (Anariba 2017). Students applied the knowledge of Chemistry and Biology to conduct a fermentation experiment to produce bioethanol which was subsequently used to launch the rocket (Figures 1(a) and (b)) (Chandrima 2017). In the Humanities section of 2D, students reflected on the ethical aspect of producing biofuel from a crop which could have been better used as food. For the mathematics component, students used differential calculus and optimisation techniques to model the rate of the fermentation process and model the motion of the ethanol-powered rocket. Finally, for the physics section, students performed physical analysis and design modifications to the rocket to fire it up to a certain target zone on a horizontal cable as shown in Figure 2. Selected 2D projects and the relevant courses connected with the same are presented in Table 3.



Figure 1(a). Fermentation experiment set up by students



Figure 1(b). Students estimating the ethanol content

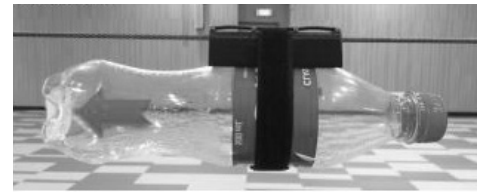


Figure 2. The ethanol-powered rocket guided along a horizontal cable

Table 3. Selected 2D Projects for First Year Undergraduates

2D Projects and Year(s)	Description	Courses Involved
<i>Biofuel-powered Rocket (2017–2019)</i>	Designed and modified a rocket powered by bioethanol that can travel via a horizontal cable and come to rest at a target zone	Math, Physics, Integrated Chemistry and Biology, Humanities and Social Sciences
<i>Temperature-controlled Device (2017)</i>	Designed a prototype with temperature sensors that can cool down an algae culture to 35°C and maintain the temperature of the culture bottle for a reasonable time	Engineering in the Physical World, Digital World, Systems World and Biology
<i>Air-dropping Medicine and Food Supplies to an Isolated Village Affected by COVID-19 (2020) (Anariba 2020)</i>	Designed a parachute and shock absorption mechanism to deliver a cargo safely and efficiently from a height of 8 m.	Modelling and Analysis (Maths), Physical World (Physics), Computational Thinking for Design, Humanities and Social Sciences

Methodology

The designettes at SUTD are team-based where students accomplish a given task by collaborating with their peers, a much needed skill of the 21st century. Throughout the process of execution, students receive immense support from a team of instructors, graduate and undergraduate teaching assistants. These projects form a critical part of the SUTD curriculum and run concurrently with the coursework. The ideation and execution of these designettes is led by a team of faculty members with diverse academic backgrounds. The 1D project is conducted by a group of instructors teaching one course. In contrast, the 2D team comprises 4–5 faculty members, each representing a course for a term. To further enhance the 2D learning experience, one faculty member is assigned as the overall lead to oversee the 2D by the middle projects across all the terms in the first year. Students are briefed on these projects

at the beginning or by middle of the term to give them sufficient time for execution. Briefings may be in the form of lectures or flipped video lessons. Students are additionally provided with a detailed hand-out outlining the goals, instructions and requirements for each course for the 2D project. For some of the open-ended projects, student groups are offered some basic materials to build their prototype and are provided with a modest budget by SUTD to purchase additional materials, if necessary. A significant weightage of the grading component for any course is assigned to the design projects, thereby mitigating the overemphasis on the traditional final written exams. For assessment purposes, students need to submit their design projects either in the form of reports, and/or posters. In certain courses, students need to demonstrate their working prototype physically in the classroom or create a video of the same. Students are assessed on their critical and imaginative thinking skills, ability to identify constraints in their design as well as their technical communication skills. In an effort to equip them better with systematic design thinking approaches, our first year students get enrolled in a course called “Introduction to Design and Innovation”, renamed recently as “Design Thinking and Innovation”.

Analysis and Conclusion

Design projects at SUTD have been implemented effectively and are expected to inculcate in our students the skills of the 21st century. Design education has equipped them to take up entrepreneurial roles to serve societal needs. Different stakeholders including students, industries and academic collaborators have provided various indicators supporting SUTD’s design-centric education (Sockalingam 2018).

Future Studies

Design education at SUTD is subjected to continual evaluation so as to evolve to meet the needs of the 21st century. Aligning with Singapore’s objective to combat climate change, the faculty is striving to incorporate sustainability aspects in various designettes. To fulfil the mission of establishing a cyber-physical campus in the near future, the university is exploring the scope of extending design teaching and learning in cyber-space. Such endeavors require a substantial use of data science and artificial intelligence (AI).

Acknowledgements

Design projects at SUTD entails involvement of multiple faculty with various academic backgrounds. I am particularly grateful to Dr Anariba Franklin who has been the overall lead for 2D design projects over the last two years. With the aid of the International Design Centre (IDC) at SUTD, Dr Franklin has framed the rubrics for evaluating various design projects. I would also like to thank my team-members with whom I have collaborated on different occasions to conceptualise and execute some of these design projects, including 1D and 2D. I would also like to express my gratitude to the Office of Undergraduate Studies at SUTD for funding these projects.

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Personality and Social Behaviour as Influencers of Happiness in Students of Higher Educational Institutions: An Exploratory Study

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ABSTRACT

This study is an attempt to evaluate the happiness level of students from Higher Educational Institutions and to identify if the components of students' personalities and their social behaviour predict their happiness. It aims to expand the domain towards students' well-being which ultimately leads to their academic achievement impacting the reputation of Institutions. It consisted of a sample of 251 graduate and post-graduate students. The collection of data was with the help of a structured questionnaire using the survey method. The quantitative analysis applied was structural equation modelling. The study concluded that extroversion and social behaviour positively affect happiness whereas at the same time introversion was also found to be positively affecting happiness. It provides scope for future research in the area of design of curriculum where factors affecting happiness are also taken care of, based on which 'a happiness model' can be created for the students of higher educational institutions. The implication of the study is for educational institutions, corporates and organisations as today's happy students will be tomorrow's happy employees, who will create a happy workplace leading to better productivity.

Keywords: happiness, personality, social factors, happy workplace, productivity

Introduction

Happiness is all that matters most in this materialistic world as everybody strives for happiness. Various definitions were given by many researchers like- "*what I experience here and now*" by Daniel Kahneman (Mandel, 2018). Happiness can also be defined as "overall appreciation of one's life as-a-whole" (Veenhoven, 2001). Search for happiness led researchers to find two impacting dimensions of personality on happiness that have received ample focus in the behavioural sciences field of teaching named extroversion and introversion. The intention of present research was to reassure if dimensions like extroversion and introversion of personality could encourage or precede happiness in students. Research tried to dig at the question: how could an institution design a system of curriculum that focuses on types of personality plus social factors and taps it for increasing happiness level among students leading to better performance which ultimately leads to improved reputation of institution?

Literature Review

Personality

Researchers observe that the pursuit of happiness is the supreme goal of human existence. It is now assumed that happiness comes from inside, then which personality characteristics/factors/ variables are responsible for creating happiness within. What are its predictable components? What factors determine how happy we are? The findings tell that a key reason is our extraverted nature (important in building social bonds) plus our 'good weather' and economic prosperity (Argyle, 2001). Also personality models frame happiness to be a stable trait that depends primarily on personality (Costa & McCrae, 1980). Many previous studies along with Oxford happiness inventory to Eysenck's model of personality, provide that its scales have relations with Extraversion and neuroticism positive and negative respectively (Francis, 1998) again demonstrating the same thing. Thus, the first hypothesis is H1:

Extraversion variable of personality positively influences happiness. The second hypothesis is H2: Introversion variable of personality negatively influences the happiness.

Social Behaviour

Behaviour in a social setup is always assumed as a reflection of one's personality. A study (Pollock *et al.*, 2016) in turn, influences their subjective well-being. However, the exact mechanisms underlying this relationship remain unknown. The present study hypothesised that the ways in which individuals endorse strategies for achieving happiness (i.e., orientations to happiness: through a life of pleasure, through a life of engagement, or through a life of meaning) assumed that the styles in which human beings strategise for achieving happiness (i.e., orientations to happiness: through a life of pleasure, engagement, meaning) mediates the relationship that personality traits have with subjective well-being (i.e., satisfaction with life, positive affect, and negative affect), which gives scope to debate on the implications of results showing all the three orientations to happiness (i.e., pleasure, engagement, and meaning) moderately mediating the relationship between extraversion and positive affect for understanding the connection between personality traits and subjective well-being. Thus, the third hypothesis H3: Social behaviour positively influences happiness.

Methodology

Participants for data collection were taken from Higher Educational Institutions of two cities of Uttarakhand, India based on simple random sampling from January 2021 to February 2021. A total of 251 fully filled questionnaires were accepted. All academic years were considered like first (63), second (73), third (50), fourth (50), fifth years (0) of undergraduate and first (8) and second (7) years of post-graduate. A total of 136 male students and 115 female students responded. A 5-point rating scale ranging from 1 (strongly disagree), 2 (disagree), 3 (neither agree nor disagree), 4 (agree), 5 (strongly agree) obtained value of Cronbach's alpha 0.879.

Data Analysis

The statistical tool used was SPSS for preliminary descriptive analysis, determining reliability (Cronbach's alpha), performing Pearson correlation among variables, exploratory factor analysis (EFA) and confirmatory factorial analysis (CFA). Lastly, AMOS was used for structural equation modelling (Hair *et al.*, 2010) to check the proposed relations. Table 1 shows mean, standard deviation and variances whereas Table 2 depicts correlations between independent and dependent variables of the study. Since correlation indicates that a quantitative variable consistently changes with respect to the homonymous values of the other, it is possible to identify that all three independent variables extroversion ($r = .357, p < 0.001$), introversion ($r = .194, p < 0.001$) and social behaviour ($r = .557, p < 0.001$) positively correlate with happiness which is a dependent variable. Whereas extroversion ($r = .320, p < 0.001$) is positively correlated to social behaviour while introversion ($r = -.155, p < 0.001$) is negatively correlated with social behaviour. Introversion ($r = -.285, p < 0.001$) is also found negatively correlated to extroversion.

Table 1. Mean, Standard Deviation, Variance of Variables

Variables	Mean	Std. Deviation	Variances
Happiness	212.243	18.693	349.430
Extroversion	8.027	1.448	2.099
Introversion	7.123	1.952	3.813
Social behaviour	12.051	1.887	3.561

Table 2. Correlations between Variables

	Happiness	Introvert	Extrovert	Social
Happiness	1	.194**	.357**	.557**
Introvert	.194**	1	-.285**	-.155*
Extrovert	.357**	-.285**	1	.320**
Social	.557**	-.155*	.320**	1

** $p < 0.01$

Factor Analysis

Factor analysis was carried out using the method of principle component analysis (PCA) with varimax rotation. All items showed good loadings so no item was excluded. Factor loadings for every item are shown in Table 3.

Table 3. Items and Factor Loadings

Factor Items	Factor Loadings	Mean	Std. Dev
V1: Introvert personality: I enjoy spending time alone	0.72	3.27	1.28
V2: Introvert personality: I like to work independently	0.684	3.85	1.02
V3: Extrovert personality: I enjoy spending time with others	0.640	3.93	0.93
V4: Extrovert personality: I like to put forward views and work in teams	0.648	4.10	0.77
V5: Social behaviour: I have close bond with my family	0.702	4.49	0.83
V6: Social behaviour: I frequently participate in social gatherings	0.518	3.60	1.08
V7: Social behaviour: I have good interpersonal relationships with people	0.593	3.96	0.79

The examination gave suitable levels of absolute fit, comparative fit and parsimony fit. The model thus formed is shown in Figure 2 with adjustment indices as RMSEA = 0.077, TLI = 0.854, IFI = 0.942, CFI = 0.939 and CMIN =2.492

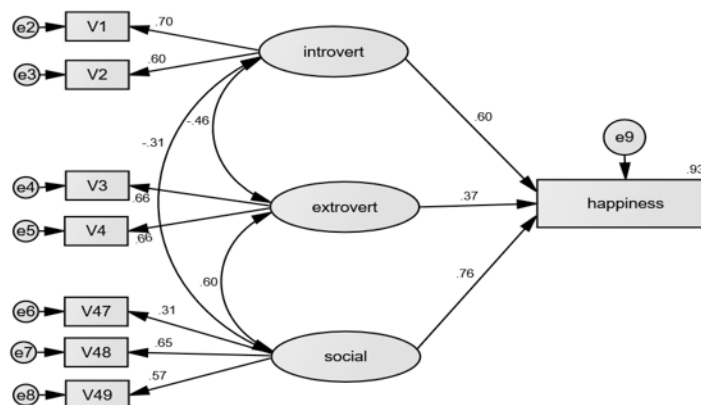


Figure 1. Structural model validating linking between variables

Hypotheses Testing

The structural equation model was estimated through maximum-likelihood (Jensen & Urban, 2007), Table 4 shows the hypothesis testing that resulted in significant p -value < 0.05 . Based on the tests it is feasible to consider that extroversion and social behaviour positively influence happiness whereas introversion, which was thought to be negatively influencing happiness, surprisingly found to be positively impacting happiness.

Table 4. Significant Values of Independent Variables on Dependent Variables

Variables	Estimate	SE	p-value
Happiness ← Introversion	0.600	2.735	0.000
Happiness ← Social behaviour	0.756	16.261	0.000
Happiness ← Extroversion	0.373	4.594	0.010

Discussion

Results show extroversion positively influences happiness. A previous researched model presented showed extraversion correlating with physical exercise and social affiliation promoting happiness (Warner et al., 2011) or across people with different scores on Big Five traits. This study provides additional evidence that naturally occurring behaviours are predictive of happiness in everyday life and confirms earlier findings about the degree to which behaviours mediate effects of Big Five traits on happiness. Why are some people happier than others? In the sustainable happiness model, (Lyubo-mirsky *et al.*, 2005). These motivates for searching strategies that can be used to increase happiness with students having extrovert personality type. Past researches, while inspecting the relationship between neuroticism, extraversion and subjective happiness, found that neuroticism acted as a general negativity factor whereas joyfulness and extraversion made an incremental contribution to variance in subjective happiness supporting the utility of a multifaceted approach to study pathways from personality to well-being (Lauriola & Iani, 2017). But the present study found introversion playing a positive role in influencing happiness. This study forces us to search for those hidden criterias that are probable reasons for this. Results also depict that social behaviour is positively related to happiness. Various studies took place like researcher (Lu, 1999) analysed collaborative model of happiness, incorporating personal factors (demographics, extraversion, neuroticism and locus of control) plus environmental factors (life events and social support) showed that when both the baseline SWB levels and personality traits were statistically controlled, social support predicted overall happiness. This analysis favours participation of students in extra-curricular activities demanding more inter-communications.

Conclusion

In this paper, personality and social behaviour aspects were examined and their effect on happiness were studied. The research found that along with extroversion and social being, introversion also positively correlates with happiness. The results compel us to think further on this as it may be the situation that introverts also remain happy from inside and just don't feel the need to show it.

Limitations and Future Studies

This research was restricted to a limited area. To generalise the results larger data collection is suggested covering wider area. Future researches have ample scope for examining remaining variables impacting happiness such as values, emotional intelligence, finance etc. as this study was limited to only personality variables and social factors.

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Demo-Based Learning: An Effective Teaching-Learning Pedagogy in STEM Education

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ABSTRACT

A figure is worth a thousand words when explaining a topic. Demonstration of a theoretical concept taught is worth a thousand figures. STEM (Science, Technology, Engineering & Mathematics) education involves understanding concepts/processes which have complex dynamics, speed, procedures, transformations etc. Such topics are difficult to visualise through just text or static figures. So there is a need to develop an appropriate teaching methodology for better learning of such concepts. This paper presents demo-based learning as an effective teaching-learning pedagogy in STEM education. Demo-based learning involves demonstrations of various theoretical processes/procedures/skills using animated video clips, simulation software and actual demo of prototypes/instruments. Demonstrations help students to understand things that are difficult to visualise. In this paper, the authors have experimented with the use of demo-based learning to teach courses in Instrumentation and Control Engineering curriculum. The activity was implemented in the classroom. The feedback of the students was taken to test the efficacy of the method used. The study shows that the student found the activity interesting and it promoted more student engagement. It is found that the students could do their assignments with confidence. This method of teaching has a lifetime learning impact which helps students to easily incorporate the theory concepts in real-time applications.

Keywords: STEM, teaching pedagogy, demo-based learning, skill enhancement

Introduction

In STEM education, the purpose is to educate students in the fields of science, technology, engineering and mathematics using an interdisciplinary and applied approach. STEM integrates these fields into an integrated learning paradigm based on real-world applications. The conventional teaching method is monotonous. Active participation of students in classroom activities is limited. The students are left with merely listening to lectures continuously (Senthilkumar et al, 2017). To implement STEM education effectively, there is a need to use modern teaching pedagogies. Through this, working in a team, interaction and interdisciplinary skills of the students get developed (Raju et al, 2000). This will also help in the readiness of graduate engineers for industry. Advancement in technology has greatly contributed towards development of innovative techniques and tools. Teachers all over the world have been using teaching pedagogies like flipped classroom, think pair share, peer instruction, project-based learning, problem-based learning, case study-based learning, demo-based learning, activity-based learning (role play, crossword, quiz, etc) so that there is an improvement in the teaching-learning process. The authors of this paper have implemented demo-based learning teaching pedagogy for effective teaching and learning. In the paper, the definition of demo-based learning, various modes for implementing this teaching pedagogy, experimentation has been done, the observations and the impact analysis have been presented. Over the last few years, there have been many instances where concerns regarding the quality of engineering education were raised (Kumar et al, 2018; Sujatha, 2017; Press Trust of India, 2016). The author of (Kumar et al, 2018) has experimented on, teaching learning pedagogies like collaborative learning, peer learning, technology enabled learning and participative learning. Information and Communication technology (ICT) based teaching technique which included video lecturing, discussion forums, different assessment patterns was used by the author of (Reddy et al, 2014). The paper also speaks about industry partnership courses. In (Kavitha et al, 2018), the author used collaborative learning for teaching programming courses. Through this exercise significant improvement was observed in the knowledge, learning level, and overall productivity of the students. With the use of peer learning teaching pedagogy, the author of (Boud et al, 2005) found improvement in the skill set of the students in the research domain. Through this activity, the students could learn

from their peers, colleagues, students in and outside the university. The author of (Desai et al, 2012) worked on activity-based learning technique in which activities such as role-plays, crossword, puzzles, case studies were used. In this active participation of students is there rather than just the role of listening. Current generation students are more techno-savvy so MOOC courses offered by Coursera, NPTEL are popular among them (Dori et al, 2005). In all the references, the authors have evaluated various teaching pedagogies using students' feedback.

Literature Review

Demo-Based Learning

Demonstrations are practical presentations of processes designed to explain various theoretical concepts. Demonstrations require lot of planning along with the support of appropriate explanation and examples to clarify concepts. Demo-based teaching can be done in three different ways, namely simulation, animation and giving actual system demo.

Simulation

Through simulations instructional scenarios, the students are placed in a virtual environment. Simulations can be implemented using an activity such as role-play and simulation software. Simulation software like proteus, automation studio, etc. can be used for explaining various topics.

Animation/Video

Using Animations/Video clips for explaining complex processes results in better understanding. They develop interest among the students. Teachers need to find appropriate animations on the Internet to adopt this approach. The topics related to certain courses in Instrumentation and Control Engineering which can be explained using video clips. For example, in Sensors and Transducer course, Vortex flowmeter topic can be explained using the video clip: https://www.youtube.com/watch?v=j_F4limaHYI

Actual System Demo

Pilot plants/ prototypes can be used for hardware implementation of the concepts studied. Students get hands-on experience on actual systems. The Instrumentation & Control Engineering curriculum includes courses based on concepts followed by application oriented courses. Application areas cover sectors like power plants, refineries, food industries (dairy, sugar, beverages, etc.), pharmaceutical plants, agricultural sector, manufacturing industries like cement, steel, paper & pulp, textile etc. For a better understanding of the processes, it is essential for the students to have hands-on experience and observe the actual work on these plants. However, it is not feasible to arrange industrial visits for the majority of these plants. To meet these requirements, pilot plants like distillation, heat exchanger and Steam and Water Analysis System (SWAS) can be used for demonstration. Students get a better insight about the processes and a feel of the industry environment. They can also perform various experiments on these pilot plants. These activities help in developing industry ready engineers. The topics relate to certain courses in Instrumentation & Control Engineering which can be explained using actual system demo. The topics like interfacing of PLC to pneumatic circuit, basics of ultrasound and various scanning modes, operation of Heat Exchanger can be explained for the courses Control System Components, Sensors and transducers, Unit Operation respectively. The use of demo-based learning might be attractive but to have such resources available might be difficult. Industry institute interaction can be useful in developing such lab resources as shown in Figure 1.



Figure 1. Pilot plants/prototypes for actual system demo

Implementation

The third year students of Instrumentation and Control engineering study Programmable Logic Controller (PLC) as one of the units in the course ‘Process Loop Components’. In this course students study Programmable Logic Controller (PLC) as one of the units. PLC is an automation tool widely used in all process industries. Under this topic, students are introduced to PLC programming. Visualisation of working of a PLC program using chalk and board becomes difficult. Also in the regular classes and practical sessions the students get limited exposure to PLC programming. In the pandemic situation, students were unable to attend lab sessions. Virtual lab provides an excellent platform for students to practice the PLC programs at home. Also, during the online lectures, students witnessed the actual working of PLC programs in Virtual lab. PLC programs related to Reversal of direction of rotation of motors, Star delta starter, Elevator, Automatic washing machine, Protection circuits for motor, Material handling system, Traffic control, Bottle filling plant, Alarm annunciator system were implemented by the students. Concepts like latching, sequencing, interlocking etc. related to PLC programming were demonstrated through actual execution of the programs rather than just theoretical explanation. Figure 2 shows the screenshot of implementation of DOL starter PLC program on VI lab. The feedback of the activity conducted was taken from the students.



Figure 2. Implementation of PLC programming in VI lab

Students’ feedback regarding this activity was conducted using the following questions:

1. Do you feel that demo-based learning results in better understanding concepts of PLC programming?
2. How confident are you in using the Virtual lab simulation tool for PLC programming?
3. Do you find this method appropriate and useful for this topic?

Result Analysis and Discussion

The feedback taken from students was analysed with the help of the graphs shown in Figure 3.

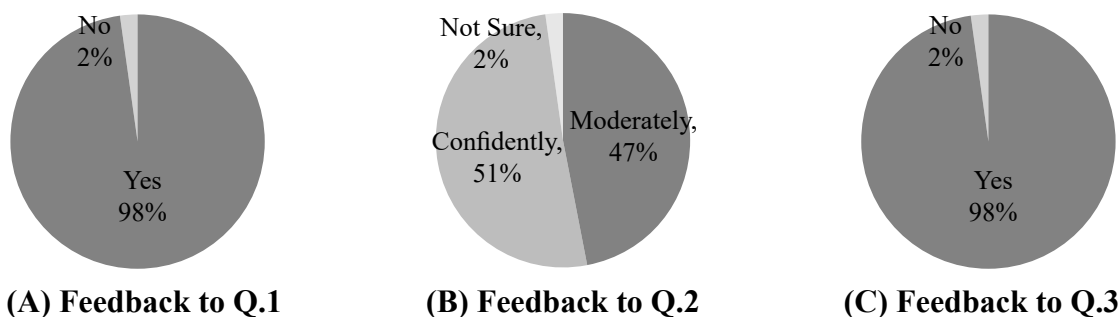


Figure 3. Responses of students for the activity conducted

The responses obtained from the students indicate that the students find demo-based learning method more effective for better understanding of the concepts of PLC programming. Most of the students are confident in using the simulation tool for PLC programming. 98 per cent of the students found this method useful in understanding the topic. Through the use of Simulation software, the students observed the step-wise execution of the program. They come to know about syntax and logical errors. They can have good practice beyond classroom sessions. This results in good grasping of the topic. This activity helps in learning the concepts in lesser time. This method is suitable for students in second, third and final year courses. In spite of the above advantages there are some limitations of this method of demo-based learning. Some simulation softwares can require licensing, constant updates, maintenance which can cost a lot. In some cases, the problems can be solved by using common sense or using analytical means or through direct experimentation. So the technique can be unsuitable in such cases. Optimal solutions cannot be obtained by simulations. In simulation the students may not encounter the real consequences that might result for human errors. To develop a good simulation model, more efforts are required.

Conclusion

The paper explains various ways in which demo-based learning can be implemented. In animation way of demo-based learning method, the teacher has to spend time in searching for suitable video clips for the topics to be taught. Actual system demo involves the use of pilot plants or prototypes. This makes the method more expensive. But with the help of industry collaboration lab resources can be enhanced. The Simulation way of demo-based learning was experimented in this paper. Virtual lab simulation software was used for teaching the topic of PLC programming. Feedback of the students shows that the use of such softwares make online lectures more interesting and engaging. In the pandemic situation the students were limited access to labs, simulation softwares proved to be very useful for practical sessions. It helps in better understanding and grasping of the content in lesser time. The students can use these for practice outside classroom sessions. The PLC programming skills of the students improved a lot. Just as the simulation method of demo-based learning was experimented on, other two methods can be also be experimented. Also, a detailed impact analysis of the feedback obtained can be made using advanced statistical tools. Use of demo-based learning methods results in better learning and can contribute tremendously towards making the students more employable.

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Transforming the Traditional Indian English Teaching Classroom into Skill-Based Teaching

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ABSTRACT

Teaching the English language as a subject and teaching the English language as a skill are two different concepts. English Language Teaching in Indian schools is mostly focused on teaching English as a subject, which is not enough to develop communication skills in English. Unfortunately, despite learning the English language for many years, students do not have enough skills and confidence to use the English language skills in real-life. Language teachers need to shift their approach to a Communicative Language Approach (CLT) to bridge this gap where students are involved in many real-life situations where they need to communicate in English. This is the same way children acquire proficiency in their mother tongue. There is a need for a paradigm shift from traditional teaching to skill-based or competency-based teaching. This paper highlights the importance of redefining the objectives and suggests the way of doing it to make the teaching-learning process focused on the English language as a skill. It makes teachers as well as students more clear about what the students actually do with the language rather than what they can recall.

Keywords: CLT, learning objectives, English language as a skill, approach, skill-based teaching

Introduction

With the advent of globalisation, liberalisation, and the World Wide Web, the demand for and importance of communication skills in English has increased significantly. In this scenario English serves as a connected or link language, and a global language as it is spoken widely all over the world. In India, English language is used as an interstate and intrastate language. English language fluency has a significant employability and educative value globally and this is the only reason why parents prefer to send their children to English medium schools. Learning English language helps a person to progress personally and professionally.

To fulfill this objective, many Indian schools have English as the medium of instruction. The Position Paper of the National Focus Group on Teaching of English, NCERT (2005) asserts the importance of learning English in schools as it is a means of providing full participation in national and international life. Srinivas V. (2015) states that when a child leaves school, his competence and excellence in English communication skill is required in his day-day life than knowledge in other subjects, so the need of the hour is to teach English that will be useful in their daily life. Shananathayniath & Anjum (2015) also emphasise the importance of English communication skills as students need to interact and negotiate with individuals, groups, clients from other parts of the world. Students need to have academic skills like making and presenting reports and presentations, and proposals. In the 1970s, there were two factors which were accountable to develop another new approach of teaching English language in Europe - the demand of more skilled people who can communicate proficiently in English and the development of new learning theories and advancement in computer and internet technology. That approach was called the Communicative approach which aimed to achieve the real goal of language teaching – to be able to communicate in the target language. British Linguist, D A Wilkins in 1972, through his book titled “Notional Syllabus” explained “the system of meanings that lay behind the communicative use of language” (Richards, pg 85), which is based on two types of meaning: notional categories and categories of communicative function. Similarly in the United States, an American Sociolinguist, Dell Hymes came up with a new term called “Communicative Competence”. Kumar, Philip & Kalaiselvi (2013) define communicative competence in CLT is a linguistic term which refers to a learner’s ability to form correct utterances in the second language and know how to use these utterances appropriately.

The main problems that students are facing is that although they have been studying English as a subject continuously for 12 years in their schools, yet they are not able to communicate confidently in real-life. Students learn English as a subject to achieve their target to get good scores only rather than mastering the language as a language. The results show that we, as teachers, need to change our approach so that the specific objectives for English as a language are achieved. NCERT stresses and guides teachers to adopt an experiential learning approach, which means learning by doing. This approach is being applied by teachers only in Science, social sciences, mathematics. The demand for graduates with good communication skills can be fulfilled, if teachers apply the experiential learning approach while teaching English.

Review of Literature

Krashen (1982) differentiates between learning a language and acquiring a language, and concludes that “Language acquisition occurs when it is used for what it was designed for – communication”. Richards and Rodgers (1986) described CLT as an approach that aimed to make communicative competence the goal of language teaching and develop procedures for the teaching of the four language skills that acknowledge the interdependence of language and communication. Widdowson (1988) emphasises that especially in developing countries, students are not able to use the English language in their day-to-day communication in spite of having many years of formal English teaching. Prabhu, N.S. (1990) finds out that the systematic learning of rules and structures of language is not required for acquiring a second language. He developed a series of problem-solving tasks which engaged learners in negotiated discourse focusing on the message rather than the language codes. Al-Zoubi (2018) recommended that to improve the fluency and proficiency in English language, students should get exposure to English language on a daily basis through reading English magazines, newspapers, watching English movies and programmes. It will enhance their English language acquisition. Santos L. (2020) examines that English language serves as one of the best foreign languages for the university students. CLT approach encourages students to speak confidently in English language to their peers and teachers which is not possible in traditional teaching methods like Grammar Translation, Direct Method.

Objective of the Study

To study the process for the transformation of traditional Indian English teaching classroom into skill-based teaching

Methodology

This study is based on descriptive research in which the researcher presents an observed idea or information. It comes under observational research.

Analysis

Common European Framework of Reference (CEFR)

CEFR is a language project started by Council of Europe around 1996 and published its document officially in 2001. It was one of the most influential publications of the last decade in the field of language learning and teaching. Its main part is the introduction of new descriptor tools that give you detailed information about the language proficiency of a learner in terms of ‘can do’ descriptors: what a learner should be able to do when using the language independently. These ‘can do’ descriptors are based on the Communicative Language approach. Further, this document has been updated according to current needs of the learners and first published online in 2018 in English as the “CEFR Companion Volume with New Descriptors” and published as a book in 2020. The idea of CEFR is described in this book as (pg. 28) “to design curricula and courses based on real-world communicative needs, organised around real-life tasks and accompanied by ‘can do’ descriptors that communicate aims to learners.” CEFR describes that language learning should be aimed to enable learners to act in real-life, expressing them and completing tasks of different natures. There are 7 criterion levels based on ability. These levels are (Pre A1, A1, A2, B1, B2, C1, C2), starting from beginning to mastery, which are widely accepted as the global standard for grading an individual’s language proficiency.

Four Modes of Language

CEFR replaces the traditional model of the four skills (listening, speaking, reading and writing) and divides communication activities in real life into four modes to bring about closer to real-life language use:

- **Reception:** You receive messages, information, and knowledge through three ways: oral, written, and audio-visual and process these inputs.
- **Production:** You produce your thoughts, messages, information, and knowledge in the form of speaking, sign language, and writing.
- **Interaction:** Two or more people are involved in a discourse and are participating in it with a language through speaking, writing, and online activities. Due to lockdowns in the current COVID-19 situation, most of the interactions are online, in turn, increasing its value.
- **Mediation:** As our classrooms are now becoming more multicultural and multilingual, mediating activities play an important role. In this, the learner acts as a social agent who creates bridges and helps to convey the correct meaning through the same language or other language – when you interact with people speaking different languages.

These four modes are the way people actually use the language in their real life. CEFR provides ‘can do’ descriptors as learning objectives for all the activities that come under these four modes of language.

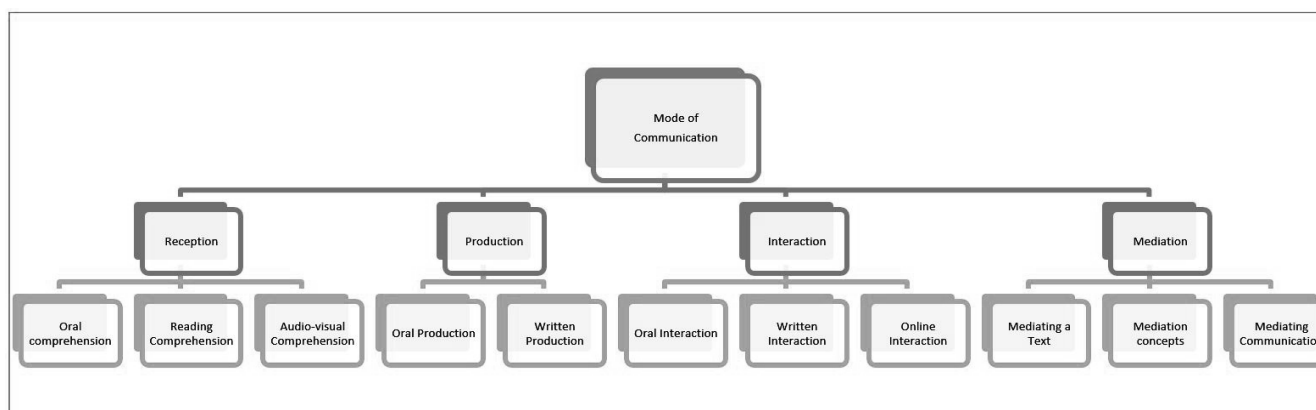


Figure 1. Different modes (skills) in a language

Discussion

Implementing ‘can do’ Descriptors in the Classroom

Even Teachers, in their teaching plan, should make the learning objectives in terms of language use as described in CFER. A teacher can use these descriptors for planning the learning teaching activities in which students learn through experiential learning – learning by doing. They can use these ‘can do’ descriptors to redefine what exactly a learner can do by using the learned language. These descriptors are also taken as the main targets around which all the teaching activities, teaching materials, content and assessment will move around. These descriptors can help the teachers look plan activities with their students. They help language teachers to decide what to teach at each level. Teachers can frame the curriculum, syllabus, lesson plans on the basis of these ‘can do’ descriptors given in CEFR. With ‘can do’ descriptors, learners can demonstrate their skills in language as the learning outcomes are totally performance based.

Conclusion

Good English communication skills are the fundamental need today, as the english language connects all the people in the world. For this, our teachers need to redefine the teaching objectives to match the demands of the present time. Learning a language is a skill and this skill can only be assessed in terms of learner’s performance or what the

learner can do with the attained skills. The National Education Policy 2020 attempts to move from rote learning to competency-based learning. Teaching and learning English language not as a subject but as a skill is an essential paradigm shift that needs to be implemented in the Indian English classroom.

Limitation and Future Studies

The scope of current study is limited only to presenting the idea of how to transform traditional Indian English teaching in the classroom into skill-based teaching. This study does not involve any practical experiment to show the efficacy of this idea. The researcher has described the ‘can do’ descriptors given by CEFR which can be used by language teachers to frame their syllabus and lesson plans, and classroom activities according to the varying proficiency levels of English language of students they have in their classrooms, consequently implemented into the classes and the effectiveness of that syllabus can be studied in the future.

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Global Virtual Exchange as a Sustainable Higher Education Practice: Developing Innovative Teaching and Learning Strategies Using Online Collaboration among Four International Universities

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ABSTRACT

In the international higher education context, there have been several challenges as well as opportunities arising due to the ongoing COVID-19 pandemic. The Covid crisis has adversely impacted almost all the spheres of academic life. The international academia also suffered due to the entire teaching-learning system coming under pressure. Consequently, some path-breaking international collaborations have been started for developing sustainable teaching and learning practices using online resources. This paper presents one such innovative collaboration by the ILDP programme of the Hiroshima University, Japan and the Global Virtual Exchange initiative by the University of Texas at Austin, USA along with the BITS Pilani, Pilani Campus and the Tribhuvan University of Nepal. The insights discussed in this paper are directly drawn from my experiences as a lead professor in the ongoing international collaboration for promoting high-quality research and academic work across the four universities mentioned above. A total of 28 students (post-graduate level), 5 TAs and a group of 6 professors, along with several external resource persons have collaborated in delivering and co-creating content on selected themes around Agriculture and Climate Change adaptations by small farm families across all the 4 countries. In this original research paper, I will be highlighting the teaching and learning practices that were used by the international team for enhancing the efficacy and effectiveness of such global level virtual collaborations as well as for promoting their sustainable practice in the foreseeable future.

Keywords: global virtual exchange, international online collaboration, higher education, competencies

Introduction

BITS Pilani is an apex Indian institution of higher education in technology and science. It has engaged in international collaborations in the teaching, research and learning domains for several decades now. At BITS, specific focus is placed upon interdisciplinary and multi-disciplinary projects with the help of sister disciplines from Social Science and Humanities, Management, and Economics & Finance domains. BITS Pilani boasts state-of-the-art technological facilities that enable real-time collaboration across campuses and continents, thus strongly integrating various collaborations of academia and industry to achieve significant international as well as national level social impact. Due to the ongoing COVID-19 pandemic, these international collaborations have been shifted to pure online modes using various platforms such as google classroom, Zoom and Microsoft Teams, among others. It is a well-acknowledged fact that international online collaborations (IOC) initiated by the virtual teams (VT) provide safe and flexible learning environment to the students of higher education across the world (Kolm et.al., 2021). However, this shift came with its own challenges and opportunities for the student communities who were more or less isolated in their own national and cultural environments with occasional exposure to an outside world. For instance, evidence points to the trend where the participants often lacked the competencies for fully participating in such IOCs, and that they found it challenging at times to engage in accessing various learning and training materials using the VTs (Jimenez et.al., 2017; Peñarroja et.al., 2013 & 2019). With the passage of time, the need for providing a specific set of skills and competencies to the higher education students is only becoming stronger in the international stage (Kolm, et.al., 2021). In this paper we shall explore these aspects in the context of an ongoing international collaboration initiated by the ILDP programme of the Hiroshima University, Japan and the Global Virtual Exchange initiative by the University of Texas at Austin, USA along with BITS Pilani, Pilani Campus and Tribhuvan University of Nepal. This collaboration initially started as a hybrid initiative with a combination of offline and online sessions, and was later converted into a virtual IOC. The team has since then engaged in multiple

teaching, learning and training activities for the purpose of engaging in this IOC on ‘Agriculture and Climate Change adaptations by small farm families’ across all the four countries, namely- Japan, USA, India and Nepal.

Literature Review

Available literature on innovative research, teaching and learning techniques in the Covid and post- Covid times reflects the increasing trend of global virtual collaboration in a prominent way (Reimers, et.al., 2020). For instance, Kolm et.al., (2021) developed a total of six domains of International Online Collaboration Competencies (IOCCs) that are sought after in the higher education student populations. These IOCCs, as coined by Kolm et.al., include-

1. ICT competencies
2. Intercultural and cultural competencies
3. Communication and language competencies
4. Self-management and organisation competencies
5. Collaboration competencies
6. Domain-specific competencies

In this paper, we will be taking these six competencies as the baseline for assessing the efficacy and efficiency of student’s ‘participation in the ILDP collaboration. Efficacy and efficiency are understood here as dependent on the success of the IOC in reaching the predetermined goals. There are other significant factors that decisively influence the continuity and sustainability of IOCs that operate through global virtual exchanges. For instance, the success and failure of the leading professors engaged in these GVE ventures are also dependent on some of the determinants such as their abilities to engage in cross-cultural communication, the mutual trust and respect they enjoy with their peers. ICT competencies and good leadership skills are also known to make a big difference in determining the quality of their virtual interactions with other stakeholders. Another crucial aspect is ensuring equity, and accountability for all the parties involved in the IOC. Also, the learning experiences of the students directly depend on the competencies of the team leaders as mentioned above. Zander et.al., (2013) highlight that three specific leadership challenges, namely- “goal alignment, knowledge sharing and motivation” are critical for the success of these global virtual partnerships.

Methodology

Due to the ongoing COVID-19 pandemic, the originally planned hybrid mode (offline + online) had to be shifted to the virtual mode. In designing the stages of the collaboration, it was kept in mind that the majority of the students/ participants may be exposed to such an opportunity for the first time in their lives. A practice based orientation supplemented by an open and direct communication between the students and their lead professors as well as across students from different countries kept the IOC going. Students were also asked to interact with the respondents over telephone, mainly to administer a semi-structured questionnaire survey. This survey questionnaire consisted of four major domain-specific themes containing 40 main questions that were further divided into sub-questions. Students participating in this IOC were divided into cross-country groups of four to five members and were given the opportunity to develop the questions under the close supervision of the lead professors. Multiple online meetings, and training sessions including on-demand lectures by subject experts were conducted in real time (7 am. IST onwards) on all designated days in the month of March 2021 to accomplish the first phase of the IOC. Students were in regular communication between the first and second phases to implement questionnaire survey (field study in respective country), complete the data entry into google forms, and engage in data analysis. The second phase is aimed at completing the report writing and virtual exchange of experiences during the month of September 2021. In a nutshell, the following steps have been designed and are/will be executed by the Virtual Teams:

- Online classes for students from four countries were conducted in March, 2021
- Preparation of the survey questionnaire using virtual teams
- Data entry, analysis and report preparation through virtual meetings
- Virtual workshop to finalise the data analysis, and complete the writing of a final report for publication at Hiroshima University, Hiroshima, Japan, to be held in September, 2021

Analysis and Discussion

Some analytical observations with regard to the challenges and opportunities facing students as well as the professors involved in this IOC are analysed and discussed in this section. With regard to student participation and their IOCCs, (Kol et.al., 2021), the following competencies were found among the higher education students participating in our IOC. As highlighted by Zander et.al., (2013), the three drivers of successful leadership, “goal alignment, knowledge sharing and motivation”, remained crucial for us in enabling the following competencies among the students from the four countries.

1. ICT competencies: Students’ abilities to engage in virtual training, active class room participation through open discussions and analysis of problems at hand using the problem-based learning technique (PBL) proved to be great assets in successfully engaging in the virtual seminars and workshops. Knowledge transfer and knowledge sharing happened smoothly due to the presence of ICT competencies among the leadership team of professors as well as the young and enthusiastic student team.
2. Intercultural and cultural competencies: Students engaged in intercultural collaboration through collaborative learning and questionnaire preparation in designated multi-country groups. Despite some initial hurdles, the leadership of the team successfully established an atmosphere of mutual respect and appreciation for the cultural heterogeneity among the participants of the IOC through enhanced opportunities for Q&A sessions and parallel informal group interactions using the MS Teams platform.
3. Communication and language competencies: Except a few students from Japan and Nepal, all the other students engaged in comfortable communication using English as the medium of verbal and written communication. This also played a vital role in determining the pace and quality of the process designated for the preparation of survey questionnaire. The entire team came together through virtual meeting sessions to discuss, test, validate and finalise the final version of the survey questionnaire.
4. Self-management and organisation competencies: Students were encouraged to engage in team work across nationalities for self-management and organisation of various team based activities. Students worked horizontally across nationalities in teams as well as vertically within their own country group. Students were found engaging in collaborative inquiry and innovative content development even in the absence of direct supervision from the mentors/lead professors.
5. Collaboration competencies: The ability of the students to engage in such international online collaboration really depended on having a trustworthy environment. The entire team of professors actively engaged in providing a safe and open environment to the students to share their opinions and perspectives without fear or favour. We also engaged in communication using Whatsapp groups to constantly motivate the students and appreciate their efforts towards continuation of the IOC despite the ongoing pandemic crisis.
6. Domain-specific competencies: The most important ability of the students to engage in subject-specific/ discipline-specific learning and research-based activities must be assessed carefully before involving them in any kind of IOC. In our own institutions, as well as at the ILDP office of the Hiroshima University of Japan, we as the lead professors engaged in thorough assessment of the students before they were nominated for participating in the IOC. It was indeed an extremely important step for bringing the IOC to fruition.

Despite all these systemic prerequisites in selection of participants for the IOC, there were challenges. As a result, a lot of the steps on our journey to a successful IOC depended on how we took/converted these challenges into opportunities. For instance, it was observed that initially a few participants from USA and Japan could not relate to the challenges of Indian and Nepalese farming communities due to the differences in land holdings, family size as well as differing technological capabilities. In order to bring all the students from different countries to the same page, in the initial stages of the first phase of the workshop, the core team of professors along with a few domain-specific experts from each partner country delivered on-demand lectures in virtual mode. We also created virtual group meetings for students in mixed groups so as to allow them to learn from each other’s perceptions and their domain-specific knowledge.

Conclusion

Despite the prevalence of the Covid crisis, the academic world has successfully managed to create opportunities for itself to engage in quality research and training at the international level, through enhancing safe virtual means of knowledge sharing and co-creation. Nevertheless, the challenges remain and the same challenges also provide us with opportunities for developing innovative and path-breaking pedagogical technologies. A significant determinant that enables success in these IOCs is mutual trust and flexibility to adapt as and when the multi-national team faces unexpected hurdles. It is highly recommended that the lead professors from all institutions keep a close eye on the modalities and the conditions throughout the collaboration to ensure sustainable interactions in the IOC. More importantly, an ecology of mutual respect and accountability should be created by all the partners involved in the virtual collaboration. A crucial driver for successful and sustainable global virtual exchanges such as the ILDP programme is the technical and moral support, and encouragement that the leadership of respective institutes provide to its lead professor and the students. The presence of strong support systems and an ecology of successful IOCs at BITS Pilani, helped our current collaboration to yield quality outcomes. Indeed, global virtual exchanges in the form of IOCs seem to be way forward for a sustainable higher education praxis in the post-pandemic world.

Limitations and Future Studies

Asynchronous semester system of the partner universities, differing time zones and curricula across participating universities made it challenging for all parties involved. For future collaborations a few asynchronous schedules will be planned that will be independently taken up by each university in their own timeframe.

Acknowledgement

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Active Learning in Higher Education by SOLO Taxonomy

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ABSTRACT

The objective of the study is to use the Structure of Observed Learning Outcomes (SOLO) taxonomy, a significant tool used in differentiating curriculum and providing cognitive challenges to the learners, to motivate students for active classroom learning in engineering subjects. Normal and SOLO taxonomy structure modes are alternately and exclusively used for preparing question papers of four class tests in an undergraduate materials science and engineering course. The performance of one hundred students on those tests is compared. Additionally, a separate feedback survey is conducted to understand students' satisfaction and learning. Performance-wise, students are observed to learn better using SOLO taxonomy. The feedback indicates that this taxonomy promotes, engages, and enhances the cognizance quality of the students and orients them to accept learning challenges.

Keywords: active learning, cooperative learning, SOLO taxonomy, Generation Z, post-millennials

Introduction

Students at all levels of education have different approaches to learning which largely influence their learning experience. In today's world, effective class room teaching has become a major challenge for educators (Seemiller & Grace, 2017). However, in the higher education sector, traditional lecture mode teaching is still the most popular pedagogic style (Shatto & Erwin, 2016). Teaching strategies need to be developed in such a manner that they create interest among students in the class room; and at the same time can promote, engage and enhance their learning.

The Structure of Observed Learning Outcomes (SOLO) taxonomy is one of the most powerful meta-cognitive tools to motivate learners for active class room learning (Biggs & Collis, 1982; Biggs, 2011). It assesses the ability of learners to synthesise a deeper level of understanding in their subjects of choice. Extant literature is very scant on how the post-millennial generation perceives the SOLO taxonomy as a learning approach. In this paper, the focus is on the application of this taxonomy in an engineering (Materials Science and Engineering) course attended by Generation Z students.

Literature Review

Based on the Cognitive Development Theory, Biggs and Collis (1982) derived five levels of SOLO Taxonomy. The five levels are well-organised in terms of various characteristics- from the conceptual to the abstract level. It is a true hierarchic taxonomy, which is nothing but aggregate of quantity and quality of thought, where the quantitative stages of learning occur first and then there is a shift towards qualitative learning (Biggs 1987, Biggs 2011).

The structure within each stage becomes increasingly complex as the cycle within that stage develops. Each stage holds the previous level but adds something more. The five stages are: 1. Pre-structural 2. Uni-structural 3. Multi-structural 4. Relational and 5. Extended Abstract. The Uni-structural and Multi-structural level questions test students' surface level of thinking and Relational and Extended Abstract level questions test higher order or deep level of thinking. When the students are able to immerse themselves completely within the context behind the learning, they can slowly escalate from a shallow 'surface' level to a more ingrained 'deeper' level of comprehension.

An important model that explains the difference between surface and deep learning has been developed by Biggs (2011) through the comparative analysis of two hypothetical learners – Robert and Susan. Susan is an academically

committed deep learner and Robert's aim is to obtain a qualification for a decent job. Teachers face challenges to teach such different learners. Figure 1 shows a big difference between Robert and Susan (Point A) where Susan is operating deep level of approaches and Robert is operating surface level of approaches. The objective is to reduce the gap between deep and surface learners and move to point B. To reduce the gap between deep and surface learning, the teaching pedagogy must focus on active and co-operative learning.

The objective of the study is to use active and collaborative learning in such a way that the surface learner is encouraged to use the higher cognitive level activities like deep learner and the active teaching can have narrowed the gap between their ways of going about learning which can reflect in their performances.

Methodology

This research utilises a pre-test, post-test repeated measures type experimental design to test the proposed hypotheses. The study followed a sampling without replacement strategy (Hair et al., 2006). Paired sample T-test is conducted to test the various hypotheses.

Participants

To determine the Quality of learning (QOL) of the learners, this experiment was envisaged and arranged for one hundred Chemical Engineering undergraduate second year students in Materials Science and Engineering. The course provides the students with a systematic review of the basic structures of inorganic solids (metallic, ceramics, and polymers) and techniques to determine basic microstructures and phases. Emphasis is given on structures-properties, correlations, and applications in chemical industries. Advance materials and their applications are also covered. Therefore, SOLO taxonomy was expected to have a different impact on the student's learning behaviour, since there was ample scope to change the students' approaches of learning.

Research Design

The evaluation components were introduced as class participation problem (CPP) and mentioned in handouts and discussed in the first class. As an institutional norm, total seven CPPs are conducted in a complete semester within 16 weeks of period. But the experiment took to Mid-semester, up to which four CPP components are covered. CPP1 and CPP 3 tests were organised in the normal mode, while CPP2 and CPP4 were organised using SOLO taxonomy (Figure 2).

The normal mode CPP1 was preannounced and it covered two chapters covered over two weeks (T1) of lectures and the CPP3 covered six chapters completed across six weeks (T3) of lectures. The CPP2 conducted using SOLO mode covered four chapters covered in a duration of four weeks (T2) and CPP4 comprised all the chapters covered across eight weeks leading up to the mid-semester (T4).

The assignment was designed in such a way that the students must prepare one question (with answer) based on SOLO taxonomy, which must have four parts; Uni-structural, Multi-structural, Relational, and Extended Abstract, marked as U, M, R, and E (the authors did not introduce Pre-structural level in this study). The domain of the question preparation was defined within four chapters of the class text book, which were already discussed in class and CPP2 was done using SOLO taxonomy. Students were provided 10 days' time period for both CPP-2 and CPP-4. The general instruction was that the marking will be based on standard/complexity of question/answer which followed SOLO taxonomy. The submitted questions must be original, and students were strictly warned against adopting plagiarised content. In CPP-2 and CPP-4, 6 marks were on question preparation and 4 marks on class test (pre-announced). In CPP-2, the best question paper prepared by the students was chosen (with proper modification) for the class test. In CPP-4 class test, the question papers were swapped among the groups.

Based on the literature reviews and the underlying theoretical underpinning of SOLO, the following hypotheses have been formulated for further empirical validation:

H1: The performance of students will increase if they are taught through SOLO taxonomy (T₂) compare to traditional teaching (T₁)

H2: Student performance will not show any major deviance if they use traditional methods (T₃) of learning after being exposed to SOLO taxonomy (T₂)

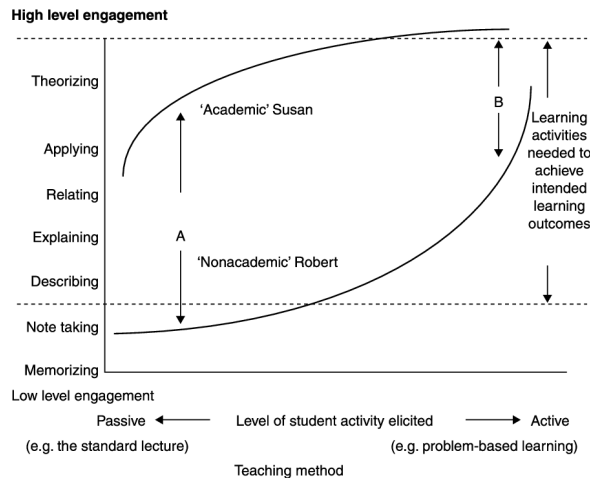


Figure 1. Student orientation, teaching method and level of engagement (source: Biggs, J.B., 2011. Teaching for quality learning at university: What the student does. McGraw-hill education (UK))

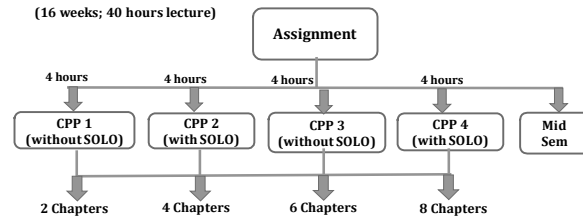


Figure 2. Experimental Design (Source: developed by authors)

H3: The performance of students should improve when they are again exposed to SOLO taxonomy (T_4) than the traditional technique (T_3)

Result and Analysis

We conducted paired-sample t-tests to compare the performance of students across different time periods. It is observed that the performance of students at time T_1 is significantly lesser than at time T_2 ($MD = -1.37, p < .001$). This gives support for our Hypothesis 1, that the students are able to learn better using SOLO taxonomy. It is observed that the performance of students at time T_3 only marginally increases from the performance during time T_2 ($MD = -0.635, p < .05$). It is also observed that the performance of students in T_4 is not statistically different from T_3 as expected ($MD = -.05, p > .05$) and it is also observed that the overall variance of the group significantly reduces.

From figure 3, it is evident that on an average the students were able to outperform themselves in CPP 2 compared to CPP 1. Also, it is observed that by the time the experiment is repeated in CPP 3 and CPP 4, the mindset of the students has acclimated to the learning philosophy of SOLO taxonomy, and hence there is no radical change in the two performances.

From figure 4, it may be deduced that majority of the students were able to perform better after their orientation towards SOLO taxonomy when their performance during mid-semester is compared to that during their evaluation based on SOLO taxonomy.

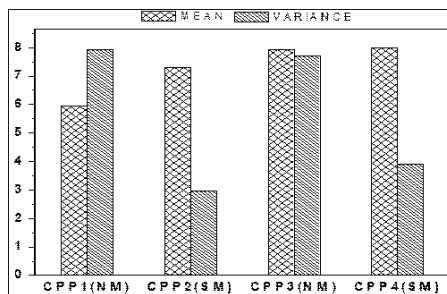


Figure 3. Comparison of the various test performances (Source: computed by authors)

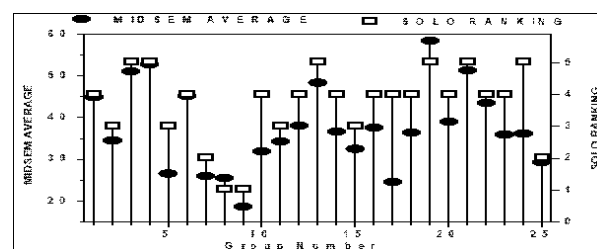


Figure 4. Comparison of student's performance during the SOLO taxonomy test vs. the Mid-semester exam (Source: computed by authors)

A separate feedback survey is conducted with 50 randomly selected students from the original sample of 100 students. For each question they were asked to put their opinion in the form of a 3-point Likert scale ranging from 1 (disagree) to 2 (neutral) and 3 (agree). Eight responses were observed to be acutely incomplete, and these were discarded from the final analysis.

Therefore, the feedback survey reports the findings from 42 responses. The feedback indicates that this new concept of learning and the scope of expressing their understanding challenge them to think more deeply about idea generation. From Table 1, it may be further inferred that SOLO taxonomy-oriented learning also helps to foster the creativity quotient in the students and helps them to think out of the box. Most of the students also acknowledged that SOLO based learning helped them inter-connect logic and basic principles across multiple chapters, which in turn helped them in developing a more well-rounded perspective about the subject. However, a significant number of students were not sure or were not appealed by the idea of introducing the learning taxonomy in other courses, citing that different courses have different flavours and this taxonomy should be incorporated in courses which required such blend of active learning with conventional classroom teaching.

Table 1. Student Feedback Survey Results

S. No.	Questions	Disagreement (%)	Neutral (%)	Agreement (%)
1	This method helps to understand the concept from simple to complex level.	19.1	25.5	55.4
2	This method helps us to link among the concepts of different chapters.	23.4	23.4	53.2
3	This method of developing the question module helps us to improve active learning.	23.4	25.5	51.1
4	This method of making question module as a group helps us to improve collaborative learning.	29.7	23.4	46.9
5	This method helps us to improve our analytical thinking.	21.3	21.3	57.4
6	This method helps us to improve our creative thinking.	19.2	17	63.8
7	This method helps us to motivate our self-learning.	27.6	21.3	51.1
8	This new method creates interest toward the course which increases our overall enjoyment.	23.4	34	42.6
9	This method is a useful and effective tool for teaching.	25.5	25.5	49
10	This method should be replicated in other courses.	31.9	29.8	38.8

Discussion

The tasks and goals were clearly defined that the group must make questions using SOLO taxonomy. The results show that the efforts of each team member benefit both the individual and the group and the commitment that gets developed among group members due to such an orientation helps them in generating both personal and group level success. From the teachers' perspective, SOLO based pedagogy is a powerful approach to engage generation Z students in the classroom because it helps students to be self-sufficient and develop a sense of ownership towards the course. The overall feedback regarding the impact of SOLO taxonomy from the students is that it is a great model to use in the classroom because it makes students realise that it helps in extending ideas into concrete application outcomes. By making the learning outcome clear, it improves students' understanding of the core reason for learning. It enables teachers to reflect at what they teach and map their teaching impact on the students' final learning outcomes. They successfully handled the accelerating nature of complexity in approach. While the

simplicity of uni-structural part of the question is evident, the students' level of conceptualisation at mid-level Multi-structural, higher level Relational, and more advanced level Extended Abstract is also appreciable.

The authors have further developed a template for curriculum design which can be used as a framework for incorporating changes specific to the preferences of generation Z students (Table 2). The findings from the experimental analysis and the qualitative feedback survey further validated the assumptions that today's post-millennial students appreciate being given the responsibility to self-learn fundamental concepts which is commensurate with the generic need for self-fulfillment and self-sufficiency.

Table 2 depicts this balance that needs to be created in the new-age curriculum design customised for post-millennial student preferences. The table also extends the implication of the changes recommended to the possible achievement of the different levels of SOLO taxonomy. It may be observed that the highest level of extended abstract can be achieved successfully using the curriculum interventions. To conclude, this study provides important insights on how to facilitate a higher level of classroom engagement by making the pedagogic approach inclusive and participative for the students.

Table 2. An Approach towards SOLO based Curriculum Framework

Name of component	Initiative	Level of synthesis achieved			
		Uni-structural	Multi-structural	Relational	Extended Abstract
Course content	To be partially self-learnt, giving Gen Z students a greater sense of self-fulfilment, teachers to take surprise evaluation of self-learnt components by asking questions to randomly selected students.	√	√	√	
	Group based and online mode of learning may be encouraged depending on interest	√	√	√	
	Students may be given the choice to suggest changes to the curriculum and if justified, the changes suggested should be considered for curriculum refinement		√	√	√
Quiz	Provision for students to decide level of difficulty of quiz, to continuously challenge each other by creating ad-hoc multiple-choice tests using Learning Management Systems or informal social network forums		√	√	√
	Students may be encouraged to host such tests on a dedicated inter-class website or app or through social network channels		√	√	√
Project / Assignment	To be decided by students in groups, and to be self-monitored by group members		√	√	√

Limitations and Future Directions

The research design of the study is experimental, which limits the external generalisations of the study. Future research may explore other possibilities in which the extended abstract version of learning synthesis can be made more mainstream.

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Mapping Pedagogical Tools to Cognitive Processes for Effective Learning Design for Post-millennials

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ABSTRACT

Post-millennial generation of students form a sizeable portion in higher education and expect the learning environment to be different from their earlier generations. This necessitates a paradigm shift in higher education from a teacher-centric environment to a learner-centric or learner-controlled environment. It is important to identify pedagogical tools and methods to keep this generation of students engaged. The main purpose of this study is to identify the best teaching-learning pedagogy to create an active learning experience for post-millennial students in higher education. This study is based on the theoretical framework of “Revised Blooms Taxonomy” (2001). This study has been conducted at a university that has its own ‘Teaching Learning Centre’ (TLC) and has made pioneering efforts in teaching. It was one of the first universities to be awarded the ‘Institute of Eminence’ by the Government of India. An intense focus group discussion of highly-rated faculty members (rated by students and their peers) across various disciplines was conducted to find out various pedagogic tools that enhance the learning experiences of post-millennials. The outcome of this research resulted in a detailed mapping of pedagogic tools used and recommended for all the cognitive processes in the Revised Bloom’s Taxonomy framework. The overarching conclusions were that though technology has become inevitable, over-dependence on technology cannot be a replacement for teaching. Team-based/ group learning, peer learning, customised teaching and providing timely feedback continue to be a prerequisite for effective learning.

Keywords: pedagogical tools, effective learning design, post-millennials, india, mixed methods research, higher education

Introduction

The Post-millennials are a generational cohort born from 1997 onwards (Pew Research Centre 2019). It is anticipated that the post-millennials’ expectations from educational institutions and the teaching-learning environment will be quite different from the earlier generations and hence a paradigm shift in higher education is inevitable to a learner-centered or learner-controlled environment from a teacher-centric environment.

The main purpose of this study is to identify the best teaching-learning pedagogy to make an active learning experience for the post-millennial students in higher education based on the theoretical framework of “Revised Blooms Taxonomy” (2001). An intense focus group discussion of highly rated faculty members across various disciplines in an eminent university was conducted to find out various pedagogic tools that enhance the learning experiences of post-millennials.

The outcome of our research resulted in mapping of various pedagogic tools used and recommended for all the cognitive processes in the revised Bloom’s taxonomy framework. The overarching conclusions are that though technology has become inevitable; over-dependence on technology cannot be a replacement for teaching. Team-based/ group learning, customised teaching and providing timely feedback continue to be a prerequisite for effective learning.

Literature Review

Definition and Characteristics of Post-millennials

As per the latest classification by the Pew Research Center (2019), individuals born from 1997 onwards become a part of a new generation called post-millennial or Generation Z. As per the Ernst & Young Report (2016), post-millennial’s unique attitude and personality that makes them more distinguished from other generations are: they are digital native,

persistent, realist, innovative, self-reliant, self-aware and entrepreneurial. Research also indicates that this generation has a shorter attention span than millennials, but greater fear of missing out than the previous generations, and regard technology in the workplace a necessity.

Roseberry-McKibbin, Pieretti, Haberstock et al. (2016) have described characteristics of present age learners as follows: they value teamwork and collaboration, active engagement through hands-on creative activities and love to use technology inside the classroom. These characteristics have paved ways to specific pedagogical techniques such as the use of technology inside the classroom, involvement of hands-on and in-class active learning strategies, preference for taking notes during the lecture in order to make it more engrossing and do not favour traditional lecture methods.

Expectations of Post-millennials

Kahl (2014) explains that the present generation of students expect learning to happen anywhere and expect more of a practical approach to learning such as field trips, practical application of the concept learnt, hands-on training, virtual study environment, study spaces outside the classroom and they expect a wide range of online academic resources and software. The current generation of learners want their academic text to be short and listed in points. It is also revealed that course work and student's engagement inside the class must be designed in such a way that it aids in knowledge building, stimulates problem-solving skills, promotes thinking, encourages creativity and critical thinking.

Teaching and Learning Research

Gilbert (2007) explains that the future of education will emphasise on learning skills, lifelong learning, learning how to learn, developing multimodal literacy, focus on relationships, connections and interdependencies, emphasising the concept that one-size doesn't fit all and finally creating learners who are actual knowledge builders. Claxton (2007) recommends that student engagement activities and curricula must have the following for better students' engagement- topics that connect and have a high relevance to that of their interest and expectations, students must know when, why, where and how to learn and must work on their learning styles, they must also imply the knowledge that is being gained into real-life practical situations.

As per Blue and Henson (2015) some of the effective pedagogical approaches are less lecture, active learning strategies, collaboration, peer learning, judicious use of technology, cooperative learning, skill demonstrations, group projects, etc. They also identified that the current generation feels more satisfied if the course is well-structured and planned, emphasises more on core knowledge and skills. The present generation of students "want to know why they need to know it" and desire that learning must be experiential and often ask for frequent formative feedback on their performances.

Murthy (2011) described that teaching must not happen on the basis of "Sage on the Stage paradigm" but teaching must be based on the principle of "Guide on the Side" treating learners as equal participants. D'Souza, Rodrigues et al (2015), have identified pedagogical practices that are preferred by millennials that include student-centred teaching, collaborative learning, parallel learning, goal-directed teaching, pair learning, enhanced instructor-student interaction, learning by continuous doing and testing, and finally ensuring continuous assessment for an enhanced learning experience.

Framework, Research Methodology and Data Analysis

The present study is based on the most commonly used teaching-learning taxonomy, "The Revised Bloom's Taxonomy (2001)". Figure 1 below depicts the various cognitive dimensions of Revised Bloom's Taxonomy.

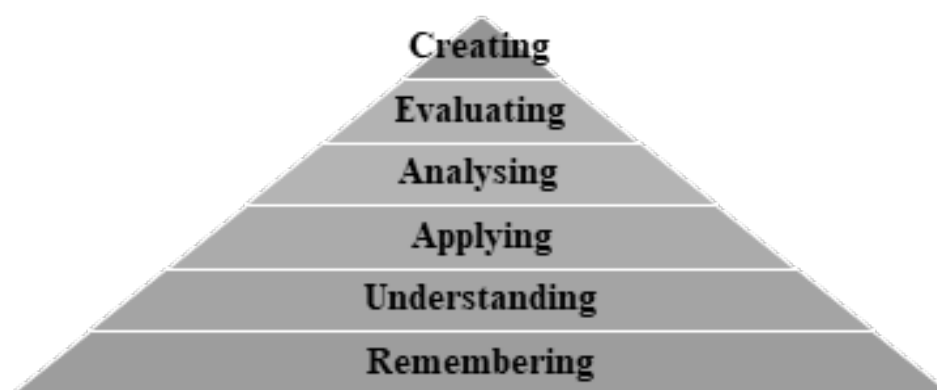


Figure 1. Cognitive Levels of Revised Bloom’s Taxonomy

(Source: Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing*, Abridged Edition. Boston, MA: Allyn and Bacon)

The sample was selected from a reputed technology university in India that is known for its meritocracy, transparency and providing students with an opportunity for all-round development. In order to promote innovation in teaching and learning methodologies and create a unique teaching experience, this institute has been one of the few to set up its own ‘Teaching Learning Centre’ (TLC). For its pioneering efforts in teaching, it was one of the first universities to be awarded the ‘Institute of Eminence’ by the Government of India. The focus group discussion was conducted by the researchers under the auspices of the Teaching Learning Centre (TLC) at the sample university. The sample included eight distinguished faculty members and a moderator. These faculty members belonged to different disciplines ranging from humanities and arts, science, engineering, and management. They were selected as they were considered to be effective and innovative teachers based on the student and peer feedback.

Based on the content analysis of focus group discussion, the pedagogical tools suggested by faculty have been mapped to each level of cognitive processes depicted in Revised Bloom’s Taxonomy starting from Lower Order Thinking to Higher Order Thinking.

Inferences

Post-millennials stimulate the teaching-learning process to a great extent. They are no longer satisfied with the traditional or classical teaching methodologies and expect multitasking and experiential learning activities inside and outside the classroom, thereby making them more participative. Table 1 presents the findings of the focus group discussion by addressing each cognitive dimension in sequential order from a lower order thinking to a higher-order thinking.

Table 1. Mapping of Pedagogy to Revised Bloom’s Taxonomy

Level of Revised Bloom’s Taxonomy	Pedagogies Used by Faculty
Remembering	<ul style="list-style-type: none"> • Mind maps - to recollect thoughts and to add topics and concepts to the basic structure of the course • Short quizzes - to recollect previously taught concepts • Brief revision of the previous class • Summation at the end of the class • Recapitulating with the help of short stories/analogies

Understanding	<ul style="list-style-type: none"> • Mechanical models • Case studies • Analogies, examples from real-life scenarios • Research articles • Assignments • Projects – short / term • Brainstorming activities • Group discussions
Applying	<ul style="list-style-type: none"> • Models • Presentations • Laboratory experiments • Take-home assignments • Workshops • Symposiums • Hands-on training programmes • Projects • Exhibits that are based on a specific theory • Open book components
Analyzing	<ul style="list-style-type: none"> • Graphs • Structural relation models • Interconnected projects • Evaluative components such as pre-viva • Seeding carefully crafted questions to individuals • Students asked to structure their own question papers
Evaluating	<ul style="list-style-type: none"> • Written exams • One to one assessment – viva /presentation • Customised assessment • Peer feedback • Group tests, group discussions • Closed-book quizzes • Encouraging students to question authorities • Critique method- asking probing questions and by courteously directed constructive criticism
Creating	<p>Pedagogical tools</p> <ul style="list-style-type: none"> • Group learning • Team-based learning • Demonstrating how to think deeply • Challenging students perspective or idea • Peer learning • Encouraging students to explore the cross-disciplinary knowledgebase <p>Learning tools used: self-study assignments, field studies, comic graphic models, cartoon representations, intensive group discussions, and case study approaches, multiple perspectives to an existing situation.</p>

Conclusion

While technology has become inevitable in teaching and learning, nevertheless “De- technologising” is equally important to make post-millennial students think independently and creatively. There must be less dependence on

technology or it be used as an adjunct or an aiding tool for teaching and learning. Team-based learning and group learning are even more effective and fruitful for imbibing higher order thinking skills. Effective feedback must be provided to students on one-to-one basis and it is based on “Sandwich method”.

Finally learning is a never-ending process in one’s life both for the faculty as well as for the students and hence the effective pedagogical tools must be based on sound structural frameworks like revised Bloom’s taxonomy and its cognitive processes, to make them both lifelong learners.

Acknowledgment and Declarations

- **Availability of data and materials:** Empirical data was collected through Focus Group Discussion and content analysis was done subsequently
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Unmuting the Mute: Turning Challenges into Opportunities

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ABSTRACT

Language classes, whether they are face to face or virtual, should be more engaging, interactive and motivating for our learners. But in a class, either the outspoken or active learners participate more. To involve all students to participate actively in the class, lessons should be interspersed with various multi-sensory activities where the learners communicate in a non-judgemental and non-threatening environment in the classroom. For more than a year during the pandemic, teachers have been facing a lot of challenges to reach them through the online mode and have been motivating learners to fight the pandemic and have been helping them to bridge the learning gaps that it has created. This paper will talk about how, by moving outside the established curriculum, a teacher can give her students enough freedom to express themselves through different carefully crafted tasks and can facilitate the acquisition of language learning skills through online mode. The activities selected were: writing articles by using tools like Write&improve.com, Plotagon, building vocabulary through YouTube videos and writing Mini-sagas. Students were provided online platforms to present, as the main aim was to make learning a fun experience for everyone with hands-on activities. There were 80 students and they were spread into two groups of 40+40 each. All the activities introduced were beyond their textbook lessons. All the practises were carried out in the online mode of teaching for six months. Their written pieces were published in the form of e-magazine and they took part in various online competitions. Their improved performance in the form of their written pieces and their presentations in online classes prove that learning becomes more interesting, exciting and rewarding by straying away from the prescribed curriculum and with the teacher playing the role of a facilitator and co-learner in the true sense of the word.

Keywords: online classes, e-magazine, innovative strategies, beyond the textbook

Introduction

Humans all over the world are passing through unprecedented times and situations. Every sphere of human life has been hard hit by the COVID-19 pandemic outbreak. Education is no exception, rather it is worst affected with school and colleges closed for more than a year. Educators all over the world have been finding ways and means to teach all learners of all levels and groups in a virtual mode.

Online education that was earlier considered a downgraded method of teaching is the only method left for teaching and learning in present times. In a developing country like India, the majority of students belong to lower income group families and are facing problems with proper devices, data cards, internet connection, availability of network and knowledge of various apps and online platforms of learning. The teachers too suddenly have found themselves in a world where they need to operate the tools of online teaching learning. In such a scenario helping the learners to enhance their skills of language through online platforms initially seemed a daunting task to an average English language school teacher, but later on with the help of plethora of language learning resources available on the internet and knowledge of online platforms like Zoom, Microsoft Teams, Google Meet, CISCO WebEx etc. to conduct classes the investigators could make the challenging task an attainable goal, and the teacher and taught started making a transition from face-to-face to online teaching and learning. The transition is still happening with addition in ever advancing new knowledge in technology and ever increasing online resources of teaching and learning. This paper traces the journey of a group of students with their teachers turning challenges posed by the pandemic into better learning opportunities.

Literature Review

- Kemp and Grieve (2014) found that students preferred to complete activities face-to-face rather than online, but there was no significant difference in their test performance in the two modalities. In their written responses, students expressed a strong preference for class discussions to be conducted face-to-face, reporting that they felt more engaged, and received more immediate feedback, than in online discussion.
- Pegu (2014) conducted a study on Information and communication Technology in Higher Education in India: Challenges and Opportunities. The study revealed that ICT could become an indispensable support system for higher education as it could provide access to education regardless of time and geographical barriers. Wider availability of course material in education can be shared by means of ICT, can foster better teaching. It would also enable development of collaborative skills as well as knowledge creation skills.
- Galway et al., (2014) studied the Flipped classrooms as student-centred paradigm, the study revealed that students reported an increase in knowledge and survey and focus group data revealed positive learning experiences and perceptions of the flipped classroom model.
- Gill (2017) conducted a study on role of ICT in effective curriculum transaction and evaluation- observed that ICT has a significant role to play in improving the standards in education.

Theme: Innovative Pedagogical Practices

This paper is ‘pandemic-driven educational research.’ It was during the pandemic times that the researchers carried out this action research to engage their learners into meaningful language learning activities using innovative pedagogical practices to enhance their language skills and develop their creative and critical thinking.

Methodology

For the students it was facilitation of learning, giving presentations, writing creative pieces, reflecting on feedback and practicing for the next task and presenting or writing again. It was student-led learning where the teacher was working as a facilitator and co-learner.

Method of study was qualitative and quantitative. Their written pieces were analysed, how many were progressing and how many were left behind. Observation sheets and maintenance of portfolios was another method to study the results in their improved performance.

Sample:

Class XI and XII students who were 80 in number and spread into 2 separate sections. They were at an intermediate level of proficiency in English language.

Action Hypothesis

If students are given tasks like writing articles by using Write&improve.com, Plotagon, writing mini-sagas, picking new words by watching YouTube videos and then weaving their own narratives, then they will have enough freedom to express themselves in writing and learn study skills. It will develop their critical thinking and improve their speech and writing.

Tools Used: Observation sheet using rubrics and portfolio for recording pieces of work of students

Action Taken: This action research was carried out for six months, from April 2020 to September 2020 with two groups of class XII students. Details of activities carried out with them for developing various skills of language are given below:

To begin with, they were assigned topics to write articles concerning contemporary social issues and issues that usually rake up an adolescent mind as these themes were related to their syllabus also. Many such issues emerged while dealing with their text book lessons. Some such issues were: feminism, love for one’s motherland, child labour in India, one’s fears and ways to overcome it .The purpose was to engage them in some meaningful activity. Process writing approach of writing was introduced. All the steps of the process writing approach were explained to

them such as Brainstroming-Prewriting-Drafting-Reviewing-Editing-Proofreading-Publishing. Brainstorming on the topic was done in online classes as a prewriting activity using AnswerGarden.com.

AnswerGarden

It is a creative educational brainstorming tool. It is a very helpful tool in online classes, as every child in the class gets an opportunity to share his/her ideas without even revealing their identity. With enough ideas before them they were asked to write a first draft of their article.

Write & Improve

It's a useful website that can give you instant feedback on your writing. This is a tool which gives automatic feedback. Research studies show that good feedback has more impact than any other factor that makes a difference in learning (Hattie, 2009), and that great teachers are 'excellent seekers and users of feedback information, skilled at monitoring the current status of learner understanding' (Hattie, 2012). Write & Improve doesn't correct your writing for spelling and grammatical errors. It provides you with three levels: Beginner, Intermediate, or Advanced. A learner has to choose any one level and then start using and practicing it. Write & Improve gives the feedback in certain colours and codes for you to see your errors.

When students write and rewrite drafts, feedback helps them to improve. Instead of feedback being provided by the teacher only, there is room for self-assessment, peer feedback and peer correction even in online classes.

E-magazine Using Wix Website

While indulging in tasks of improving their pieces and with students' polished pieces beforehand, the idea of publishing the e-magazine took shape. A team of five students volunteered to undertake the task of the publication of e-magazine without any funds or external professional help. More creative writing in the form of stories, poems were invited for the e-magazine from all students of these two groups. The writing pieces for magazines were edited by the student and final vetting was done by the teacher.

A team of volunteer students created the magazine on the wix website along with cover page design, graphics, fine art pieces, short video clips of students. They were able to publish the same in the month of July 2020. This was an outcome of their creative abilities and inspired budding writers to choose writing as a profession in future. It was shared with the principal, teachers and all other students of the school. They won accolades from all quarters. Enthused with their success and appreciation from all and at the suggestion of the School Principal they planned for the second issue of the school magazine where students of other classes were invited to contribute their write ups for the ECLAT in the month of September 2020. The challenge posed by the pandemic outbreak was turned into an opportunity to read more, write more, speak more and improve their language skills. E-magazines can be accessed at the following links: <https://aryashruti76.wixsite.com/e-magazine2>, <https://aryashruti76wixsite.com/e-magazine>

Building Vocabulary

Research has shown that children who develop a large vocabulary are more likely to think deeply, express themselves more clearly, and read more. The size of a person's working vocabulary is both a measure of educational attainment and a key to academic and career success. To build the active vocabulary of the learners, flipped approach was used in online classes with some modifications. In this some vocabulary building videos curated from YouTube were sent to them beforehand. They were supposed to watch them, note down all the important words and expressions and use them to weave the same into narratives of their own. Initially, the researchers started with some story-telling assignments as the students are generally hesitant in speaking, fearing that if they make mistakes other students will laugh at them. To shed their inhibition they were introduced to Voocaroo.com and Plotagon app. Voocaroo is an online tool that can be used by students to record their voice, share it and download voice messages. It is simple and user-friendly. The audio files created on Voocaroo can be shared as a link on Google classroom, websites and social networking sites. Use of Vocaroo.com helped them to shed their resistance to speaking. (<https://voca.ro/Z5oCS241yxm>)

Plotagon is a free animation app that makes students' stories come to life. This app helped them express themselves in an animated movie and share it with the world. They created their own 3D characters and avatars. Students wrote dialogue and played those and some of them gave their own voice to their characters. While creating narratives with all the new words learnt from the YouTube video some of them made use of the Plotagon app. Many students were found engaged in creative works and this helped us to push their imagination beyond the classroom boundaries and they started thinking 'out of the box'.

The narratives created were presented in online classes via screen share mode highlighting all the new words learnt from the video. For this purpose YouTube videos of Mr Duncan, Miss Lucy and Miss Chetna were used. At one stage a competition was organised where they presented their narratives and were assessed on pre-defined rubrics that were shared with them. Some good narratives found place in the e-magazine.

Writing Mini Sagas

A mini saga is a short story based on a long story. It contains exactly 50 words, plus a title of up to 15 characters. However, the title requirement is not always enforced and sometimes eliminated altogether. Mini sagas are alternately known as microstories, ultra-shorts stories, or fifty-word stories.

These 80 students of class XII and 30 of class XI were first oriented to write mini sagas in a webinar. The researchers themselves oriented them and shared many model mini sagas with them. They were acquainted with the genre by sharing some videos and links. Later on a competition was organised where the learners presented their mini sagas via screen share mode in Microsoft Teams. A senior English language teacher was invited to judge the event and they were assessed on already shared parameters. All the sagas found place in the Second issue of their e-magazine ECLAT.

Results

- They learnt to play with the language, learnt how to write in brief and how to be creative and meaningful by using few words.
- Students started writing good articles which were placed in the school e-magazine.
- They learnt study skills like analysing, interpreting and synthesising.
- They could shed their inhibition of speaking in online mode.
- Out of 80 students of class XII, 50 students became active by participating in all the activities and competitions organised for them, whereas the other 30 participated partially.
- In the month of September 2020, this intervention was further used for 15 days and investigators could motivate 12 students out of 30.
- It was found that strategies like mini saga, Write Improve.com, Plotagon, Vocaroo YouTube videos, provided freedom to students to express themselves and also they learnt language skills in a meaningful way.

Discussions

The need of the hour is to discuss how could the system build the capacity of their teachers in terms of content and digital tools and other online resources to be used in a classroom. Once teachers are equipped, it is bound to percolate to the students. In terms of government school student, we also need to ponder upon the digital divide, almost 50% students do not have even smartphones with internet access to attend classes. The government must provide intervention and we need to find out ways to equip our learners with devices.

Conclusion

No doubt teaching and learning is a complex process which cannot be bound in theories, methods, approaches and techniques. There is a lot beyond that, like the human touch, the connection that the teacher builds with her learners and this helps them to grow. This human touch, connection is more important with students coming from marginalised sections of the society. During the pandemic time it was not only loss of learning that they were facing

but they were facing vital problems like sustenance problem, family moving to the hometown, lack of device, not having money to get the data card recharged, network issues and many more unstated problems. Teachers have been helping them in all possible ways. Already there has been a huge learning loss due to lack of regular studies as it was a sudden shift from face-to-face to online mode. No one was prepared for it. But after 15 months it is time for the government to attend to the needs of the students by providing them with tabs and an allowance to, recharge their data cards to attend online classes and for teachers to look for some new online ways to engage learners. We as teachers need to think of alternative ways of moving forward by using online tools and apps to involve our learners and unmute their voices in an online mode. Along with this we need to build the capacity of our teachers to conduct online classes with enough knowledge of all the resources available to them.

Limitation and Future Studies

As this study is an action research focusing on the classroom practice so it cannot be generalised. But after seeing its result we should look forward in future to conduct such study for a large population by increasing the sample size. We can also think of conducting an experimental research where one group will be the controlled group and the other one an experimental group, in which we can use the above stated interventions and see the results.

Way Forward

No doubt the use of technology in education is going to stay even after the pandemic. Post-covid blended learning will be the mode of teaching in schools and colleges. The role of a teacher is changing in a big way. A teacher has to curate resources and guide and motivate her learners to learn to manage their learning graph. For all this it requires a lot of researching, planning and designing activities for an online platform on the part of a teacher. She/He needs to build a platform where learners are engaged in meaningful threads of discussions. This generation sitting in our classrooms is known as digital natives. They are more aware and sharp in the use of technology. A language teacher needs to be a facilitator and co-learner in this 'brave new world'.

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Impact of Innovative Teaching Strategies

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ABSTRACT

Teaching is an accredited vocation and a profession that is vital for every learner. A teacher is the person who requires skills as well as knowledge in the area of teaching. There are a lot of innovative methods and strategies which are implemented to teach in the best possible way. Learners have various modes and options to learn new things in this modern world through various platforms. These developments and innovations are used by the teachers productively. Every teacher would like to know whether their teaching is satisfactory and effective.

Keyword: innovation, teaching, innovative method, effective teaching, vocation

Introduction

Education is a veritable instrument in this modern world and plays an important role in global economic development. People are interested to learn new things daily and to persist in this fierce world there is a lot to learn from an overall perspective. For educating, technology plays a very important role in every child.

Every learner needs a preceptor. A preceptor is a person who guides, teaches good moral values, and shares knowledge and experience on the subject matter. For such teaching, certain skills and potential are required, like communication, listening skills with that behaviour and attitude of the teacher.

Every preceptor has their own unique style of teaching and their strategies. To share their views, they use different methods to do it. In the modern world, technology plays a major role in education like online portals, websites, and other applications, that help learners to understand and gain knowledge easily in various fields. Technology is a boon to both faculty and students, as it helps them gain knowledge.

Effective Teaching

Effective teaching helps students to understand the topic in a better manner. Effective teaching should have certain components and elements like.

- Knowledge about content or subject matter
- Potential to coordinate with students
- Stimulate and mentor the students

Qualities of an Effective Teacher

- Clear voice and Variation of pitch and tone voice
- Delivery pattern
- Observation and supervision of students
- Possession of good inter- and intra-personal skills

Literature Review

Leighsa Sharoff (2019)¹ inferred that providing abundant online resources gives students an avenue to further explore the material. From this author's experience, students tend to explore on their own and forward links for articles and

additional web-based resources. And concluded that the overall objective of online education is the same for face-to-face didactic methodology: provide students with an excitement to learn, engage, and seek knowledge. Unique issues arise with online learning that requires the educator to be creative and innovative in meeting pedagogical objectives and outcomes.

Richard J, Rateau, Eric Kaufman, and D. Adam Cletzer (2015)², in their study, revealed that themes emerged describing innovative instructors' strategies for developing core skills, ability to learn, and thrive in changing environment. 1. Enthusiasm for students learning, 2. Experimentation of new ideas for educational practice, 3. Approach teaching with a guiding mentality more than a directing mentality, and 4. Stay abreast of new developments and invest time in barriers. The study concluded with being an innovative instructor in today's higher education system is a demanding and multifaceted position. Finally recommended that academic administration and innovative instructors promote and implement learner-centered teaching into the classroom.

Objectives

- To know the effectiveness of innovative teaching
- To identify the satisfaction level of innovative teaching

Scope of the Study

Innovative teaching, in recent years has replaced the traditional methods. Because of various ways and methods available for teaching, the scope of new innovative strategies is high and different methods are used for teaching. There are different technologies and innovative methods used to teach the students effectively and to get satisfaction from their work and do justice to their vocation.

Statement of the Problem

Teaching requires skills and knowledge in which the external environment also needs to be favourable. Education is the thing that everyone looks forward to in this modern world. Hence the role of teachers and their adaptations is highly important. The faculty should be satisfied with their teaching which will give good output to the students. Due to the technological developments, faculty are to use innovative teaching methods which will make the students understand in a better way. This study aims to know the effectiveness and satisfaction levels of teaching among the teachers in using innovative teaching methods.

Research Methodology

The research methodology consists of primary and secondary data collection. Primary data is collected from the appropriate respondents through a well-structured questionnaire and secondary data is collected from various journals and articles. By adopting a simple random sampling method, the responses are been gathered from 50 respondents in Coimbatore city. For further analysis, tools such as percentage analysis, Chi-Square analysis, and Rank analysis are used.

Analysis and Interpretation

Table 1. Showing the Socio-Economic Status of the Respondents

S. No.	Demographic Factors	No. of Respondents	Percentage	
1.	Gender	Male	19	38
		Female	31	62

2.	Vocational Qualification	Undergraduate	4	8
		Post graduate	30	60
		PhD	15	30
		Others	1	2
3.	Vocation	Teacher	19	38
		Professor	28	56
		Mentor	3	6
4.	Residential	Rural	31	62
		Urban	19	38
5.	Incumbent	School	19	38
		College	22	44
		University	9	18

Interpretation

It is inferred that 62 per cent of the respondents are female, 60 per cent of them are qualified up to postgraduate level, 56 per cent of them are working as professors, 62 per cent of them reside in a rural area and 44 per cent of them are working at college.

Table 2. Effectiveness and Satisfaction of Teaching

S. No.	Effectiveness and Satisfaction	Percentage	
1.	Usage of modern modes effectively	Yes	94
		No	6
2.	Preparation time for taking online class	Less than 1 hour	18
		2 hours	42
		3 Hours	30
		More than 3 hours	10
3.	A strategy used for effective teaching	Presentations	26
		Videos	27
		Online examples	29
		On-trend topics	18
4.	Average time needed for effective teaching	Less than 1 hour	24
		1 hour to 2 hours	62
		More than 2 hours	14

5	Identification of communication reached effectively	By conducting test	10
		By conducting a quiz at the end of the session	22
		By asking questions while teaching	30
		The behaviour of the students	18
		Based on the interaction of the students	20
6.	Satisfaction with online teaching	Yes, absolutely	20
		Yes, but I would like to change a few things	50
		No, there are quite a few challenges	26
		No, not at all	4
7.	Satisfaction with innovative teaching	Highly satisfied	12
		Satisfied	48
		Neutral	38
		Dissatisfied	2
		Highly dissatisfied	0
8.	Satisfaction with how your teaching has reached the students	Unit test	11
		Weekly test	14
		Group Discussion	22
		Question answer session	25
		Based on the doubts asked	22
		Seminars	6

The above table explains that 94 per cent of the respondents are using modern modes effectively, 42 per cent of them take two hours for preparing for online class, 29 per cent of them use online examples as effective teaching strategy, 62 per cent require one to two hours of average time for effective teaching, 30 per cent of them identify that their communication has reached the students in effective manner by asking questions while teaching, 50 per cent of them are satisfied with online teaching but they would like to change few things. On the whole, 48 per cent of respondents are satisfied of teaching with innovative ideas, 25 per cent of them will conclude with satisfaction that their teaching reached the students through question-answer session.

Rank Analysis

To study the most important factor for effective teaching, the Henry Garrett ranking method has been applied and the details of Garrett points and mean are presented below.

Table 3. Important Factors for Effective Teaching

S. No.	Factors	Mean Score	Rank
1.	Mindset of the teacher	57.98	1

2.	Preparation	55.44	2
3.	Class time duration	50.64	3
4.	Environment	48.76	4
5.	Students Behaviour	46.74	5
6.	Execution	42.64	7
7.	Interactive Session	44.8	6

Hence, it is concluded that the important factor for effective teaching is the 'Mindset of the teacher' with an average score of 57.98 Garrett points.

Chi-Square Analysis

The study is based on this result

If P value > 0.05 – Not significant

If P value < 0.05 – Significant

To study the relationship between vocational qualification and satisfaction level in innovative teaching tools

Hypothesis

Null Hypothesis (H_0): There is no significant relationship between Vocation Qualification and satisfaction level in innovative teaching tools

Table 4. Showing the Satisfaction Level in Innovative Teaching Tools

Applications	Chi-Square Value	Df	Significant Value	Significance
Google Meet	21.750	12	0.40	NS
Zoom	9.038	12	0.700	NS
Microsoft teams	13.952	12	0.304	NS
Google classroom	14.366	12	0.278	NS
Skype	15.669	12	0.207	NS
Web White board	11.316	12	0.502	NS
YouTube live class	8.423	12	0.751	NS

S- Significant level 5%, NS- Not Significant at 5%

From the above table, it is revealed that there is no significant relationship between Vocation Qualification and satisfaction level on the application used for teaching purposes as the p-value is greater than 0.05. Hence the null hypothesis is accepted.

To study the relationship between Vocation and satisfaction level of innovative teaching factors

Hypothesis

Null Hypothesis (H_0): There is no significant relationship between Vocation and satisfaction level of innovative teaching on factors.

Table 5. Showing the Level of Satisfaction of Innovative Teaching

Factors of Innovative Teaching	Chi-Square Value	Df	Significant Value	Significance
Helps to improve	3.643	6	0.725	NS
Easy to interact with students	15.001	8	0.059	NS
Keep myself updated	13.185	6	0.040	S
Helps to communicate faster and with clarity	6.902	8	0.547	NS
Helps to understand the topic easily	11.813	8	0.160	NS
Time saving	7.433	6	0.283	NS

S- Significant level 5%, NS- Not Significant at 5%

From the above table, it is clear that there is no significant relationship between Vocation and satisfaction level on factors of innovative teaching as the p-value is greater than 0.05. Hence the null hypothesis is accepted.

Suggestions

Teaching Methods

As every teacher has their way of teaching, improving their teaching discussion among colleagues will help them to try different methods which lead to better methods to implement while teaching.

Participation to Learn Various Aspects

In each profession, improvement and updating are required, for which participation in conferences, seminars, workshops, and other related activities will motivate them, help them to learn new things as well as they can update themselves.

Adaptation to the Current Trend

As the students are at their homes. It is difficult to monitor everyone. The way of teaching will be different than the traditional way which restricts the teacher at certain times. For such a situation, adaptation to current trend is required, for else, there will be a barrier in communication. The new normal situation has forced all to use the technology to reach the students.

Conclusion

The study concludes that a teacher is a person who needs to groom the students and educate them in the proper way to succeed in every aspect of life. To achieve such results, effective teaching is the key. This will make the students observe, and learn quickly and easily. Teachers are using various innovative methods and strategies to motivate and educate students in a proper way. Modern technology helps the teacher to update and improve themselves and helps the students to learn easily as they have the option to learn through various sources. Teaching effectively helps the teachers to satisfy them and they are trying to use more innovative methods and push themselves to improve more to give their best at all times. Teachers also suggested certain changes through which teaching can be even more effective and they will get more satisfaction.

Notes

- ¹ Sharoff, Leighsa (2019), "Creative and Innovative Online Teaching Strategies: Facilitation for Active Participation" *Journal of Educators Online*, ISSN: EISSN-1547-500X, ERIC Number: EJ1223934, v16 n2 Jul 2019.
- ² Richard J, Rateau, Eric Kaufman, and D. Adam Cletzer (2015), "Innovative Classroom Strategies that Prepare College Graduates for Workplace Success" *Journal of Agricultural Education*, Volume 56, issue 3, 2015.

Websites

<https://resilienteducator.com/classroom-resources/5-types-of-classroom-teaching-styles/>

A Cross-Disciplinary Teaching Approach on Transformational Learning for Multidisciplinary Education

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ABSTRACT

The need for Cross-Disciplinary Teaching for multidisciplinary education has become more prevalent in the 21st century learning. The study aimed at integrating knowledge as a whole into the teaching process and fostering the Transformational Learning experience in pre-service teachers to engage in cross-disciplinary theme teaching for the successful implementation of cross-curricular teaching approach in schools. The objective was to find the effect of Cross-disciplinary Teaching Training Modules based on Beckmann's Model of Cross-curricular teaching on Transformational Learning among pre-service teachers. This experimental study used pre- and post-test control group design. A sample of randomly chosen 64 pre-service teachers formed the sample of the study. The experimental treatment included the Training Modules with essentials on lesson plan development on Cross-Disciplinary Theme teaching in three phases for pre-service Teachers at Secondary School Level developed by the investigators. A standardised scale on "TRansformative Outcomes and PrOcesses Scale (TROPOS) by Robert Charles Cox (2017) was adapted for data collection. This instrument (30 items) was divided into four modular subscales: social support, attitude toward uncertainty, criticality and transformative outcomes. Results indicated that the pre-service Teachers exposed to Cross-Disciplinary Teaching Training Modules exhibited significantly better Transformational Learning experiences than the pre-service teachers exposed to traditional discipline-based teaching. The study has implications for pre-service and in-service teacher education at all levels of Education for implementing effective multidisciplinary 21st century education, in which learners integrate knowledge and modify their worldviews or perspectives as they engage in a cross-disciplinary teaching approach.

Keywords: cross-disciplinary teaching, integrated knowledge, beckmann's cross-curricular approach, transformational learning

Introduction

Contemporary education is in a discipline-convergence period. If subjects are necessary to investigate exhaustively one dimension of reality, understanding reality as a whole requires an interdisciplinary approach (Timmerman, 2017). The need for Cross-Disciplinary Teaching (CDT) for multidisciplinary education has become more prevalent in the 21st century learning. CDT Approach is a creative practice that involves an extension to other disciplines or the integration of other disciplines into one's own discipline. Therefore, successful work of this approach requires that there is a proficient co-operation with other disciplines and immense efforts on the part of the teachers. Given these considerations, the CDT Approach implies the collaboration of a team of teachers and co-operation of various subject/discipline teachers. Beckmann (2009) expanded the cross-disciplinary/cross-curricular/subject-interactive teaching by proposing the various forms of co-operation. As given in Figure 1, Levels 1 and 2 characterise the work that goes beyond one individual subject, while at levels 3 and 4 co-operation is based on the joint work of the subjects.

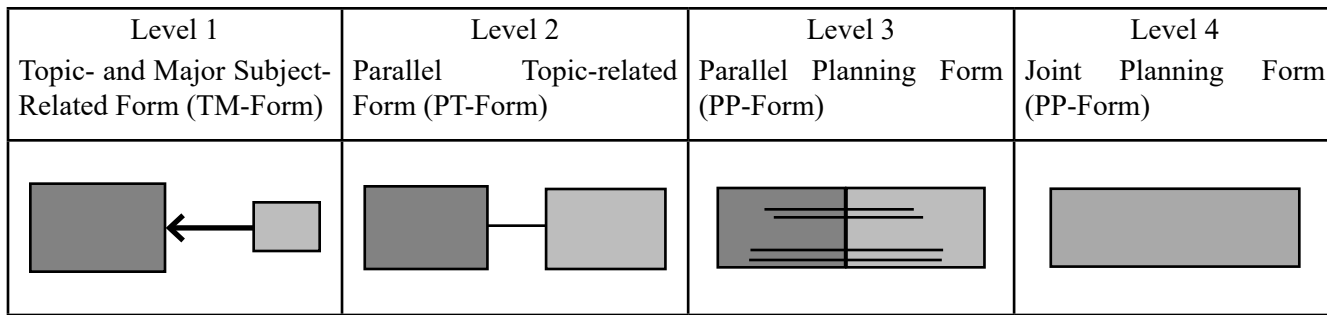


Figure 1. Forms of Cooperation – Cross-Curricular Teaching (Beckmann, 2009)

Beckmann (2009) has provided a practical approach to Cross-Curricular/Cross-Disciplinary Teaching Approach in his work on ‘A Conceptual Framework for Cross-Curricular Teaching’. The objective of this study was to find the effect of CDT Approach training modules based on Beckmann’s model of cross-curricular teaching/subject integrative on Transformational Learning among the pre-service teachers at Secondary School Level.

Literature Review

CDT Approach can be a creative practice for Transformational Learning has been affirmed by a number of studies. Lindgreen and Borgh (2020) conducted cross-disciplinary research to explore how to undertake cross-disciplinary research that advances knowledge and understanding and to examine how to break cross-disciplinary boundaries. The study showed that a multidisciplinary approach will be required depending upon the type of research challenges. A Cross-curricular Teaching (CROSSCUT) European project (Reference Framework, 2019) aimed at supporting secondary level teachers’ professional development by training them to adopt cross-curricular teaching approach. Ying Zhan, W. W. (2017) in a research explored senior secondary students’ beliefs and experiences of learning an interdisciplinary curriculum and sheds light on the realisation of interdisciplinary learning in secondary education in contexts where teacher-centred pedagogy remains influential. Greenwood (2013) sought information on the extent to which Northern Ireland primary school teachers have developed cross-curricular topics. This study described integrated approaches as being a better reflection of the realities of pupils’ experiences outside and stated that ‘Curriculum integration is one of those ideas that is obviously good’. Traditional subject teaching tends to create a gap between education and the emerging needs of modern society. CDT approach could bridge the gap by moving away from traditional disciplinary approach to CDT approach at schools and college level. Hence, it is important to train the teachers to be aware of this teaching approach and implement in our education system.

Topic

The Objective of the study was to study the Effectiveness of CDT Approach on Transformational Learning for Multidisciplinary Education among pre-service Teachers. (Within this paper, the terms ‘cross-curricular’, Cross-disciplinary and ‘Subject-integrative’ have been used interchangeably). CDT approach is an integrative approach that involves extension to other disciplines or the integration of other disciplines into one’s own discipline. This implies crossing subject boundaries and other disciplines are integrated into teaching and learning. In the present study, it refers to the exposure of pre-service teachers to the training modules in order to enable them to apply the theme-based CDT approach to prepare lessons and execute them in peer teaching sessions. Transformational Learning describes how learners identify, challenge, and refine assumptions underlying perspectives that guide a learner’s actions and decisions. It also describes how learners integrate new knowledge, perspectives, or practice into their worldview as they engage in CDT and learning. Transformational Learning is measured in the study with respect to Social support, attitude toward uncertainty, criticality and transformative outcomes.

Methodology

The experimental design used in the study was pre-test post-test control group design. The population of the study

consisted of all the pre-service teachers pursuing their two years Bachelors of Education programme in Mangalore Taluq of Dakshina Kannada District in Karnataka state. The sample of the study consisted of 64 pre-service teachers randomly chosen and distributed into Experimental and Control groups with 32 pre-service teachers in each group. Pre-test and post-test data was collected using the adapted form of “TRansformative Outcomes and PrOcesses Scale” (TROPOS) Cox R. C. (2017). The following hypotheses were formulated and statistically tested using “t” test.

H₀1: There is no significant difference in the mean gain scores on Transformational Learning of Experimental and Control group pre-service teachers.

H₀2: There is no significant difference in the mean gain scores on Transformational Learning components of Experimental and Control group pre-service teachers.

Analysis

Hypotheses H₀1 and H₀2 were tested using the ‘t’ test of significance and the results are given in Table 1 and Table 2.

Table 1. Test of Significance Results of Gain Mean Scores on Transformational Learning and its Components of Experimental & Control Group Pre-service Teachers

Transformational Learning & Its Components	N	Groups	Mean	SD	t
<i>Transformational Learning</i>	32	Experimental	13.81	8.89	5.41*
	32	Control	4.05	3.29	
<i>Social Support</i>	32	Experimental	26.63	4.06	29.22*
	32	Control	0.81	4.02	
<i>Attitude towards Uncertainty</i>	32	Experimental	4.65	2.94	1.85*
	32	Control	3.10	2.47	
<i>Criticality</i>	32	Experimental	5.55	3.95	3.35*
	32	Control	2.35	2.17	
<i>Transformational Outcomes</i>	32	Experimental	5.10	3.28	3.56*
	32	Control	2.30	2.00	

Table 1 results indicate that ‘t’ value for Transformational Learning (5.41) and its Components with respect to Social Support (29.22), Criticality (3.35), Transformative Outcomes (3.56) is significant and for Attitude Towards Uncertainty is not significant at 0.05 level of significance. Hence, it is concluded that the CDT Approach is significantly effective in enhancing Transformational Learning as a whole and in terms of its components namely Social Support, Criticality and Transformative Outcomes of Pre-service Teachers.

Discussions

Results indicated that the pre-service teachers exposed to CDT training modules have exhibited significantly better Transformational Learning than the traditional discipline-based teaching. The present study results are supported by the study done by Cox (2017) where he demonstrated a moderate correlation between social support, criticality and transformative outcomes. Cox (2017), with reference to TROPOS reports that there appears to be preliminary evidence for the importance of items in the attitude toward uncertainty scale accounting for variance in transformative outcome scores. The CIDREE (1998) report states that cross-curricular approach provides helpful constructions to ensure curricular balance in the new emergent forms of knowledge, which must be considered as a valuable innovation. Today, some of the European countries like Denmark, Finland, France, Norway, Poland and Portugal have introduced cross-curricular teaching approach. Such teaching culture is not deliberately made in Indian

education system though the teachers are using it unconsciously. In this creative practice, teachers are required to collaborate and co-operate with teachers who teach other subjects. The successful implementation of this integrative teaching approach requires training of teachers and in-service teachers to make it truly multidisciplinary in nature. Hence, the need for training the teachers to get use to this type of approach is of great important in Indian context. Though the above empirical research supports the results of the study, arguments concerning the implementation of cross-disciplinary to teaching and learning have been debated for many decades, either ardently supporting or opposing implementation of this innovative approach in schools (Reid & Scott, 2002, Timmerman, 2017). Hence, future research is required in the Indian context to generalise the results.

Conclusion

Traditional discipline teaching approach will no longer be sufficient to fully integrate new information and elaborate forms of knowledge that a 21st century society needs. The pre-service teachers who participated in CDT Training Modules exhibited better Transformational Learning because they were exposed to knowledge as a whole, provided opportunity to pull together appropriate knowledge from a range of subjects and relate it to everyday life and modified their worldviews or perspectives as compared to others. They dealt explicitly with questions and issues that enabled them to explore fundamental aspects of their lives. This gave us insight that when CDT approach is implemented effectively it can be benefitted more by the students, and educators. For the successful implementation of CDT approach in pre-service and in-service teachers training, it should be given the priority and make multidisciplinary and convergence approaches applicable in a real sense. It also requires teachers' self-confidence, adequate content knowledge, co-operation and collaboration of a team of teachers to plan and deal jointly with many subjects and constantly in touch with one another. This study aimed to motivate and help the teachers to start realising that teaching needs to go beyond the disciplinary boundaries by training them to find the effect of CDT approach on Transformational Learning for multidisciplinary education.

Limitations and Future Studies

The research manifested the cause-effect relationship. The present experimental study was limited only to pre-service teachers who were pursuing their bachelor's in the Teacher Education programme. However, the study has a wide scope of application at schools and colleges to move away from traditional disciplines/subject teaching to cross-disciplinary teaching approach. Future researchers may choose to utilise other dependent variables like self-directed learning to examine the potential relation with Cross-disciplinary Teaching Approach and similar study can be undertaken for in-service teachers.

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Social Contributory Micro-learning Activities Motivate Learners to Pursue Higher Order Learning Outcomes

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ABSTRACT

The ubiquitous availability of a smartphone device and technology-enhanced learning, not only aided the teaching fraternity to thrive through the COVID ridden academic year, but also hard-pressed one to explore and discover new avenues of online learning, for enhanced learner engagement. It promoted a certain type of Social Micro-Learning environment, conducive to motivate learners to pursue higher level learning outcomes. In a pre-dominantly practicum based Teacher Education Program(B.Ed), it led to successful exploration of a series of contributory micro-learning activities, in the Methodology of Teaching English, thereby encouraging the teacher and the students to become co-learners and co-creators of content. Evolved strategies of contributory learning sought to engage, both the First Year (FY) and Second Year (SY) B.Ed learners in social micro-learning activities related to higher order cognitive objectives – such as analysing, evaluating and creating – by utilising online platforms and social software. Early results of the study confirm the assumption that SY B.Ed students, who were rather well-equipped with the subsequent content knowledge base, gained deeper insights during the learning process. Though similar socio-micro-learning implementation, when duly adapted through appropriate scaffolding techniques, did yield a gradual progression, for FY students too, through an upward spiral of competence development. The proposed approach not only improved students' learning performance in terms of factual knowledge but also enhanced student motivation in terms of increased learner autonomy, competence, relatedness and learning satisfaction.

Keywords: social learning, contributory learning, micro-learning

Introduction

The present study focuses on the exploration and promotion of a certain type of Social Contributory Micro-learning environment explored during COVID-19, enforced online learning scenario in a predominantly practicum based Teacher Education Program. Social Contributory Micro-learning, here refers to a pedagogy that encourages bite-size, focused segments of learning that are connected to an overall more expansive learning objective. These short bursts of learning seem to come naturally to learners when well-constructed assignments and tasks, related to the course objectives, are created using digital media platforms. Incorporating the proven strategies of collaborative learning, the system could be designed in a way, where group work and intermittent online discussions, further interaction amongst the learners, ultimately leading to deeper insights about the content at hand (B. Goschlberger, 2017).

Literature Review

B. Goschlberger (2017) observes that 'Micro learning focuses on short term and informal learning activities using small but self-explanatory learning resources that are available on the internet. Micro-learners' immediate need to fill a knowledge gap might be sufficiently served by remembering specific facts. He further suggests a social micro-learning approach, based on Baumgartner's Learning Model that could attract micro-learners to pursue higher level cognitive learning objectives. Social online learning environment seems to be suitable for micro-learning, especially with its being easily available on the web and optimised for mobile devices. George Hanshaw (2019), in his study employed the use of a new instructional design (ID) that incorporated a scenario-based learning (SBL) approach and an online learning management system (LMS) to deliver content to mobile devices, available to the participants anytime, anywhere; at times convenient to them.

Social Contributory Micro-learning Activities

Series of Social contributory micro-learning activities evolved gradually with the exploration of varied topics included within the syllabus for B.Ed, 'Methodology of Teaching English'. The underlying study model adapted from B. Goschlberger and later evolved for this work was a product of the amalgamation of the best strategies adapted from Micro learning, all rendered through social media platforms.

Learning Model

Four phases of a learning model is spiraled in an upward ascent of active learning methodology which took students towards greater learner autonomy, making them co-creators and co-users of knowledge.

- Phase 1: For added Interaction, interactive and creative learning activities were included. These consisted of easy going, light-hearted topics like Teaching Phrases and Idioms in ELT, and Using Riddles and Jokes in ESL classrooms. These were whole group sessions with interactions through social media platforms. Creativity was the key.
- Phase 2: For Enhanced Active Learning, learners organised content already available online or adapted it to suit their purpose by tagging, rating or commenting. Enhanced lectures and formative quizzes were used. Non-verbal Communication in ELT was a major work in this phase, related to topics from the syllabus.
- Phase 3: Enhanced Interaction correlated with assignments related to topics from the syllabus. It included Flipped Classroom, Case studies, and Small Group Project work. Activity-Based Learning in ELT and Designing Graded Activities for Slow Language Learners, was major work here.
- Phase 4: Create, share and improvise was the aim with activities incorporating Team-based learning, Discussion Board, Group Projects, Reflective Journal etc. Designing Projects and Assignments in ELT, Activity-Based Learning in ELT, Developing e-content (on Core content of teaching English) of the syllabus, were major works here.

Table 1. List of Social Contributory Micro-learning (SCML) Activities Employed

No.	Year	SCML Activity	Description	Tools Incorporated	Mode	End Product	Assessment
1.	SY B.Ed	Teaching phrases & idioms in ELT	Flashcard- photograph illustrating an idiom/phrase	Photos-mobile Canva, Snapseed	WhatsApp, Google classroom group session	e-Booklet content + contributed flashcards	Self-/peer assessment
2.	SY B.Ed	Riddles & jokes in ESL classroom	Teacher shared riddle/joke, + use in ELT	Jokes, riddles, photos, video online	WhatsApp, Google Classroom	e-Booklet content + shared jokes/ riddles	Peer feedback
3.	SY B.Ed	Using memes in ELT	Teacher shared meme + insights on use in ELT	Online memes	Online WhatsApp group discussions	e-Booklet, shared memes + use in ELT	Peer feedback
4.	SY B.Ed	Activity-based learning	Teacher shared activity, discussions	Reflections from internship	Reflective teaching	e-booklet, reflective journal	Rubric
5.	SY B.Ed	Designing projects & assignments in ELT	Orientation on interdisciplinary, sports/arts integrated projects	NCERT, CBSE documents providing guidelines	Group work, online Google classroom	e-Portfolio	Rubric review session

6.	SY & FY B.Ed	Seminar presentation - Unit 6	Orientation, core content of teaching English	Online/offline resources	Individual/group presentations	Presentations - video, small group	Rubric peer assessment
7.	SY & FY B.Ed	Non-verbal communication in ELT	Flipped classroom, self-reflection	Online articles, OUP & British Council Blogs	Individual and group work, WhatsApp	Jigsaw learning e-Booklet	Peer feedback
8.	FY B.Ed	Teaching vocabulary in ELT	Phased learning- Shared ideas & games on	Experience, self-reflection, online resources	Online, WhatsApp group	e-Booklet	Self-assessment
9.	SY B.Ed	Writing reference helper	Case study, lecture, samplers	Online discussions boards	Online, WhatsApp, group projects	e-Portfolios, writing reference helper	Rubric

Methodology

Series of social contributory micro-learning activities were employed in a phased manner, first with S.Y B.Ed students (N=27), studying Methodology of Teaching English followed by the F. Y B.Ed (N=21) students. Students of both years showed high level of engagement with the content as well as effective interaction with peers across groups. But the second year students fared better in achieving higher level cognitive objectives, possibly because they were better equipped with the subsequent content knowledge, as compared to the first year students. Hence the researcher sought to improvise the evolved strategies to suit the needs of the first year students. Similar social micro-learning activities when enriched with appropriate scaffolding techniques, such as access to related online learning resources to clear basic concepts, contributory explanations, insights afforded through synchronous group sessions and intermittent peer as well as teacher feed-forwards, proved extremely effective and led to a gradual progression through an upward spiral of competence development, even amongst the novice first year students.

Analysis

Student Survey, Online Discussion coupled with Interview and Concrete Work Samplers of the students were the primary sources of insights regarding learner's perceptions and the overall effectiveness of the learning model. The superior quality of student's work samplers, in the form of E-Posters, E-Booklets, Presentations, Projects, E-lessons and E-Portfolios which were assessed using rubrics confirmed the achievement of higher learning objectives. An online Likert-style quantitative survey adapted from G. Hansaw, followed by online discussion, interview questions and self-reflection statement from the students validated the effectiveness of these activities.

Table 2. Survey Results of the SY B.Ed Student's Responses

Survey Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. Improves knowledge acquisition & retention	63 %	37 %			
2. Learning as active process	55.6 %	40.7 %			
3. Interactions between peers fosters ties with content	40.7%	51.9 %	7.4%		
4. Promotes learning insights	44.4 %	51.9 %			

5. Promotes learning from self-reflection & critical feedback	59.3 %	33.3 %	7.4 %
6. Results in deep learning	44.4 %	44.4 %	11.1 %
7. Dynamic approach deepens critical understanding	40.7 %	48.1 %	11.1 %
8. Enhances teamwork & spirit	48.1 %	48.1 %	
9. Knowledge creation affords sense of accomplishment	63 %	37 %	
10. Improves learning performance in terms of autonomy, relatedness & satisfaction.	59.3 %	37 %	

Group Discussion & Interview of the second year students show three emergent themes regarding the efficacy of the activities, readiness to transfer the knowledge gained in the classrooms and satisfaction of achievement, as evident from the following replies of the students quoted;

- These micro-learning activities were effective, engaging and also efficient in achieving the desired learning outcome. They increased knowledge and improved the performance. They helped us in learning new techniques and new E- activities in ELT. It was a wonderful experience using these activities in college.
- Definitely yes! These activities were effective in achieving the desired learning outcome in the online teaching mode. Helped better concept understanding, thinking critically hence enhancing knowledge.

Discussions

The analysis of the above data shows that social contributory micro-learning activities improved learning performance, not only in terms of factual knowledge but also enhanced students motivation in terms of increased learner autonomy, competence, relatedness and learning satisfaction. These activities improve knowledge acquisition and retention as it allowed learners to engage in short, focused segments of spaced learning, related to course objectives. Learners as co-creators and co-users of knowledge, transform learning into an active process. Interaction between peers over shared goals, through various social media platforms, fostered strong connections amongst distant/remote learners. It promotes learning from insights and self- reflection. Constructive and critical feedback from peers also helps improvise their ideas. Dynamic approach to learning helps learners to consider content from multiple angles, thereby deepening critical understanding. Collaborative learning enhances teamwork, sense of shared responsibility towards success motivates learner to fair better, gives a sense of belongingness and improves self-esteem. Knowledge creation afforded a sense of accomplishment.

Conclusion

Social Contributory Micro-Learning environment can be suitably adapted to online learning, for enhanced learner engagement, making it conducive to motivate learners to pursue higher level learning outcomes. In a pre-dominantly practicum based Teacher Education Program (B.Ed), it led to a successful exploration of a series of contributory micro-learning activities, in the Methodology of Teaching English, thereby encouraging the teacher and the students to become co-learners and co-creators of content. Evolved strategies sought to engage learners in social micro-learning activities related to higher order cognitive objectives – such as analysing, evaluating and creating – by utilising online platforms and social software. Learners equipped with the subsequent content knowledge base, gain deeper insights, though similar activities when duly adapted through appropriate scaffolding techniques, do yield a gradual progression through an upward spiral of competence development.

Limitations and Future Studies

The study was limited to the students of SY & FY B.Ed studying Methodology of Teaching English. The results may not be suitable for to other populations. The second year students were key to this study as they had undergone both the modes of pedagogy. Comparing their performance before and after the incorporation of the micro-learning

activities could be more relevant. Also, online learning enforced due to COVID-19 had its own limitations forced on the total learning scenario. But these restrictions were also the ones that hard pressed one to look for creative ventures and innovative solutions. More detailed data, properly analysed for equivalent content units, for the both the years of students would rather give a more reliable picture.

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Innovations in Pedagogy, Student's Assessment, Technology: An Approach to Build a Responsible Citizen and a Better Society

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ABSTRACT

Post COVID-19, online education has evolved as a dominant strategy. However, online teaching is submerged into several limitations viz-a-viz the physical classroom teaching. Online education also suffers from the student's assessment point of view. A few advanced technologies have been adopted by the academic fraternity to address the unethical behaviours of the students. A large number of teachers and trainers are innovating using technology and assessments strategies. This paper describes the commentary on the views of a set of eminent faculty members engaged in teaching at business programs. An unstructured questionnaire collected the data for the innovations in online teaching and student learning. The qualitative data collected from the interviews were analysed using the Nvivo statistical software. A few classified word clouds were generated to gain a clear idea about the frequently emerging keywords. The counting of the words led to the identification of the dominant innovations in pedagogy. The research is expected to enhance the learning and education literature. The key finding of this research is that technology-enabled learning, peer group learning, industry-linked learning, project-based learning, and self-learning pedagogies are prevalent to ensure effective students learnings. The findings of this research share the best practices to the academic fraternity for an improved learning environment for the students. The findings of this research can help the institutions to build advanced technological infrastructure; to the academicians to learn to innovate and adapt learnings from colleagues practising the teaching and training; to build ethical behaviour among the students and engage them in a classroom environment.

Keywords: innovation, teaching pedagogy, qualitative research, word cloud, nvivo

Introduction

This research was started with the quest to compile knowledge around teaching pedagogies and best practices to benefit the classroom for effective learning of students. The literature review on the subject was an eye-opener to know that so many innovative teaching pedagogies existed in a fragmented manner. Further, the review of the literature revealed that the research on pedagogical innovations is fragmented. This research is an attempt to bridge this gap and to bring the fragmented literature to a single platform for quick dissemination of this knowledge, and make an impact on the academic fraternity, and thereby the students' effective learning environment, and finally to the society.

The core propositions of effective teaching are that a teacher is committed, knowledgeable, responsive, systematic, and a member of learning communities. Thus, pedagogy is the art and science of teaching (Bhowmik, Roy, & Banerjee, 2013). The innovative teaching pedagogy comprises an empirical, interdisciplinary, student-focused pedagogy that promotes international best practice, team building and leadership competencies supported by technology.

The key research questions that need examination are:

Research Question 1: What are the various innovative teaching pedagogical best practices across disciplines reported in the literature over the last two decades?

Research Question 2: What is the view of teachers and students on innovative teaching pedagogies?

Content Analysis

In order to answer the RQ1, we conducted a review of the literature and using content analysis, and we report the innovations in teaching pedagogies as follows. We conducted our literature review using EBSCO, ProQuest, ABI/Informs, Elsevier databases using the keywords as innovation in teaching, teaching pedagogies, etc.

Collaborative learning: Collaborative learning in peer groups using simulation was reported to have effective student outcomes in the economics courses at the Clarion University of Pennsylvania. The students made independent consumer decisions, production decisions. Collaborative learning leverages individual strengths and attributes by accepting diversity to achieve personal goals and engaging in a dynamic and interconnected society (Raehsler, Haggerty, & Caroppreso, 1996). The students become active partners to meaningfully contribute to self and peers' learning with increased creativity and responsiveness.

Technology-enabled learning (TEL): The TEL is about engaging students with business databases, econometric tools, eLibrary, internet tools, office tools, websites, applications, business games, simulations (Mehra & Mital, 2007). The additional TEL emerged in recent times: meeting rooms, breakout rooms, online assessments, campus solutions for courses design, curriculum design, delivery, assessment, plagiarism checks, virtual conferences, web-based surveys, projectors, and video conferencing. The schools heavily invest in the TEL infrastructure. The key antecedents to the effective use of TEL are the faculty and student's adaptation, years of experience, ease of use, training.

Reflective teaching pedagogies: It advocates creativity and innovative thinking in teaching and learning. Technology is predominantly being used in most teaching pedagogies (Salmon, 2005).

Socratic Lecture Model (SLM): It is defined as the forward questioning to ignite the innovating thinking (Arvind, 2013). The key attributes of SLM are interactive classrooms (flow and connection in previous class/concept, present class/concept, and next class/concepts); time management (interaction requires time beyond lecture content), a teacher is not a devil's advocate (teacher participate like a friend), student participation (teach students how to learn), feeds students with endless content (questioning activate thoughts underneath), self-directed learning (independent of teachers), focus on moral education (strong relationships and values).

Design labs: In architectural education, evidence was found that the students socialise and interact with them in the labs, which creates cohesiveness and increases the sense of unity and commitment. The students also learn from the experiences of others in the design labs. Students grow better by making mistakes in a laboratory environment (Kavousi & Miller, 2014).

Industry-oriented education (IEO): A curriculum in which courses and classes are tailored to real-world business application and industry are linked to make the students employment-ready (Gharehbaghi, 2015). The faculty members establish regular interaction with the industry employing research projects, case studies, student projects, guest sessions, live debates.

Quiz type powerpoint games: To improve students' participation, interaction and performance, it was advocated to use online formative instead of summative assessments by teachers (Squire, 2019). The online quiz-type PowerPoint games were also an effective learning strategy for first-year writing courses.

Innovation orientation: The instructors can support and encourage students to think in an innovative manner rather than being just authoritative to know the framed bookish knowledge and follow a defined program (Jain, 2019). They raised a few important questions, such as can the teaching pedagogies be more innovation-oriented than exam-oriented? Can the pedagogy focus on life and entrepreneurial skill development beyond geographical boundaries rooted in raw innovation, experiments and inspiration?

Peer group learning: In a Bhutanian research study, the students claimed that either the teaching was very fast, or the teacher just gave the notes, and the concepts taught were unclear to the students even from notes. However, the concepts got clear when a high achiever student taught low achiever students in remedial sessions in hostels or session recess (Utha & Rinzin, 2019). Unfortunately, the teachers are most unapproachable after the session, and

the comfort zone between the student and teacher is generally nonexistent in most cases.

Crisis Resilience Pedagogy (CRP): CRP is defined as an approach with which a teacher adapts innovatively and quickly to new circumstances. The advent of the new term CRP has emerged as an outcome of the pandemic and virtual mode of teaching. The key attributes of the CRP described are adaptability, creativity, connectivity, diversity, and endurance with an objective of flexibility and sustainability (Chow, Lam, & King, 2020). We explore the use of resilience pedagogy in times of crisis. First, we propose Crisis Resilience Pedagogy (CRP).

Empirical Analysis

To answer our RQ2, we surveyed the teachers and students. The survey of the teachers comprised unstructured qualitative questions. The analysis in this paper was represented by the faculty members and students of five business schools in India.

Teachers' Viewpoint

A few of the pedagogical innovations that emerged out of the teachers' survey are described below:

Innovations in online teaching: Online simulation, recorded videos, use of breakout rooms, virtual class as a debate platform, online games, use of poll, surprise instant quizzes, quizzes with more than four choices MCQ, use of new meeting platforms such as MS team, Velox, etc.

Innovation in physical teaching: Hands-on problem-solving, case study discussions, role-plays involving extensive use of acts and expression, in-class simulations, in-class exercises, use of props.

A management teacher quoted an interesting view: everyone talks about the burnout, boredom, monotony, and depression of students due to online education, and the impact on instructor health has not been given sufficient attention. However, unfortunately, the instructor's health has also been significantly affected during the pandemic and remains unaddressed.

Students' Viewpoint

The inputs from management students revealed students' perspectives about the pedagogical expectations. The qualitative analysis is presented in Figures 1 and 2.

Innovation in online teaching: Breakout rooms, the use of digital communication apps, a hybrid model of the online and physical classroom, and chat for questions and answers.

Innovation in physical teaching: More practical examples, group work, research-based self-studies, class brainstorming, personal interaction, positive atmosphere etc.

Some students suggested that a few innovative assessment ideas such as 1) the students can be asked to design their questions and answer those questions from the content taught by the teacher, 2) students selected but the teacher guided the project work.



Figure 1. Students' viewpoint



Figure 2. Teachers' viewpoint

Conclusion

We notice that the word 'cloud' from the three sources (literature, students survey, and teachers survey) reveals consistent results. The technology enables learning, and self-peer group learnings appear to be the dominant learning pedagogies. The review of teaching pedagogies and the survey of the faculty and students from premier schools of India indicates that the purpose of teaching should be effective student learning. The innovative practices that emerged from content and survey analysis were that technology enables learnings, peer group learning, Socratic learning, project-based learning, experiential learning, industry linked learnings, crisis resilient teaching, reflective learning, and collaborative learning. Adaptation to these innovations and pedagogies can help deliver students effective learning and develop better and more responsible individuals.

This research can be extended by a comprehensive review of the literature and a wider survey of the teachers and students to bring all the best pedagogies and their limitations to a single platform. This can be transformational to society at large.

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Challenges and Implications of Developing English Speaking Skills Using Task-Based Approach

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ABSTRACT

This paper aims at tracing the nature of the challenges and their implication for teaching-learning speaking skills using the task-based learning approach. The focus remains on the action/activities followed during the classroom interaction. This qualitative study is concept-based, using a synthesis research design. It analyses various arguments and counterarguments weighing task-based learning as an enabler of fruitful learning likely to be implemented practically. First, all viewpoints are collated, then analysed, and finally carefully perused to get a comprehensive understanding of the notion. The findings indicate that task-based learning is more process-oriented than product-oriented where the learners become the active members and the teacher is the facilitator. The approach may be different but it is productive when properly put to use. This approach, despite the challenges and gaps, remains productive and constructive and may help teachers, students and the learning outcomes.

Keywords: task-based teaching, ESL, developing speaking skills, challenges

Introduction

Speaking is the main core feature of second language learning and teaching. English is not only the medium of day-to-day interactions but also the language of international importance. The need of ESL programs is very important and specific as every sector demands proficiency in the English language (Holfester, 2019). It is the language of international academia, international commerce, bureaucracy, etc. (Khoshsima & Shokiri, 2016). As speech is the most primary means of interpersonal relations, learning to speak is very important. With the importance of English as an international language, even the non-native speakers of English have to learn to speak, especially the students for their future academic endeavours. For secondary school students, the general language skills (vocabulary, grammar, language expression, and comprehension) provide the foundation for academic success where they fall behind (Rogde et al., 2016). Teaching of speaking skills has to be focused on more by adding respective curriculum measures. It is evidently seen that the learners are not getting the intended input from the teachers (Klu & Mukhuba, 2017). The silent way technique, total physical response, scaffolding, the direct approach, the whole language approach, and the interactive student centred approach are the common instructional methods used to teach ESL to these learners which help them to come to the mainstream or get future opportunities in international sectors (Holfester, 2019). Language learning includes grammar, vocabulary, communication skills (listening, speaking, reading, writing), for the contextualised task. That is why in recent years a number of researchers, and experts have called for a move in language teaching towards task-based approaches to instruction (Prabhu, 1987; Nunan, 2004; Ellis, 2003/2000).

Task-based teaching (TBT) (Prabhu, 1987) promotes L2 learning more as it provides better contexts, activates and opens the learner for language learning, especially speaking skills because the central component of TBT in a language classroom is the task (Shehadeh, 2005). TBT being learner-centric in nature eases comprehensive communication (Malihah, 2010).

Nunan (2004) prescribed elements such as goals, input, procedures, teacher role, learner role and setting into consideration when designing a task. Basic assumptions of TBT are (Murad, 2009):

- focus is on product as well as process
- involves activities and task focusing on communication and meaning

- interaction, communication and engagement via meaningful activities
- activities are based on learners' purpose or pedagogy purpose specific to the classroom
- activities and task can be sequenced as per difficulty

Researchers have specified the importance of task-based instructions in improving learners' speaking skills (Nget et al., 2020; Safitri et al., 2019; Leslie, 2014); speaking accuracy and fluency (Munirah & Muhsin, 2015). Harmer (2001) states three basic reasons for administering speaking tasks to students in the classroom: speaking activities provide chances to **rehearse** the real-life language use; speaking tasks provide **feedback** for both teacher and students; and they provide opportunities to the students to activate the various elements of language they have stored in their brains (**engagement**). A task-based approach instruction in speaking skills includes preparation and material phase before pre-task, pre-task (introducing topic, explaining the task, and learning goal), during-task (task, planning, and report), and post-task (involves procedure) (Malihah, 2010; Frost, 2004).

Besides the importance of TBT in developing speaking skills, there are challenges and problems in implementing it in language classrooms due to the cultural difference in settings and elements involved in TBT. The focus (being on task, student-centric, and process) creates challenges at different levels /facets (stakeholders): teacher /learner and institution (school /college) /curriculum /syllabus. Thus, the aim of this study is to present the challenges faced in implementing TBT with respect to speaking skills.

Methodology

This is a qualitative study using a synthesis approach. The database includes secondary sources (mainly research articles in English language teaching, TBT, speaking skills, etc.). The studies used for synthesis are from the latest 10-year publication published in English language only.

Findings and Analysis

The analysis of problems and challenges in TBT implementation have been done at three levels in this study: institute, teacher and learner (see Table 1). The study attempts to analyse these three levels to bring clarity in the concept of TBT to enhance speaking skills during language classroom teaching/learning.

The above-mentioned problems and challenges occur due to change in classroom culture and context. The role of teacher, learner, and materials get changed in TBT as compared to traditional approaches used earlier. The focus has now shifted to learner and process along with product (outcomes) through making the learners rehearse, providing feedback, and engaging through meaningful tasks and activities. The break in the classroom culture maintaining the routine activities led to new strategies as per defined tasks. This leads to differences in the working culture of classroom context, teaching/learning, and instructional materials.

Challenges opened up a new vista for seeking solutions to make learning meaningful. Various suggestions like moving from "adoption to adaptation" (Butler, 2011, p. 43), which means supporting a contextualised version of TBT that may better suit the local needs and educational values. Also, the curriculum based on communicative competence and introduction and development of a 'situated task-based approach' (Kim, et al., 2017; McDonough, 2015; Carless, 2007) has been suggested. There is also a need to make the systematic, practical and continuous teacher training learner-oriented.

Conclusions and Implications

TBT is more effective because of its flexibility. Varied tasks make it easy for the learner to understand and apply the speaking skills in real-life. It provides endless possibilities for a teacher to create a chain of task-based activities which make the learner more active and open in the classroom. TBT enhances speaking skills through goals, input, procedures, teacher role, learner role and setting.

The challenges are at multiple levels: institute, teacher, and learner. The nature of the challenges has changed due to the shift in classroom culture and context, teaching and learning pattern, and process and product. The challenges have led to the solutions which are more congruent with the latest changes. Thus, there is a need to focus more on the adaptability as per the teaching/learning needs and current evolution of required speaking skills.

Table 1. Problems and Challenges

Levels		Problems and Challenges at Different Levels					Authors
Institute	competitive grammar-oriented college examination system	goals of the curriculum and syllabus	a mismatch between what the government wants and the reality of what is happening inside the classroom	pressure of curriculum			Liu and Xiong (2016); Zheng and Borg, 2014); Taylor (2011); Thomas and Reinders (2010);
Teacher	Misunderstanding of the method	Definition of 'task'	lack of teachers' clarity on the term	Inadequate teacher training in TBT methodology	lack of opportunities to practice TBT	Not always locally appropriate	Zhang (2007) Littlewood, (2004); Baker and Westrup (2003); Hedge (2000); Tong, Adamson and Che (2000)
Learner	Not always locally appropriate	need to practise more different tasks in order to be fluent in speaking.	Dominance of first language	Lack of exposure	Lack of confidence		

The classroom environment needs to be changed in such a way that provides for task-based and practice-based teaching/learning opportunities to make the teacher/learner familiar and user-friendly with this approach. Teachers need to be made aware about the concept of the current approaches and techniques to be used in teaching/learning, learner habits and style through professional development and self-awareness to accommodate the requirements in improving speaking skills of the students. The use of technology may help in increasing awareness and exposure of task-based techniques in teaching/learning to focus on learner-centric classrooms and learning outcomes.

There is a need to focus on the task developed to practice in a particular context. Local context and cultural aspects of the teachers and learners are to be kept in mind to make the task easy and practical while performing. The consideration of local context and cultural aspects (in terms of living styles, food, festivals, etc.) may help in healthy familiarisation towards TBT approach in achieving the learning outcome. Thus, there will be more opportunity to use the task TBT approach for teachers as well as learners. This will provide meaningful contexts in the classroom.

More practice may lead to an increase in confidence of the learners. This will boost their confidence to participate more in tasks provided to them. The learners will also open up with their teachers, and share a good teacher/learner relationship. This may help in bringing the learners their problem to the classroom, sharing them, and asking for help.

Consequently, some modifications are also required in the assessment procedure to adapt to TBT. This may ease in removing the challenge at institute level to some aspects and again provide a comfortable environment at all three levels: institute, teacher, and learner.

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Assessing the Understanding Level of Students for the Computer Programming Course through MATLAB: A Case Study of Working Professional Student

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ABSTRACT

As new digital technologies evolve in various engineering facets, there is a need for an engineer, as a stakeholder to understand and comprehend the backbone of the technologies and the logical framework involved. Programming plays an important role to understand it easily, therefore, the article emphasises the impact of teaching programming to the engineers and its effectiveness with respect to the learning outcomes. The case study involves working professionals who are students at the largest technical institute which offers work-integrated learning programs in India. The research is carried out for the recently concluded course Computer Programming in their current semester which was taught through MATLAB. It has been observed through a feedback survey that the level of understanding of the logic and the software was increased significantly at the end of the semester.

Keywords: MATLAB, work integrated technologies

Introduction

As digital technologies evolve in majority of engineering domains, there is increased emphasis on understanding and applying these technologies in the respective organisations. To understand these technologies the student should be equipped with the logical framework and programming level knowledge to comprehend the required changes in his or her workplace projects. Traditionally, engineering education involved teaching programming through high level languages such as C and Fortran, students need to understand, comprehend, and implement lengthy codes and programs to perform numerical computation. This led to many learners perceiving the course as a time-consuming task and difficult to debug and complete the scripts and thus limited the computation for their projects, assignments, and lab work.

With the advent of new age languages such as MATLAB and PYTHON, and its applicability in technology, it is gaining interest among the students and working community. However, PYTHON is an object-oriented language whereas MATLAB uses MATRIX for technical computation. In a core engineering program, MATLAB is most suited for foundational knowledge of computation, programming, and applications. In university environments, it is the standard instructional tool for introductory and advanced courses in mathematics, engineering, and science (CIMSS, 2021). Therefore, many universities started reviewing their course curriculum for foundation programming course and replaced C with MATLAB. The need to solve numerical computations and the use of modularised functions was the primary reason for the change. MATLAB is a high-level programming language developed by MathWorks. MATLAB allows matrix operations, plotting of functions and data, implementation of algorithms, user interfaces, and compatibility with other programs (Muhammad et.al., 2014). This article is an inquiry into the understanding level of computer programming course using MATLAB. The aim is to explore the impact on the working professional student. The course is offered as a foundation level course in four units and is offered to B. Tech (Engineering Technology) students who are working professionals employed in various organisations and pursuing their education in India's leading university (BITS, Pilani), which is one of the first universities to offer technical education for working professionals without having a career break. The rigour and curriculum are designed at par with the on-campus programme. Course pedagogy is offered through state-of-art technology platform. Labs are offered in virtual and remote mode through cloud-based servers. Since the course is offered

in the first semester of the program, the students need to understand the foundational concepts in MATLAB and programming. The article attempts to comprehend the following questions for effective teaching-learning practices to be followed in this course.

- Are the learning outcomes as per the student's expectation?
- Which concepts in MATLAB are difficult to understand?
- What is the satisfaction level in Assessment?
- Find the impact of MATLAB course in their workplace.
- What is the feedback about the course?

To perform this inquiry, extensive literature review was carried out, as discussed below.

Literature Review

Engineering education for the working professionals is an innovative approach. This model of education should design courses and programs to meet their expectation without compromising the rigour of any typical on-campus university course. The vital components of engineering education are problem-solving, designing, idea generation, and implementation (Chan and Fok, 2009). Universities and engineering institutes need to equip working professional students with theoretical knowledge along with the practical use cases. These cases demand a profound understanding in the foundation courses offered. Most of the institutions normally focus on course curriculum design and instructional delivery in the classroom (Noguez and Sucar; Xiaoyan et al., 2006) and therefore the practical use cases are not covered in-depth in the curriculum. The alignment of foundation courses with future coursework is essential to climb the learning curve ladder and therefore such an attempt was made in the computer programming course which was using C language till 2016. The course was modified using MATLAB as a tool without compromising the basic tenets of programming a computer used in earlier coursework that involved C as the tool. Mike Fitzpatrick et. offered MATLAB in their programming course at Vanderbilt university due to its versatility and also its applications find their place in a variety of domains such as natural sciences, social studies, and finance, as well as engineering, and it is used extensively in the industry as well. Many students across the globe were attracted to their MOOC which offered MATLAB as the tool (Mike Fitzpatrick et. AL.2021). This success of MOOC (Massive Open Online Course) provided the motivation for revising the course. Few ideas that were adapted from various MOOC's are:

- The students are self-directed and independent.
- The students bring in a reservoir of experience which they can use in the course.
- There is a need to understand the relevance or need to learn (Knowles, 1984)

With this background and review, after six months of deliberations and meetings the authors got the programme committee to offer the foundation course of four units.

Instruction Methodology

The course was revised to be offered using the flipped model, and the video content was curated by faculty experts in computer science. Such a classroom where the students come prepared by watching video content is called a flipped classroom (FC). The students have sufficient pre-class instructional material and apply the concepts learnt for problem-solving in the class. The popularity of this pedagogical approach has been growing at a rapid pace during the last decade and has been implemented and tested in a wide variety of educational contexts (Bergmann & Sams, 2012).

However, there is a constant debate about the merits and demerits of such a classroom. Some education researchers presume that this approach has positive effect in terms of learning outcomes and self-paced learning capabilities of students (Lape et al, 2014), others hypothesise that student's lack self-regulated learning capabilities in such an approach (Lai & Hwang, 2016). After studying various literature review and its impact on learning outcomes, the course handout was developed (Kale et al., 2021) as shown in Figure 1.

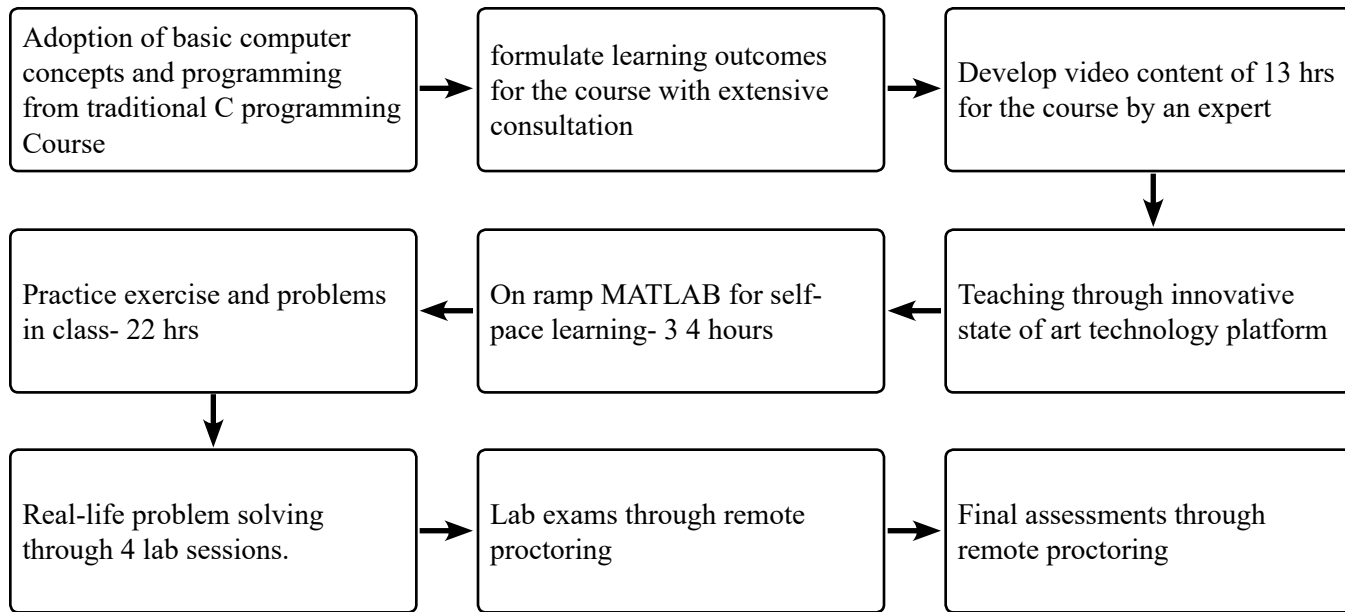


Figure 1. Instructional and assessment approach for computer programming (MATLAB) course

The detailed methodology of this pedagogical approach on learning outcomes has been discussed below.

Methodology

The following methodology was adopted to assess the understanding level of students in the computer programming (MATLAB) course.

- Survey mechanism for the class to gauge the class inputs on the applicability
- Study the impact of this course on their technical skills
- Which element of this course is well understood, and which is not
- Assessment review and feedback for the course.

The survey instrument used both the qualitative and quantitative method for analysis (Likert scale) and feedback from Learning Management System (LMS). It was categorised in the following manner.

- Background information
- Prior programming knowledge
- Concept understanding level in each module taught and in the lab
- Concept understanding in on-ramp
- Confidence to apply MATLAB in organisation problem-solving
- Course rating and feedback analysis

Analysis

Analysis for understanding the impact of learning outcomes should assess the learning gained with respect to knowledge and an, analysis of the context of the course since all the students are working professionals too. Therefore, the analysis should assess whether the instructional coursework is fulfilling their expectation.

The survey was sent to 420 continuing students of B. Tech. (Engineering Technology). Out of 420 students, 77 students recorded their responses which was 18 per cent of the total population. The response rate is at 10 per cent error as per survey monkey statistics which is valid in gauging the responses (Survey Monkey, 2021). The average age of the class was 31 years, and the average work experience is 10 years. This data reveals that the students have sufficient workplace experience, and they need skills that can be applied in their workplace, therefore the emphasis

was on application through concept mapping. Further, background screening validated that the students are majorly from the manufacturing industry (58 per cent), and service industry (39 per cent) and area of work mainly is in production, quality, and maintenance. Therefore, introduction of lab components in the course was very much linked to the above work functions of the continuing students. Before the commencement of the course 60 per cent did not have any knowledge of programming and did not apply any programming technique in their workplace. 40 per cent did have elementary or basic exposure in their diploma programme. Further, the survey posed the questions on learning outcomes, assessment, and application of programming in their workplace. The learning outcomes were analysed based on the following Likert Scale in terms of understand level (1: least effort 2: little effort 3: fine/neutral 4: somewhat difficult 5: very difficult). To analyse whether the student understood the various components highlighted in course handout the following data was obtained from the survey responses as shown in Figure 2.

Kindly rate the concept understanding for MATLAB in the Scale of 1 to 5 (1: Least 2: Little effort 3: Fine 4: Somewhat difficult 5: Very Difficult

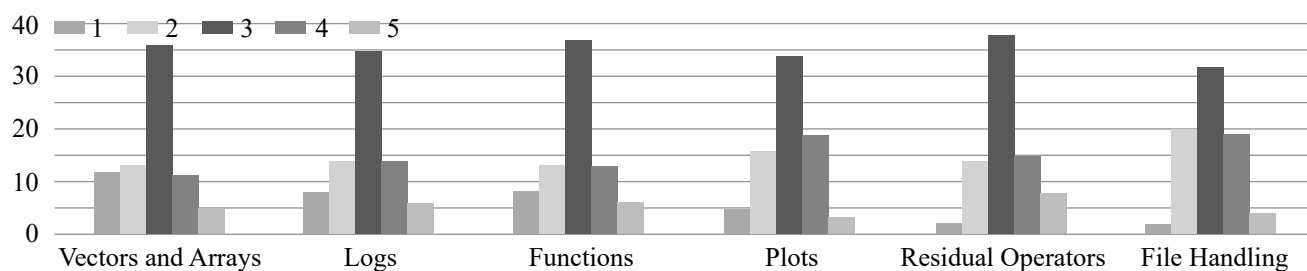


Figure 2. Concept understanding in course

Kindly rate the concept understanding for Lab offered in MATLAB in the Scale of 1 to 5 (1: Least 2: Little effort 3: Fine 4: Somewhat difficult 5: Very Difficult

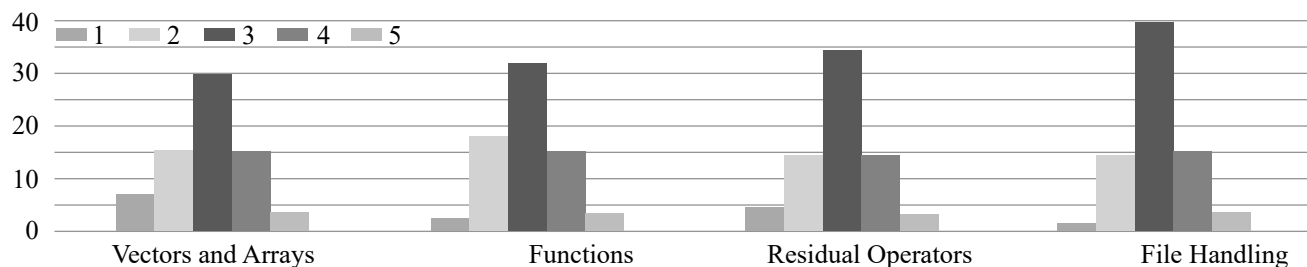


Figure 3. Concept understanding in lab modules

The data revealed that very few percentages of students found it very difficult to understand the concept (approx. 10 per cent). Similarly, the concept taught in the lab modules was also analysed which also indicated the same response. The analysis is shown in Figure 3. The responses in lab were very encouraging as these modules were planned to understand complex numerical computation which can be used for all applications. The survey also inquired about their interest in the course and 58 per cent rated it excellent, whereas 25 per cent rated it as good and 17 per cent not so good. More than 85 per cent were satisfied with the instructional design of the course and more than 90 per cent students were satisfied with the lab and the course pedagogy. This was also tested with the quantitative feedback in LMS which was 4.3 out of 5 means 86 per cent were satisfied. 70 per cent students feel that they are confident of using MATLAB in their projects in the workplace. 94 per cent students felt that the learning outcomes were achieved in the course and 77 per cent felt the same instructional design can be used for other technical courses for the programme. The assessment with respect to MGPA was found to be higher than the other three courses in the semester.

Discussions and Limitation

The decision to offer MATLAB as a tool in the foundation course was found to be valid from the survey responses. The instructional design of the course was in line with student expectation and the course outcomes. The learning outcomes were fairly achieved from the received responses. However, to test the efficacy, further interviewing and exploratory inquiry is required, which was not done. Therefore, validation of the result can't be examined as yes or no. Also, the course needs deeper hypothesis testing to test the impact of learning based on faculty delivery as, there are many factors which can affect the learning and satisfaction of the students. Therefore, to get the correct outcome, a more controlled experiment needs to be performed. Further, inquiry needs to be established and statistically proven.

Conclusion

Overall, the research inquiry clearly points that the directions and interventions in the traditional course with MATLAB as a tool led to increased interest among the working professional students and achieved the stated learning outcomes of the course. The students enjoyed learning in this course and performed better because of the blended instructional approach.

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Content Analysis of Research on Blended Learning in Higher Education in India: Current Progress and Future Directions

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ABSTRACT

The concept of blended learning in education is becoming mature, thanks to the main target on many of its research topics for an extended time. This research is undoubtedly extended to the body of data, yet the various definitions of blended learning in existing literature indicate the shortage of consensus on true meaning of the concept. It's therefore expected that these discrepancies will further constrain the development and use of blended learning in education, especially in India. The goal of this paper is to analyse the research articles for the definitions of blended learning, academicians' view towards the pedagogical approach of blended learning, and identify the present understanding of what researchers mean by the concept. The researcher has used an inductive content analysis of 27 research articles published in peer-reviewed journals from scholarly databases for understanding and developing the generic template for blended learning in HEIs. The articles included for the analysis are relevant to blended learning for HEIs in India. This study focuses on the present understanding of blended learning in education in India, This study focuses on the current understanding of blended learning in higher education in India. Multiple gaps have been identified and suggestions for future studies are proposed based on extant literature on blended learning. It is proposed that the findings of this study can serve as foundations of HEIs in India for the progress and implementation of blended learning in both academic and research fields.

Keywords: blended learning, content analysis, HEIs

Introduction

Higher education institutes (HEIs) in India are in a transition phase in adopting the modern pedagogical approaches in teaching and learning process. The recent tech-driven approach of blended learning has forced HEIs to think beyond the traditional classroom teaching and provide a more accessible and flexible learning environment to the students with regards to course content and use of ICT. The COVID-19 spurred pandemic situation has increased the use of online teaching and learning processes. Considering the opportunity from this, HEIs should focus on developing the curriculum and courses that can assimilate Blended Learning. By virtue of this, the students can gain more knowledge of the subject by using tools like links, webinars, stimulation-based internships or assignments, assessment of same, one-on-one coaching in order to rectify mistakes and enhance skills (Bansal, 2014).

The Term blended learning refers to the aspect of blending physical classroom teaching with online-based learning modules. The amalgamation of classroom learning and learning with online media catalyses cognitive, effectiveness and behavioural components in students. In contrast to traditional learning, blended learning enables efficient teaching-learning environment to proliferate well with substantial flexibility of learning various curricula. The same is the limitation of only e-Learning or only traditional teaching learning (Rabha, 2020).

In a blended-learning approach, three components such as learning activity, students and teachers are moulded in such a way that the different aspects of it can be effectively achieved. Lab rotation blended learning allows students to go from desk to desk and work on various tasks with other classmates under the supervision of the teacher. In case of enriched virtual blended learning, it is more focused on online coursework. They meet their teacher periodically when they want to discuss something with the teacher. In Flex Blended Learning, the students are supposed to learn a module online at their own pace of learning and the rest of learning is in classroom teaching. The Flipped Classroom based blended learning is one more aspect where reversed strategy than usual teaching has been employed. Students are asked to study before the classroom teaching takes place. HEIs in India are undergoing a slow transition from traditional teaching learning to providing holistic development to the students. Blended Learning (BL) provides

prospects for students to build their thinking skills, access to knowledge and flexibility in learning. This study attempts to identify the current research on blended learning which HEIs may use in adopting blended learning.

Methodology

This paper conducts systematic literature review of research papers related to blended learning in Indian Higher education context by means of content analysis. According to (Kassarjian, 1977), “content analysis is a scientific, objective, systematic, quantitative, and generalizable description of communications content.” The researcher has followed the inductive category development approach (Mayring, 2000) for content analysis. As the name suggests, the approach includes use of inductive reasoning to develop the categories or themes through systematic procedure. The procedure involves collection of data, development of categories, coding the data, assessing reliability and analyzing the results. The literature sample for current study comprises research papers published in scholarly journals which gathered through the use of Google Scholar and concerned databases for downloading the full papers. A Literature search was carried out with the words, “Blended learning” and “Higher education”. After carefully reading the abstracts the papers relevant to the Indian context are selected for the current study. The set of 25 research papers and two conference proceedings are found relevant for the study. Then according to the procedure, categories are developed inductively (refer Table 1). The steps suggested by Mayring (2000), papers are analysed according to these categories. The results are presented and discussed in view to provide the practical implications to HEIs of India for effective adaptation of blended learning.

Analysis and Result Findings

The research papers are coded according to categories created and this section explains each of these categories with codes from few sample and relevant quotes. Table 1 presents the analytical categories developed and no. of research papers having mention of these categories in their studies.

Table 1. Analytical Categories and No. of Papers having these Categories

Categories	No. of Papers
Nature of Blended learning	20
Student Perspectives	18
Teachers’ Perspectives	5
Use of Technology/Tools	8
Effectiveness of BL	14
Assessment in BL	8
Students Performance	7
Challenges of BL	23
Comparison of BL and traditional teaching method	22
Student Engagement	14
Methods of BL	19
Use of LMS	4
Need of BL	10

The trend line in yearly distribution of research papers shows increase in the publications in last two years for blended learning in HEIs of India. After the pandemic these numbers may increase exponentially.

Sample Coding under each category with sub-categories is shown below in Table 2.

Table 2. Sample Coding

Nature of Blended learning	Kumar, A. (2012), “Blended learning gives learners and teachers a potential environment to learn and teach more effectively. Blended learning provides flexibility to incorporate various curricular and institutional needs, goals and priorities”
Student Perspectives	Badre, P., & Badre, S. (2020), “This study was done under the three parameter perception towards blended learning process, feasibility and ease of using MOODLE in higher education and content used in Blended learning methods.”
Teachers’ Perspectives	(Dwivedi et al., 2019), “Teacher’s concern and involvement with the students have been seen to influence learner’s intent to persist; the level of cognitive engagement has also been identified as an important aspect of student’s participation.”
Use of Technology/ Tools	(Pandit, 2020), “Indian education may be caught in the web of ineffective techniques of teaching and thereby produce ineffective graduates who may be rejected by the corporate world, according to Darwin’s theory of survival of the fittest.”
Effectiveness of BL	(Goyal & Tambe, 2015), “with the positive feedback from the students and a successful adoption of MOODLE by the teachers, it was possible to present a case, about the effectiveness of using technology in a business school, to the institute’s management.”
Assessment in BL	(Selvakumar & Sivakumar, 2019), “The main aim of this research study explores the impact of the Blended Learning Environment on students’ academic achievement.”
Students Performance	(Sanjeev & Natrajan, 2019), “There are a lot of factors affecting the performance of the students like personal, environmental, and instructional. However, an education institute or a teacher can only focus on the instructional aspect.”
Challenges in BL	Bansal P. (2014), “These challenges include a large population of learners from varied backgrounds, needs, motivations, abilities, learning preferences, time availability and course content requirements; a greater number and variety of higher education places without corresponding increase in funding; a demand for more “client” responsive and flexible courses; and the drive to use information and communication technology (ICT) in teaching and administration.”
Comparison of BL and traditional teaching method	(Nayar & Koul, 2020), “The findings indicate the improved learning effectiveness of blended learning tools vis-a-vis traditional tools. Generation Z students were more engaged with the use of blended learning tools and enjoyed the experience. The study recommends blended learning tools for educators aiming to transition from the experience.”
Student Engagement	(Sanjeev & Natrajan, 2019), “The blended learning enhances the engagement level of the students and thus the performance of the students also increases. The current technology-based education must be supplement to the face to face teaching.”
Methods of BL	(Nayar & Koul, 2020), “BL engages students in active learning, which then fosters communication skills, enhances creativity and increases information literacy. This creates a culture among students to use digital platforms for multiple purposes. BL tools like MOOCs, FC, simulation, games, webinars, blogs, etc. are used by many academic institutions.”

Use of LMS	(Roy, 2021), “It is imperative that educational institutions amplify the momentum gained during the lockdown and transition to a BL model supported by the adoption and use of learning management systems (LMSs). Government should support this initiative by providing a centralized LMS.”
Need of BL	(Roy, 2021), “The lockdown has provided the much-needed impetus to reshape higher education in India. Calls for the adoption of blended learning (BL) have been made on prior occasions; this chapter renews that call and stresses its urgency.”

Discussions

This study investigates the current research work carried out related to blended learning in HEIs in the Indian context. The data collection revealed that this area of research is undervalued in the Indian context as only 27 research papers were found relevant to the topic of the study. Also, the researcher observed that the publication in this topic is more conceptual in nature and lacks in empirical study and that is why many authors have mentioned the same as a research gap in this topic. Also, the study indicates that most of the research is happened in understanding the nature of BL, challenges of BL and student teacher perspective towards BL. Few studies have been carried out to understand the effectiveness of BL and tools or media used under the BL. The challenges of BL are mostly categorised in three sections (Bansal P., 2014; Kumar A, 2012) as mentioned below: i. Faculty related included Faculty development, time commitment, lack of support of course design, difficulty in acquiring new teaching and technology skills; ii. Student-related challenges include expectation of less work, lack of time-management skills, self-responsibility of learning, use of technology, interaction with faculty for immediate doubt solving and discussion. iii. The Institutional challenges include technological infrastructure, quality assurance, alignment with institutional goals and priorities, resistance to organisational change and lack of experience in collaborations and partnerships.

Majority of authors have focused on understanding the difference between blended learning and traditional classroom teaching. The comparison factors ((Khan et al., 2012; Nayar & Koul, 2020, Patil & Shinde, 2010) include place of teaching, time of learning, learning methodology, use of technology, assessment methods, involvement of faculty, effectiveness of teaching.

The understanding of the perspectives towards blended learning have drawn the attention of Indian researchers. Challenges to this perspective (Badre, P., & Badre,S. (2020); Dwivedi et al., 2019, Bordoloi et al., 2021; Kaur, 2013;) have also categorised into student perspective, teacher’s perspective and institution or management perspective. These perspectives are understood through learning environment, teaching pedagogy, use of media and technology tools, infrastructure, self-learning by student, quality of content, student expectations and experiences, faculty mindset, percentage of classroom teaching and technology-based teaching, assessment and evaluation, faculty interaction. “One notable observation during this study is that all the researchers who conducted empirical studies have used quasi-experimental research design in which the researcher often does not have control over the treatment, but instead studies pre-existing groups that received different treatments after the fact” (Hande, 2014; Qasem & Viswanathappa, 2016; Nayar & Koul, 2020; Khan et al., 2012; Silvakumar et al., 2020; Dwivedi et al., 2019). The research papers assist in understanding the effectiveness of BL, student performance and student engagement (Selvakumar & Sivakumar, 2019; Khan et al., 2012; Sanjeev & Natrajan, 2019, Dwivedi et al., 2019) conclude that as blended learning increases, so does the student engagement level which creates a positive impact on student performance. Roy, 2021 and Goyal & Tambe, 2015 have presented the put the emphasis on use of LMS (Learning Management system) for making blended learning more effective and their research results indicates the same. The knowledge sharing and collaboration (Kavitha & Jaisingh, 2018) in blended learning environment has constructive influence in enhancing teaching-learning process in higher education.

To conclude the discussion, HIEs in India need blended learning (Roy, 2021; Pandey, 2019) after the COVID-19 pandemic for enabling Indian students for global competitiveness through innovative and integrated learning environment.

Conclusion

In India, the education field is evolving rapidly with new courses and pedagogies. COVID-19 has changed all the equations of education, reflecting in advancement and accelerated growth in a blend of newly developed and traditional teaching. So far academicians and education field experts are working on analysing and studying the nature of blended learning, methods of blended learning, comparison between blended learning and traditional methods, effectiveness of the blended learning methods of over traditional teaching techniques. Change in teaching techniques eventually result in productive changes and improvement in Students. UGC, the apex body in the Indian Higher education has also proposed the inclusion of blended learning aspect which calls for the thorough research on blended learning. It is suggested that the effectiveness of integrated technology in the classroom has been reflected in such a way that fruitful Student Teacher interactions, conceptual understanding and learning core concepts with realtime advancement has become a part of blended learning.

Limitations and Future Studies

The current study has some limitations such as research papers related to blended learning were included from the Indian context only. Though researches have thoroughly identified the categories for content analysis, missing of particular code will be possible. As online teaching adoption has increased due to COVID-19, the use of blended learning after this pandemic will also increase and hence studying the different tools of blended learning empirically is the need of the hour. Also, further studies should be possible on effectiveness of content development, delivery of content and assessment of student's performance.

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Employing Collaborative Problem-Based Learning for an Immersive Online Experience in an Undergraduate Bioinformatics Course

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ABSTRACT

Critical thinking, communication, collaboration, creativity, and problem-solving skills are five essential attributes that ensure that students are well-equipped in working under 21st-century challenges across research and practice settings. Despite their importance, only a few Biology Undergraduate courses have implemented these graduate skills fully or partially or tried to change their course structure to evaluate curriculum activities. The current study reports on implementing a hands-on tutorial programme designed to enhance students' active learning, collaboration, communication, and problem-solving skills of undergraduate biology students. The blending of collaborative and problem-based learning in the hands-on tutorial course was administered two subsequent years to 51(2019–20) and 75 (2020–21) third-year undergraduate students in Bioinformatics. The qualitative feedback of students revealed that students preferred this problem based hands-on tutorial teaching style over the traditional lecture-based format. Also, the individual-specific problem approach generates interest, engagement, and positive experiences among the students. The assessment of such pedagogical intervention was evaluated by the quality and novelty of the students' manuscripts or end semester reports and their respective feedback about their perception of this new intervention. The findings also suggest that the development of collaborative, problem-based actively engaged the students in hands-on sessions, which helped them gain much-needed practical experience by getting exposed to various tools and databases. These hands-on sessions allowed students to acquire the required graduate skills to achieve learning outcomes and complete their end-semester project. The results also revealed that students rated hands-on experiences as coherent and well-structured as it has a rationale that helped them understand the theory better.

Keywords: problem-based learning, collaborative learning, hands-on tutorial, bioinformatics, experiential based learning

Introduction

Bioinformatics is a computational form of Biology that deals with macromolecules by applying “informatics” techniques to understand and organise the information associated with these molecules on a large scale (Luscombe et al., 2001). In India, bioinformatics education research is in continuous progress that involves the creation of bioinformatics centres, training human resources, consortium projects, participation in international sequencing projects, and the development of tools (Som et al., 2019). The current undergraduate course in Biology often lacks Bioinformatics skills that are required for 21st-century employment opportunities. There is also a need to fill the gap between theory and practice in bioinformatics education at different educational levels (Attwood et al., 2019). To overcome this challenge, we need to develop active learning-based hands-on modules that teach students about the necessary skills of bioinformatics and help them learn and apply those skills in real-world problems like genome annotation, drug designing, etc. The key ingredients for active learning modules are experimental design, collaborative effort, hands-on experiments, hypothesis generation, and real-life scientific questions. Students' achievements can be evaluated by their reports describing the evidence for the candidates' involvement. Collaborative learning also has specific multi-student characteristics that promote peer interactions and enhance the learning performance of students. An effective collaborative-Learning technique provides active learning opportunities, motivates students to solve problems in groups, and makes them more confident. Collaborative learning is better than conventional methods that only focus on cognitive and psychomotor aspects rather than active engagement, problem-solving skill development, peer learning, communication, teamwork, and student engagement. There are significant benefits of using Problem Based Learning (PBL) in hands-on tutorials as it is helpful for students to acquire independent knowledge, skills, and competencies at an advanced level (Higher-Order Cognitive Skills) (Jailani et al., 2017).

Problem-based learning's primary goal is to strengthen the students regarding problem identification, analysis, formulation and solving, and development of four essential skills, i.e., communication, corporation or collaboration, critical thinking, and creativity. PBL encourages students to cooperate and authentically solve real-world, professional and scientific problems (Costa-Silva et al., 2018). It also ensures the interaction of students with their instructor (i.e., rapport). This strategy works quite well when it integrates with small group strategies like cooperative or collaborative learning, for it entails knowledge sharing, academic discussions, collective decision-making, mutual critical feedback, and action coordination among the group members (Sugiharto et al., 2019).

Literature Review

Bioinformatics education is still in the initial phase of becoming an established scientific discipline. Sczyeba et al. introduced a hands-on Bioinformatics course at the University of Bielefeld for second-year undergraduate students, where they showed that using an online platform improves students' learning and promotes rapport between students and instructors (Sczyrba et al., 2008). A semi-qualitative study was conducted in a Bioinformatics laboratory-based research project using pre-and post-module quizzes, which incorporated process and content-specific questions. The study showed increased students' engagement, practical Bioinformatics skills, and process-specific knowledge (Brown, 2016). A flipped teaching style was conducted as an integrated group-centred PBL by Davies et al. for master's students. The result of semi-structured interviews showed the effectiveness of PBL as compared to traditional teaching (Davies et al., 2019). In other study using e-Learning Bioinformatics tools for undergraduate Bioinformatics courses at the National University of Singapore, 63 per cent of students of the third year and 90 per cent of students of the second year agreed about the usefulness of this pedagogical intervention and said it positively impacted the learning process (Lim et al., 2009). An application-centred project-based learning was conducted in the Bioinformatics training course by Emery et al. to determine engagement, active thinking, interaction, and discussion among the students. The results showed increased class participation, higher satisfaction, and greater awareness of Bioinformatics resources among the students (Emery & Morgan, 2017).

Methodology

We implemented PBL in *Introduction to Bioinformatics* course taken by IIIrd-year students of two successive batches, viz., 2019–20 and 2020–21. Each student was assigned to work on a unique gene, on which they had to perform the analysis based on the Bioinformatics tool taught each week during the hands-on session (see Table 1 below).

Table 1. List of Weekly Experiments and their Basic Learning Outcomes

Lab session	Learning Activity	Learning Outcomes
1	Investigation of gene variants from the available database and basic information about Python	Capturing the basic understanding of the problem of the gene sequence and improve existing bioinformatics platforms
2–4	Use Python libraries and other bioinformatics tools to locate genes, transcripts, start, stop codons, TFBs, ORFs, etc.	Analysis of gene sequence data and prediction of the possible protein sequence to infer its function.
5–6	Sequence alignments, i.e., pair-wise and multiple using Dynamic Programming, BLAST, CLUSTAL-W for finding out homologous sequence, conserved domains in different gene sequence variants.	They are gaining familiarity with alignment tools and algorithms, i.e., predicting the function and consensus of the gene sequence.

7–8	Use of Phylogenetic analysis algorithms to find out the origin of the gene and generate an optimal tree	Prediction of the origin of the disease, including orthologs, and paralogs, and indicating the recent recipient of the mutated gene.
9–10	Use of various algorithms and tools to analyse consensus data of protein sequence to predict the secondary and tertiary structure of proteins and visualise the active site within the protein structure	To gain familiarity with structural aspects of the protein, and to be able to design ligands to block or minimise the activity of protein

For the 2020–21 batch of students, additionally, groups were formed based on the gene assigned, with each member of a group working on the same gene, but on a different ortholog. Each student had to share their results with others in the group, integrate the data, and present comparative analysis at the beginning of the hands-on session each week. The course culminated with an end-semester report which comprehensively captured all the weekly analysis and a conclusion (Figure 1). Student learning experience was assessed through a survey taken at the end of the semester.

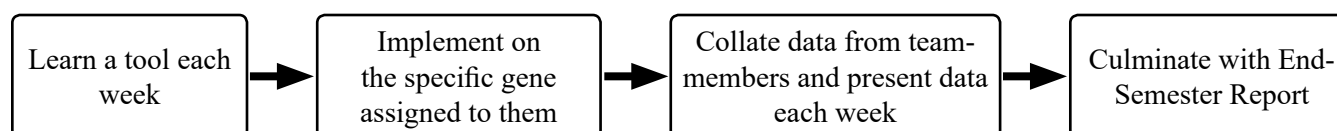


Figure 1. Workflow of hands-on tutorial in 2020–21

Analysis

Learning about Bioinformatics tools was done at an individual level by each student, followed by collaboration in a group, wherein they learnt comparative Bioinformatics analysis. The end-semester report comprised individual data collated over successive weeks and presented in an integrated manner. For instance, one group presented the comparative analysis of *CLK2* gene sequence in Rhesus monkey, house mouse, dog, human, cattle and rat. The G-C content value was similar across species, despite the CDS not being conserved. In the case of poly-A tail regions, isochores and segments were conserved across species. The length of the protein-coding region was approximately equal and found in the positive frame of ORFs among all the species. Pairwise and multiple-sequence alignment between nucleotide sequences of human, dog, and Rhesus monkey indicated that they are highly conserved, while the protein sequences showed alignment only for the Rhesus monkey and dog. The phylogenetic results reveal that humans and Rhesus monkeys are closely related. In the end, the secondary structure of proteins showed that alpha helices, beta sheets, and turns and coils are crucial for protein function and found to be constant across the species.

In a survey conducted to assess this method of learning, in which nearly 76 (2019–20, N=51) and 81 per cent (2020–21, N=75) of students who had enrolled participated, attendance in the hands-on session increased by 14 per cent in 2020–21. Students rated PBL as an effective method of learning (4.23 vs. 3.82 out of 5 in these years), and indicated it should be continued in the future offerings as well (4.67 and 4.17 out of 5). Ratings of demo worksheets and demo videos was also increased in the second offering (3.92 vs. 4.48 out of 5).

Discussion

Bioinformatics has an interdisciplinary nature, so the current study adopts innovative teaching approaches to meet the needs of Biology education. Problem-based learning serves two aspects; first, it provides technical expertise to achieve research outcomes. Second, it provides learning opportunities, induces collaboration, promotes division of work, generates a sense of accountability and responsibility. Problem-based learning is in complete alignment with the Taxonomy of Significant Learning, as it covers major domains like foundational knowledge, application, caring,

and human dimension. In addition, collaborative learning intervention encourages communication, collaboration, and simultaneous reporting among team-mates and group-mates.

In this study, we have redesigned an undergraduate Bioinformatics course by incorporating a problem-centred approach in the weekly hands-on sessions, enabling active participation and group interactions. While students, when working independently, learnt about the tools and how to use them on a specific gene, when working in a group they are able to build a comparative analysis of the gene orthologs, which would have been laborious to do individually. Further, such data can be utilised for higher-order applications like drug designing and building a Bioinformatics pipeline. Besides these benefits, employing group-based activities is also seen to be correlated to overall increased attendance and is preferred over the traditional lecture-based offering, possibly due to the interest, engagement, and positive experiences generated among students.

Conclusion, Limitations and Future Studies

Our study examines the effectiveness of two pedagogical interventions – use of problem-based learning and collaborative group activities – on student learning and class participation in a third-year undergraduate Bioinformatics course. Instead of the usual theory-based instruction and examinations, use of PBL enables students to contextualise the concepts being taught and appreciate the importance of what they learn. When working in groups, students learn to harness the power of collaborative work to keep their motivation sustained and to visualise new dimensions of data that would have otherwise not emerged. The slight decrease in the ratings of PBL sessions in 2020–21 as compared to 2019–20 could be either because of the post-pandemic fatigue of online classes, or due to having worked additional hours for completing weekly tasks, which is not commensurate with the credit awarded. While collaborative learning is highly encouraged in the post-Covid scenario of education, wherein students yearn for interaction, care should be taken to structure the interactions during the scheduled class hours, rather than expecting them to work outside, for the latter increases their burden. Also, credit allocated for lab sessions can be increased in the future offerings of the course.

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A Survey on Issues Faced by Prospective Engineering Students in Contextual Usage

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ABSTRACT

English holds an indisputable place in the professional world today. Students need to prepare for the world of opportunities that will open up their way with a sound knowledge of English. An insight into the perspective of the students regarding the value of English in academics and professional life is important.

This survey is based on the observation and the data collection made by the investigators. A survey among 104 students of Engineering was carried out by the investigators with the objective to understand the current needs in terms of productive skills of learners at the tertiary level. In this survey, the investigators collected the data from the prospective engineering students on the difficulties faced by them in their day-day life or we can say that in contextual usage and the investigators observed that students are facing problems in their English speaking and writing skills. The major areas of the problem cited by the students are lack of confidence in production of English grammar, fluency, vocabulary and pronunciation. The survey also brought to light the fact significance that the students associated significance with the English language. Students have adequate theoretical knowledge of grammatical structure but they are not that confident when they have to use the language in their day-day life. Analysis of the data collected projected that a majority of the learners need improvement in productive skills. Insisting the significance of feedback on speaking and writing, the survey suggests the need of offering a need-based ELT programme to students of Engineering in order to improve their speaking skills and writing skills.

Keywords: ELT programme, engineering students, productive skills, ESL

Introduction

As long as English continues its predominance worldwide, Anglo Skilled (those who have the advantage of English language skills) will have predominance over Anglo-SkilledNots. In the struggle between Anglo-Skilleds and Anglo-SkilledNots, it is always the former group that has an advantage over the latter.

Rayan (2017)

The above quote has been taken from an article published in *The Hindu* states the importance of English Language, in this modern world. English holds an indisputable place in the professional world today. The students need to prepare for the world of opportunities that will open up their way with a sound knowledge of English. An insight into the perspective of the students regarding the value of English in academics and professional life is important. English language is essential for the students' personal, academic and professional growth. English language is known as 'lingua-franca' which shows the success of English language in the modern world.

In the current study the investigators have designed a survey and collected the data from 104 students of Engineering. It has been observed that the major areas of problem cited by the students are lack of confidence in usage of English grammar, fluency, vocabulary and pronunciation, cohesion and coherence.

This research article is focused on the need of the students of Engineering and the investigators are more focused on the real need of the students for the English language. A survey was conducted by the investigators with the objective to understand the current needs in terms of productive skills of learners at the tertiary level.

Literature Review

In language skills we can include all the four language skills, listening, speaking, reading and writing. These four skills are known as receptive and productive skills. Here the researcher talks about the productive skills of the English language. In the productive skills, we can include Speaking and writing skills.

Speaking skill is very important in this modern era. One should have a command over his/her language. If the person has good command over speaking it will help the person to get benefits in business, academic as well as in personal growth also. Some scholars discussed the importance of speaking skills.

According to Allan, D. (1992), when the person is speaking at that time he or she should speak in such way, so the listeners will not misunderstand anything.

Sometimes, the speakers are speaking or trying to communicate with the people at that time they should be very careful. If they will be not able to send the message in a proper way or communicate with the people in the correct way the listener will find it difficult to understand the communication.

It is stated by Dakowska (2005), in the field of foreign language teaching, speaking is the important skills. But at the same time speaking skill is considered as the difficult language. Learners are given an opportunity in the classroom to communicate or to use the language in the classroom. But once the class is over, they are not communicating or use the language.

All the official documentation is done in the writing form. If it is not there in writing it will be not considered as an official document. Furthermore, it helps the people to have a proof in written form for all the documents. So, writing is helpful for the written documentation.

Widdowson (1978) addressed that writing is the clear graph of logical and grammatical system of the language. Writing is the clear study of the logical idea and the grammar. In the writing people have to be attentive while writing, as they have to be alert while using grammar. In the writing people have to pen down on the paper and they have to write their thoughts on the paper. So, people should have logical ideas while writing.

Peacock (1986) said writing process involves the composition of ideas in the mind and it creates a piece of writing from the models stored and organised in mind. It is added by, Raimes (1984) that teaching writing reinforces the grammatical structure, idioms, vocabulary, etc., which are already taught to the learners. Teaching and practicing writing will give students space to be creative.

So, teaching and learning grammar to the learners it will help them to learn the language skills.

Sommer (1989) addressed writing is a way of learning other subjects; it can be used in every discipline as a strategy for teaching and learning.

Irmscher (1979) addressed that writing requires focus, concentration, and discipline to transform the thoughts in symbols and this process leads to the development of writing skills as well as personal and professional development.

In view of Murray (1973), writing is a very important skill in the complex and changing society especially for students who are in school and college as well. There is need of the people who can communicate with the help of writing, share knowledge, order and experience. It is one of the language skills which help the learners to improve their writing abilities. Writing has become a key to unlock doors of many fields.

A Survey on Issues Faced by Prospective Engineering Students in Contextual Usage

The English that is used for everyday or for business communication is far different from the one used in academics. English language which is used for the corporate world is far different from the academics. This point is raised by Uribe (2008) when he said, “While social English refers to a familiar and common language which is used in an everyday situation, academic language refers to an advanced form of language used by the educated which is needed for university education and later in professional life.” In the early stage of school education, the students are more focused on their conversation skills and try to improve their vocabulary and grammar. When we talk about higher education where students have to be more focused on their communication skills. Students are not aware as to how they can use English for their overall progress. Halliday (2004) announced, “Many students who are highly

successful in an informal context may struggle to communicate at school/college in instances where academic language is required. They face problems when writing essays, reports, paragraphs, applications or paraphrasing. They employ ‘playground language’ in formal settings.” Haynes (2007) remarked about English Language Learners, “ELLs who speak English well in the social situation, however, are not necessarily prepared for academic tasks in the classroom.”

The investigators have been working with institutions of higher education for the past some years. The investigators have observed that students are struggling to improve their English skills. The investigators have observed students focus only on their syllabus which is related to their examination. Students are not making adequate efforts for improving their speaking and writing skills.

Methodology

The investigators have been designed a survey for the first-year students of Engineering and gather information about speaking and writing skills for the survey. For the survey the investigators approached 106 students of Engineering taking various streams of Engineering Mechanical, CSE, Electrical and IT Computer. The survey has been designed in the google form and with the help of it the data has been collected to check the needs of the students to develop their Productive skills.

Analysis

The investigators have designed needs analysis to check the needs of the students. As per the data collected from the students, according to their needs, most of the students agreed that speaking skills and writing skills of English language are as important as other skills. If we talk about their personal growth, professional growth and academic growth they will need English language for their better future. Approximately 67.3 per cent of the students agreed and believed that English language is important in their studies.

The investigators designed 25 questions in the questionnaire. They collected responses from 104 students of Engineering about various aspects related to speaking and writing skills. The data (Figure 1) showcased that the sample collected proves that students need to be trained in English language. It was observed that approximately 45.2 per cent students believed that they need to be trained in writing in English language and 42.3 per cent students need to be trained in speaking in English language.

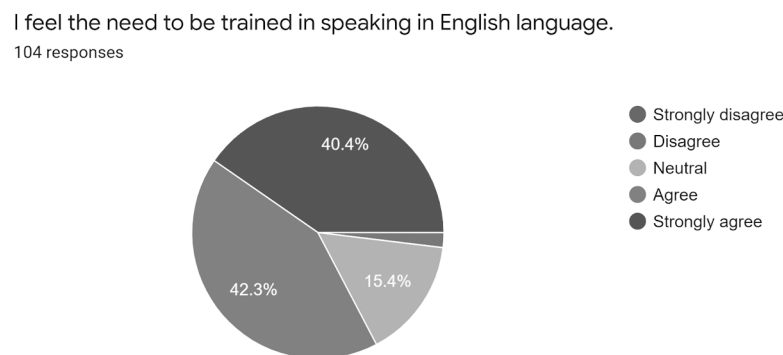


Figure 1. Survey of students of Engineering

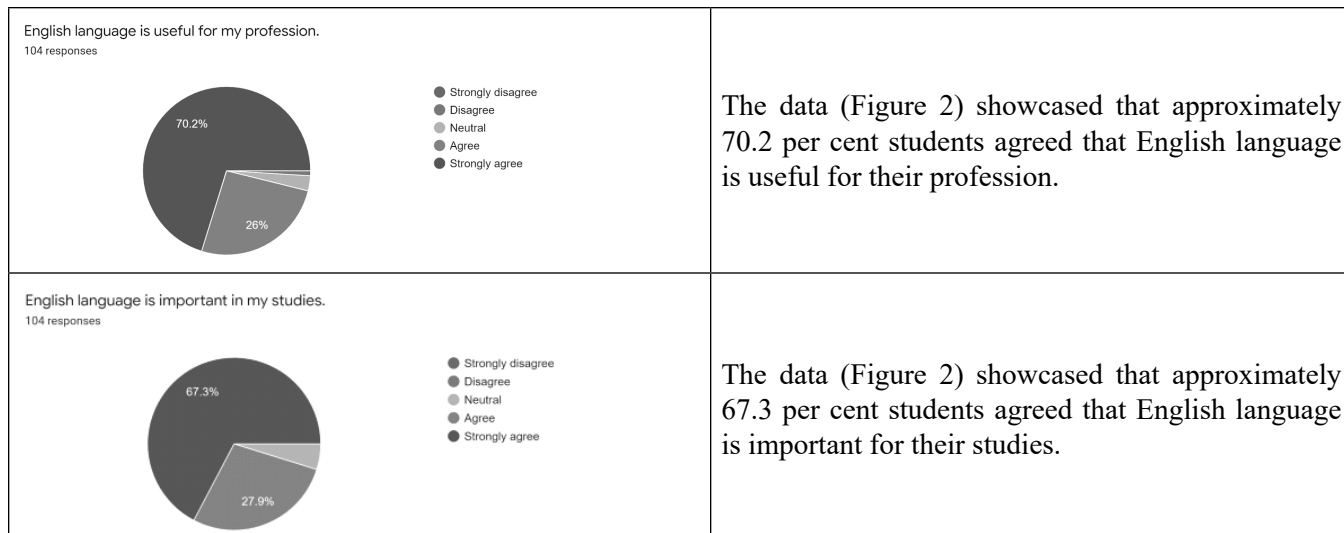


Figure 2. Survey of students of Engineering

Discussions

The investigators talked to the students regarding English language and how it is useful for them. Students answered all the questions asked by the investigators. The investigators asked questions pertaining to the difficulties they faced while writing in English and speaking in English and the students replied that they had problems of limited vocabulary, spelling mistakes, grammar usage, punctuation marks, lack of confidence and fluency in speaking, incorrect, grammar and pronunciation in spoken English.

Conclusion

Speaking and writing are challenging tasks for the students of Engineering. Analysis of the data shed light on the difficulties faced by the students in using English Language in their day-to-day life. Engineering students particularly focus on core subjects and communication skills is also taught as one of the subjects. But communication skills as a course does not provide the students enough practice for writing and speaking skills and the syllabus is based on the exam purpose only but with the help of the other skills, students can improve their overall skills. The investigators suggest that the learners at tertiary level should be taught how to be good in grammar, paraphrase, summarise, describe, report and makes notes. Teaching all these skills, the learners also should be taught the language structure and vocabulary to be used.

Limitations and Future Studies

The study is limited to the the first year B.Tech students of Charusat, Changa, Gujarat. In this study students from different fields of engineering like Mechanical, Computer Science, Civil, Computer Engineering, Electrical and Civil participated. The study is limited only to speaking and writing skills from among the productive skills.

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Modifying the Jigsaw Technique for Teaching Communication Skills in a Technology-Enabled ESL Classroom

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ABSTRACT

An increased emphasis on cognitive development necessitates a blend of independent learning and social interaction in a heterogeneous classroom, calling for a cooperative environment of active participation and shared knowledge. Cooperative learning divides learners into groups to ensure positive interdependence alongside individual accountability. One such effective strategy is E. Aronson's Jigsaw Technique. By enabling the creation of an environment premised on consistent interaction of multiple skills (listening, speaking, reading, writing, grammar and vocabulary) and multi-modal (visual, auditory, reading/writing and kinaesthetic) learning, Jigsaw proves useful for teaching language and communication skills in an ESL (English as a Second Language) classroom. However, existing research on the technique in an ESL context spans its use for teaching language skills in isolation and includes case studies detailing experimental designs that measure its impact on student learning and attitudes. Sufficient research on its use for integrating the various language and communication skills, learning modalities and technology is missing – a gap which is filled by this paper that proposes a modified Jigsaw model with suggested activities, to delineate the ESL classroom as a communicative learning space thriving on cooperation.

Keywords: jigsaw, ESL, cooperative learning, learning modalities, technology

Introduction

Research on cognitive development benefits education as a better understanding of how the mind processes information contributes towards developing effective pedagogy. Piaget's theory of four stages of cognitive development, now extended to adult learners, argues for self-initiated discovery and precedence of thought over language, and regards second language acquisition as a conscious process that requires learning strategies and opportunities for constructing knowledge from experiences. Vygotsky's theory in contrast, upholding socio-cultural interaction and tutor guidance, believes that internalisation of language drives cognitive development, thus encouraging teaching strategies based on collaboration through social negotiation. An ESL (English as a Second Language) classroom of today requires a blend of both individualistic and collaborative approaches to create a teaching-learning space of cooperation and shared experience (Tran, 2013). Cooperative learning is a structured methodology where learners and their social environment actively aim for a common goal, combining individual accountability with positive interdependence (Johnson et al., 2006). While a traditional classroom is lecture-based and teacher-centric, a cooperative learning space has small, heterogeneous groups involved in self-learning and helping others. In an ESL classroom, where students fear or hesitate in sharing their ideas in class, a cooperative environment is conducive to language learning.

E. Aronson's Jigsaw Technique explicitly attempts to curtail competition and promote healthy discussion, crucial to all learning, but especially fruitful in an ESL classroom. Motivation to participate arises more out of self-interest than altruism, nevertheless producing beneficial outcomes for everyone (Aronson & Bridgeman, 1979). The technique was improved in subsequent versions by increasing group competition in Jigsaw II (Slavin 1978), adding review quizzes in Jigsaw III and IV for better assessment and accuracy (Stahl 1994; Holliday 2000), and customising it for adult learners as Reverse Jigsaw (Hedeen 2003). Nevertheless, the relevance and success of any model depends on the needs and characteristics of the learners and the topic being studied.

Literature Review

Many studies demonstrate attempts at implementation of the technique for teaching English language and communication skills, and have observed positive outcomes in learners' academic achievement and motivation. However, most of them focus on a single skill, such as reading comprehension (Katemba & S. Samuel, 2017), vocabulary and/or grammar (Astane & Bermniani, 2014; Evcim & İpek, 2013; Gömleksi'z, 2007), written expression (Sahin, 2011; Sitohang & Purnawarman; 2015), speaking skill (Al-Yaseen, n.d.; Wulandari, 2009), or listening skill (Tuanany & Bharati, 2017). Moreover, they are case studies detailing their experimental designs and measuring the technique's impact on learning and attitude change. Studies also indicate the importance of integrating the various skills, or learning modalities (visual, auditory, reading/writing and kinesthetic) with each other, and the use of technology in the ESL classroom (Dolan, 1985; Jacobs & Liu, 1996; Raghul & Rajkumar, 2018). However, research is lacking on how the Jigsaw technique can be utilised for achieving this fruitful symbiosis. The modified Jigsaw model proposed in this paper is an attempt in this direction.

Modified Jigsaw for a Technology-Enabled ESL Classroom

Traditional approaches used to teach English language and communication often involve teaching the skills in isolation, contrary to their simultaneous use pragmatically. The shift towards communicative competence, preferring fluency over accuracy, called for an integrated approach to language teaching and learning. Moreover, in a heterogeneous classroom, students varyingly benefit from the four learning modalities - visual, auditory, reading/writing and kinesthetic, but more so from their integration. The Jigsaw technique, which necessitates and concurrently enables the creation of a cooperative environment premised on meaningful interaction and multi-modal learning, is therefore well-suited for teaching communication skills in an ESL classroom, and further benefits from technological intervention. This paper will propose a model for a Jigsaw task in an ESL classroom, followed by example ELT activities based on it. It has been customised for a technology-enabled ESL classroom and modifies the previous models in two ways. First, it adds a preliminary step (Stage I, step ii) which ensures individual accountability in the Expert Group, while also giving the Jigsaw Group members motivation to participate. Second, they apply their accumulated knowledge in a collaborative task assigned to them at the end (Stage III, step iii). For convenience, it assumes that there are 24 students in the class. The proposed model is divided into three stages, each with multiple steps:

Stage I: Jigsaw Group

- i. The teacher divides the class into four Jigsaw Groups of six students each.
- ii. As an additional preliminary step, each Jigsaw Group is required to explore a new grammatical concept or vocabulary using the Internet or pre-prepared resources. This learning will be unique for each member of an Expert Group and ascertain individual participation in Stage II, step ii. A review quiz may be administered beforehand to check for understanding and ensuring accuracy.
- iii. The main lesson, in the form of a reading, listening or a viewing task, based on drama, poetry, prose or comic, is briefly introduced by the teacher. It is divided into as many parts as the number of students in each Jigsaw Group (here, six), such that each student is given an individual part to study in isolation, shared with them using Language Lab Software, or uploaded to Cloud with restricted sharing settings.

Stage II: Expert Group

- i. The Jigsaw Groups are dissolved and students sent to their Expert Groups, where the students are denied access to the lesson.
- ii. Every member in an Expert Group has to teach the rest of the members the unique learning acquired in Stage I, step ii. They discuss using discussion prompts prepared by the teacher and answering each others' questions. The cumulative learning emerging at this step is tested in Stage III.
- iii. Students then discuss the part of the lesson assigned in Stage I, step iii, and make notes. This enhances their comprehension and retention, and also improves their listening, speaking and note-making skills.

- iv. A review quiz of each student is conducted (using Language Lab software or other digital tool) to check their understanding of the main lesson and ensure accuracy of information disseminated in Stage III, step i. In case of poor performance, the teacher can intervene for clarification. Students revise their notes, if required.

Stage III: Return to Jigsaw Group

- i. Students now engage in a discussion of their knowledge gathered at Stage II, steps iii and iv, by referring to their notes. Listening and speaking skills are targeted again.
- ii. A review session for the whole class is conducted as a quiz /game to prepare them for final assessment.
- iii. Students are assigned a collaborative task to apply their knowledge. This task is based primarily on writing, speaking, presenting or performing, but evaluation should also consider the grammar and vocabulary acquired. An online collaborative writing or presentation tool could be used for this purpose. Simple exercises may also be given.
- iv. Audience interjection could be encouraged to promote active listening.
- v. Feedback is provided by the teacher for motivation and improvement. The individual performance and contribution are graded and added up to derive group scores.

The following activities are suggested for implementation and can be modified and planned according to learner interests, curriculum demands, resource availability and time schedule.

Drama: Pick a short play or an act from a long play with multiple scenes for the reading task. For the preliminary step, provide each Jigsaw group with a different cue to explore new vocabulary related to the play. The number of parts into which the reading is divided should be one more than the number of students in one Jigsaw Group, such that the last part is not assigned to anyone. At Stage III, step iii, assign an activity to the Jigsaw Groups where they write the script (using a collaborative writing tool) for the last part of the play, and enact it in front of the class.

Poetry: Select a suitable poem to read. For the preliminary task, introduce each Jigsaw Group to a different aspect of poetry analysis, such as form, relevant figures of speech, imagery, rhyming scheme, etc. Each Expert group analyses the given portion based on all the aspects. For the Jigsaw Group task, students write and present a group interpretation of the whole poem (using a collaborative presentation tool), including the various aspects learnt in their Expert Groups.

Prose: Choose a short story for listening comprehension and a grammatical concept such as tenses for the preliminary task. Each Jigsaw Group is introduced to a different set of rules (four or five) related to tenses. The Expert Groups are given gap-filling exercises based on their assigned part, and sequencing exercises based on the whole story once members return to their Jigsaw Groups. They are then asked to collaboratively construct a new ending for the story while incorporating the grammar rules learnt, and narrate it to the class.

Comics: Divide a short comic book into parts two more than the number of students in a Jigsaw Group. Assign the parts, except the last two, to the members. For the preliminary task, introduce the students to the comic's context and ask them to research related idioms, phrases and words using the internet. In the Expert Groups, they could re-arrange jumbled-up panels. At Stage III, step iii, students are given the remaining two parts by masking their dialogues and asked to construct an ending using the vocabulary learnt, and enact the same in front of the class.

Conclusion, Limitations and Future Studies

The proposed model encourages learners to practice multiple language and communication skills simultaneously or consecutively. Using technology-assisted interaction with visuals, sounds and texts, which inspires them to move and perform in collaboration, the modified Jigsaw model employs a multi-modal approach towards creating an efficient and fun learning environment. Through this triangulation of skills, modalities and technology, it illustrates an innovative pedagogical strategy for diverse classrooms with students from multiple backgrounds, who can now learn independently while gaining social skills through cooperative learning. However, this model, like the original Jigsaw method, may not be suitable for large classrooms with a paucity of time where technology may easily become a disadvantage if participants are not well-versed with it. Effective implementation requires advance planning in the form of allocating sections, structuring similarly-competent groups and during the actual task, coupling careful observation with a motivational nudge to those in need. Furthermore, the students should be informed about the

potential for grading without disclosing the actual nature of the activity so as to prioritise learning over memorisation. Future research on novel pedagogical practices can aim at testing the feasibility of this model in an ESL classroom, adopting it for science classrooms, and developing it for further use in smart or AI-based classrooms.

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Attainment of Course Outcome and Programme Outcome: Direct and Indirect Method

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ABSTRACT

An efficient attainment method for evaluation of course outcome (CO) and program outcome (PO) is required for the engineering program accreditation. For accurate evaluation of CO and PO, an efficient strategy for evaluating student performance through direct and indirect assessment tools will be beneficial. Most of the engineering colleges make use of internal assessment tests, assignments and final exams as the direct and indirect assessment tools for evaluating the student's performance. The tools used for the CO-PO attainment needs to be selected properly to judge the students' knowledge. This paper gives complete guidelines for calculating the attainment using an appropriate selection of the direct and indirect methods to measure COs and POs. Each CO is defined to address a subset of program outcomes. It is possible to correlate the COs with POs by identifying the strength of mapping with the help of correlation levels 1, 2 or 3. 1 stands for Slight, 2 stands for Moderate and 3 stands for Substantial. The effectiveness of mapping is determined by the assessment techniques used to calculate CO and PO. For each course outcome, a target level is set in terms of low, medium and high. Based on the evaluation of the attainment, obtained by the direct and indirect method, the target level is compared and it is one of the measures to indicate the correctness of CO-PO mapping. The attainment obtained using direct and indirect methods along with an example is described with detailed mathematical calculations. The results give a comparative table indicating the target level and the attainment level obtained which enables the teaching faculty to identify the gaps and accordingly take action to boost the learner's overall proficiency.

Keywords: course outcome, program outcome, assessment, attainment

Introduction

An international agreement by the Washington Accord is responsible for accrediting Engineering degree programmes. Accreditation makes the institute understand their strengths, weaknesses and opportunities. It helps the institute to accept the innovative and modern methods for the betterment of the institute. One of the important criterions in the National Board of Accreditation is related to the achievement of course outcomes and program outcomes. NBA anticipates that the evaluation of a student's performance and knowledge will be based on the evaluation and attainment derived from the course and programme outcomes (Marey et al, 2018; Ahankari et al, 2016).

Course outcomes are narrower statements that explain what learners are supposed to understand after the completion of the course, and how they are able to use the skills, ethics; knowledge gained, and how they will be helpful to the society. The COs are one-to-one continuous mapping to POs, and further on, are mapped to program-specific objectives (PSO). Program outcomes are narrower statements that describe the skills, knowledge, and actions that students learn from the programme during their enrollment. Programme outcomes are well defined and are common for all the courses and mentioned in the university SAR-UG guidelines (Vanjale et al, 2015; Sudheer, et al, 2016; Karthikeyan et al, 2016).

Correlation between Programme Outcome and Course Outcome

Each CO can be defined to address a subset of programme outcomes. It is possible to correlate the COs with POs by identifying the strength of mapping with the help of correlation levels 1, 2 or 3.

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) (Vanjale et al, 2015; Sudheer, et al, 2016). The effectiveness of mapping is determined by the assessment techniques used to calculate course and programme outcomes. The stakeholder's suggestions also should be taken into account while setting the target level. A CO-PO matrix can be created based on the strength of selected POs. To illustrate mapping, an example of Electronics

Instruments and Measurement subject (EIM) ELX304 in semester 3 Electronics Branch is taken into consideration to understand the correlation between CO & PO and the target level is set as 1, 2 or 3 as defined above. The Course Outcomes are defined as in Table 1.

Table 1. CO Statements for ELX 304

Subject Code	Course Outcome Statements
ELX304.1	In the measurement process, students will be able to identify the static and dynamic features of an instrument, general instrumentation system components and static and dynamic errors.
ELX304.2	To assess the unknown quantity under estimation, students will evaluate different test and measurement methods, including AC and DC bridges.
ELX304.3	Based on working standards and modes of operation, students will be able to compare types of oscilloscopes.
ELX304.4	Students will be able to comprehend the cathode ray oscilloscope (CRO) and its application to calculate different functions such as measuring current, voltage, frequency and phase.
ELX304.5	Students would be able to comprehend the analog and digital Instruments –DVM, signal generators and wave analyser.
ELX304.6	For various applications, students will be able to choose a transducer used in real-life based on the understanding of principle of operation, working, construction and characteristics.

Table 2 indicates the target level set for the CO with respect to PO for the subject EIM outcomes based on the direct and indirect attainment tools.

Table 2. CO-PO Matrix for ELX304

CO	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₈
ELX304.01	2	-	-	-	-	-
ELX304.02	-	2	-	-	-	-
ELX304.03	2	-	3	-	-	-
ELX304.04	-	-	-	-	2	-
ELX304.05	-	-	-	2	2	-
ELX304.06	-	-	-	-	2	2
ELX304(average)	2	2	3	2	2	2

Tools and Attainment

Attainment is the result obtained as a standard outcome in order to accomplish the desired objectives. Appropriate assessment tools and targets are set to measure the attainment of each of the course outcomes. In order to achieve the course outcome, following direct and indirect tools are used.

A. Direct attainment

- IAE Answer Sheet Evaluation: The internal examination marks in theory paper are evaluated by calculating the average of the two internal assessment exams that are conducted. It is a measure to continually determine the achievement of course outcomes in relation to course objectives.

- Assignment: Assignment can be one of the assessing metrics for primarily determining the expertise of the student.
- Lab Experiment: Lab experiment may be one of the evaluation parameters for primarily evaluating the functional experience of the student with its design capabilities.
- Case Study: In order to primarily test student knowledge, case study may be one of the evaluating criteria.
- University Papers Result analysis: End Semester examination (theory or practical) is the metric used by the subject teacher to measure the achievement of course outcomes.

B. Indirect attainment

- Industrial Visit: Industrial visit helps to gather information from students related to programme satisfaction.
- Seminars: Seminar grades will be determined by the end-of-semester evaluation.
- Quiz: Collect a wide range of data from students related to programme satisfaction.
- Course Exit Survey: Helps to gather information from students related to programme satisfaction after completion of the course.
- Feedback: Collect a wide range of data on outcome-based education in the teaching and learning programme.
- Project Selection: At the end of the eighth semester, the project marks for the final year shall be based on an assessment by a committee consisting of senior faculty along with Head of Department and project guide.
- Feedback on Facilities: Helps to gather information on facilities from the students

The process for measuring attainment of each of the POs is: First set the target level using the co-relation level 1, 2 or 3. Keep track of the information that will be used to assess the course's outcome. The information can include the internal assessment, assignment, laboratory experiments, project evaluation student feedback, course exit survey, etc. Select the appropriate tool for direct and indirect attainment. Calculate the total number of students for the set course outcome. Calculate the average score obtained in any of the tool used for individual course outcome. Target level 1, 2, or 3 is set depending upon percentage of students getting higher than average percentage marks. (Karthikeyan et al, 2016; Sujit et al, 2016; Saxena, 2015; Maitra et al, 2016)

Results and Discussion of Evaluation of Programme

The target levels are set in order to achieve the desired outcome. Target levels are defined as per the levels of understanding. Level 1 is defined as a minimum of 50 per cent of students getting higher than average percentage marks. Similarly, Level 2 is defined as a minimum of 60 per cent of students getting higher than average percentage marks and Level 3 is defined as a minimum of 70 per cent of students getting higher than average percentage marks.

A. Direct Attainment

Table 3 shows CO-PO mapping obtained by direct attainment. IAE marks are used as a tool for direct attainment. The questions for internal assessment examination are framed considering the course outcomes described for the subject and the same are related to the program outcomes as shown in Table 2.

Table 3. Direct Attainment

ELX305		Direct Attainment						
Subject Name	ELM	IAEI			IAEII			ESE
Year & Sem	S.E. (SEMIII)	T1Q1	T1Q2	T1Q3	T2Q1	T2Q2	T2Q3	Q
Ac. Year	2016–17	PO1	PO2	PO1, PO3	PO5	PO5, PO4	PO5	
Faculty	Rushali Thakkar	CO1	CO2	CO3	CO4	CO5	CO6	Cos
No.	Name of Student	10	5	5	10	5	5	41
1	ABC	3	1	5	7	5	4	45
2	DEF	8	0	4	2	5	0	46
3	GHI	7	2	5	4	1	4	41
4	JKL	4	3	5	2	1	0	50
5	MNO	4	3	0	2	0	3	63

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58	RST	4	0	4	1	2	1	0
59	UVW	3	0	4	2	2	3	0
60	XYZ	4	2	2	4	5	0	0
	Average	4.740740741	0.962962963	2.13208	3.77778	2.14815	1.81481	36.61111
	total students > average	27	19	33	36	32	30	37
	% of students > average	50	36	62	67	60	56	69

B. Indirect Attainment

Table 3 shows CO-PO mapping obtained by indirect attainment. Course Exit Survey Marks are used as a tool for indirect attainment. The questions in Course Exit Survey are framed considering the course outcomes described for the subject and the same are related to the programme outcomes as shown in Table 1.

Table 3. Indirect Attainment

ELX305		Indirect Attainment					
Subject Name	ELM	Course Exit Survey					
Year & Sem	S.E. (SEMIII)	CES1	CES2	CES3	CES4	CES5	CES6
Ac. Year	2016–17	PO1	PO2	PO3	PO1	PO2	PO8
Faculty	Rushali Thakkar	CO1	CO2	CO3	CO4	CO5	CO6
No.	Name of Student	5	5	5	5	5	5
1	ABC	4	4	4	4	4	4
2	DEF	2	2	3	2	2	2
3	GHI	4	4	4	1	1	2
4	JKL	4	4	3	4	1	5
5	MNO	4	3	4	4	4	3
---	---	-	-	-	-	-	-
58	RST	5	5	4	4	5	5
59	UVW	5	5	5	5	5	4
60	XYZ	5	5	4	4	3	3
	Average	4.07	3.9	3.7	3.5	3.5	3.4
	total students > average	48	38	51	30	32	28
	% of students > average	89	71	95	56	60	52

C. Final Attainment

Table 4 indicates the attainment level obtained using direct and indirect tools. The attainment level is set as per the tool selected for direct and indirect attainment considering average score obtained for the set course outcome. If the target level is achieved with the attainment level then there is no gap and the course outcome and programme outcome are perfectly matched. However, if the target level is not matched to the attainment level, then there is a need for identification of the gap and corrective action to be planned to achieve the target level.

Table 4. CO-PO Attainment

EIM	PO ₁	PO ₂	PO ₃	PO ₄	PO ₅	PO ₈
	CO ₁	CO ₂	CO ₃	CO ₄	CO ₅	CO ₆
EXL304 (Target)	2	2	3	2	2	2
Direct Attainment	1.5	-	2	2	2	-
Indirect attainment	2	2.5	3	-	-	1

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The Effect of Changing Models for Changing Times in Context of a Teacher's Continuous Professional Development Programmes in Innovative Pedagogical Practices

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ABSTRACT

The global pandemic has made relevance in planning clearer from the perspective of planning for the present times, the future and the changing times. The discussion on Teacher's Continuous Professional Development remains a key factor of policy perspectives for a nation's socio-economic development. The NEP 2020 envisions holistic development of learners through a holistic curriculum to meet 21st Century Education needs UNESCO, SD "G 4 Quality Education", for an Indian context deeply rooted in cultural identity. The earlier Education commissions-University Education Commission 1948, Secondary Education Commission 1952, and Education policies 1968, 1986, Plan of Action 1992 have given cognizance to teacher's development. In alignment with educational policies, since 2009, the Faculty Development and Research Centre has been conducting Teachers Training programmes for CBSE affiliated schools. Having trained approximately 18,000 teachers through its offline and online modes, this paper discusses the changes in the training models in the wake of the changing needs and their effect on teaching in Covid times. The training models have been based on curriculum model, Values integration, integration of Instructional strategies, Innovative pedagogies and Technology integration. The recent pandemic has brought to document the effect of the Teachers training model in alignment to the National Mission on Education through Information and Communication Technology (ICT) in the basic, medium and advanced ICT integrated models based on the Koehler, M. J., & Mishra, P. (2009) TPACK model and the flipped classroom training models. Teachers' competency to apply them during the Covid lockdowns has shown seamless progression in teaching-learning platforms from offline to online platforms. This seamless transition is an effect of accordance to a national mission, policy planning and management objective that directed the Teachers Continuous Professional Development. The planning ahead is to adopt an online Knowledge management model for teachers' capacity building in preparation for changing times.

Keywords: continuous professional development, teachers competency, innovative pedagogies, ICT

Introduction

The 21st Century demands enhancement in teachers' transactional skills befitting curriculum deliverance to engage and prepare digitally aligned learners in a changing scenario of present, future and unprecedented times. The emergent and increasingly technological intervention for societal context in terms of jobs, communication and travel demands the need to develop learners' conceptual clarity and skills for immersing in a digitally functional society. Adopting and adapting to innovative pedagogies as suggested in NCF 2005, NEP 2020 calls for a continuous investment in teachers' capacity building. Teacher as the central point for educational reform has been unanimously agreed upon by various education commissions (1948, 1952) and policies (1968, 1986, 2020) in the post-independence times. Investment in "Human Resource Development", through continuous professional development continues to be an agenda of priority for educational management and it continues to draw attention as a variable for study in research. The Covid situation has brought out a requirement for teachers capacity building to meet the needs of unprecedented times. In order to avail opportunities amidst the challenges in reaching closer to Sustainable Development Goals for Quality Education (SDG 4) by 2030 and a step further towards global empowerment for 21st Century (<https://en.unesco.org/sustainabledevelopmentgoals>), there is a need to revisit the processes of planning for teachers empowerment, especially after the Pre-service education requirements are fulfilled.

The Faculty Development and Research Centre (FDRC) conducts Teachers Inservice training for Army Public Schools across India. Established in 2009, FDRC has trained 19,000 teachers through face-to-face workshops till

March 2020. The designed in-service training models emerged as outcomes of interactions with principals, teachers, experts and management. These models also align to the needs of schools, directives of educational bodies like the Central Board of Secondary Education (CBSE), National Council of Educational Research and Training (NCERT) and the Government’s Mission on Education. Research studies and emerging trends have also influenced the FDRC’s training model designs. In accordance with the National Mission on Education through ICT (2011) <http://www.sakshat.ac.in/document/Missiondocument.pdf>, UNESCO’s ICT Competency framework (2011) and the document, *Envisioning the future of education technology* (2012) by envisioningtech.com, tferesearch.com, Marie Curie FP7, <https://commission.fiu.edu/helpful-documents/higher-education-general/envisioning-the-future-of-education.pdf>, FDRC designed the ICT models as Technology Aided Learning and Technology Accelerated Learning. In 2011, the management took an initiative to train teachers in ICT. All teachers attending five days FDRC training underwent Basic ICT skills in MS office features. In Technology Aided Learning (TAL) and Technology Accelerated Learning (TAeL), teams of Computer teachers and a subject teacher were trained as Master trainers. To support the ICT mission, FDRC underwent an IT infrastructural change with laptop procurement and upgradation of Internet facilities. Concurrently, at the school level, the school management was directed to assist teachers in procuring their laptops through bank-facilitated loans. In phase 2 of the Technology Accelerated Learning (TAeL) programme, it was supported by procurement of tablets, digital cameras, printers, scanners, smart board and visualisers for the training. Approximately 1100 teachers were trained as TAL Master Trainers for 137 Army Public schools from 2011 to 2019. The impact of COVID-19 made evident the success of Army Public School teachers seamlessly graduating onto online platforms.

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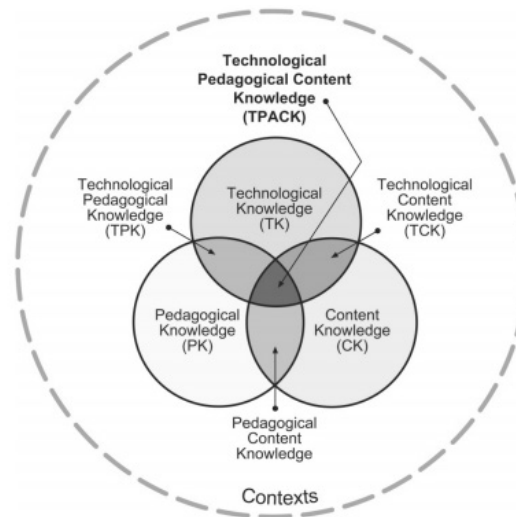


Figure 1. TPACK Model (Mishra & Koehler) (2009)

Effect of Emerging Trends on Changing Training Models

The first effect on training models was to redesign the lesson plans for integrating with the curriculum. The TPACK Model by Mishra & Koehler (2009) with content knowledge, pedagogical knowledge and technological knowledge framework was the basis of designing the TAL model. This was an upgradation from the basic ICT model. The second effect of the TAL and TAeL training models was the direct effect to upgrade ICT, Intranet, Internet, Hardware, software tools in schools along with mechanism to support teachers for procurement of personal laptops. The third effect of the training model was in teacher’s skill upgradation in planning, teaching with and through technology, e-communication, using social media and content development on various digital devices.

Literature Review

National Mission on Education through Information and Communication Technology envisions reducing the gap between those who are digitally empowered and those in the non-digital environment and to facilitate them to join a knowledge-based economy.

Teacher Education, In-service Teachers Training and Continuous Professional Development

National Education Policy (NEP) 1968 states Teacher as the most important factor for national development. This reflects the basis for Teacher's continuous professional development of teachers (NEP 2020) suggesting 50 hours of Continuous Professional Development (CPD) in the areas of their interest. The NEP 1986 & POA 1992 elucidates the lack of opportunities for teachers to innovate, invest in professional development for career progression and upgradation of skills in concept and techniques (NEP 1986 & POA 1992). An extensive literature review by Villegas Reimer (2003) on Teacher professional development signifies the three main aspects in the term Continuous Professional Development in terms of providing continuous opportunities, systematically planned experiences and promoting growth and development of the teacher. Studies by Guskey (2002) imply Continuous Professional Development as an outcome of formal and informal experiences. Studies by Opfer, V. Darleen and Pedder, David (2010) recommend the need for more "collaboration and research based Continuous Professional Development programs." Koehler, M. J., & Mishra, P. (2009) state relevant ICT Trainings are strong in Content, Pedagogy and Technology Integration. The ICT implementation factors advocate ICT training, Leadership, availability of Technology infrastructures, Goktas, Y., Yildirim, S., & Yildirim, Z. (2009). Abraham. Jessy, Wadhvani Reshma (2013) highlights lack of time, internet, power back up facilities and overcrowded classrooms as barriers for ICT implementation. Gaps between ICT Application and Investment policies in ICT Infrastructure are evident (Lu, C., Tsai, C.-C., & Wu, D.2015).

Methodology

TAL Training Models for ICT Master Trainers Training: Master trainers were trained in phase 1 and phase 2 as per the given models for TAL and TAeL.

Table 1. Models for Technology Aided Learning phases 1 & 2

TAL Phase 1 Training Model 1 (Five-day training for team of Computer Teacher and Subject Teacher per school) (2011–2014)	TAeL Phase 2 Training Model 2 (Five-day training for team of Computer Teacher and Subject Teacher per school) (2015–2019)
Subject Teachers: Lesson plans integrating ICT; Downloading NCERT syllabus; Making Fortnight planner, concept maps; Selecting a pedagogy, instructional strategies and Assessment tools; Using softwares like Movie maker; MS Office, PowerPoint, Word and Excel sheets; Photoshop, Multimedia, and Internet surfing –searching and downloading; Using visualiser and Smart Board; Learning parts of the PC and setting up Computer Teachers: To make a Plan of Action for conducting trainings in Schools To make training models for Basic level and TAL trainings Showcasing on Day five of the training	Subject Teachers: Flipped Classrooms, Lesson planning for Flipped classrooms as per NCERT Syllabus, Using Skype, Google Drive, Making Blogs, Using Digital camera, video recording of their sessions, content development as teaching learning materials; Using Tabs; Scanner printer upgraded version of Smart Board, Visualiser – upgraded versions; Online collaborative Platforms like INTEL Engage, Google Hangouts Computer Teachers: To develop a plan of Action for conducting trainings in schools To make training models for TAeL trainings Showcasing on Day five of the training

Table 2. Sample of Lesson Plan TAL Phase 1

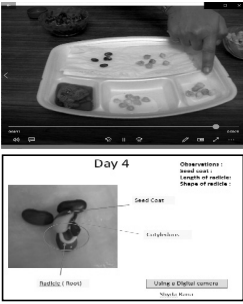
Concept	Instructional Strategies	Task/Activity (Teaching Learning Materials Required)	Integrating TAL (Audio, Video, PPT, Animations, Games)	Assignments Given (CW/ HW)																
Seed Germination	Inquiry-Based Learning Explanation Demonstration	Viewing a downloaded Video clipping Viewing teacher recorded video	Download a Video Record a video – Use a digital camera	Watch the video and explain the process of germination?																
Factors for seed germination: Air, Water Sunlight Terms learnt: Seed Germination Seed coat Plumule Radicle	Inquiry Based Learning Non-Linguistic Representation (Data collection, Analysis and Inference)	Activity: Soak some seeds, observe and record the changes you see in the seed. <table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th></th> <th>Day 1</th> <th>Day 2</th> <th>Day 3</th> </tr> </thead> <tbody> <tr> <td>Seed coat</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Seed colour</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Seed</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Day 1	Day 2	Day 3	Seed coat				Seed colour				Seed				 Use a camera to record the changes	What changes did you see? What does your data show? What does it mean? Day 4-Growth of radicle captured with digital camera
	Day 1	Day 2	Day 3																	
Seed coat																				
Seed colour																				
Seed																				

Table 3. Lesson Plan by Teacher participant for Technology Accelerated Learning Phase 2

Class X- Topic Light			A Flipped Classroom Approach				
Key Question	Key Concepts	Suggested resources	Suggested Activities	Issues/ Challenges in teaching this topic	Technology Integration	Assignments/ Activities	Teacher Preparation & Resources
Which Mirror is used as a rear mirror? Why is it used as a rear-view mirror?	Write the characteristics of the image formed by a plane mirror.	All the polished surfaces. E.g. clear water in a pond	NCERT View the images in spherical mirrors from different distances.	Study the chosen topic. Identify the concept. Study the NCERT syllabus. Develop the Essential questions. Identify the issues.	Teaching Tool: (Audio Video Simulation)- An Audio Video on concept of light and reflection Communication- Using Skype Recordings sent to children Watching video Sharing practical observations	Home Assignment: Watching a video on concept of light and related phenomena Class Assignment: Discussion on the video Individual Assignments	Study the chosen topic. Identify the concept. Study the NCERT syllabus. Develop the Essential questions. Identify the issues.

Analysis

In terms of analysing the TAL and TAel training models, FDRC continued to change its models based on the policy directives, management initiatives, emerging trends and faculty needs. It was analysed that the role of management in infrastructural and technological upgradations impacted ICT Implementation and training effects. Teachers, perception of the TAL and TAel trainings was rigorous and comprehensive. They expressed varying levels of achievement based on their ability to adopt integration of Technology in alignment to content and pedagogical knowledge. The monitoring and evaluation processes have been the weakest links in the training programmes.

Discussions

The discussion centralises to the point that the mere mass ICT training programme in ICT or Technology in isolation will not meet deliverance of an educational reform as envisioned in the educational policies. It is imperative to carry out strategic planning and involvement of administrators, educators and researchers to translate an envisioned policy into implementation in a timely phased manner. Infrastructural upgradation is equally important to ensure implementation of acquired training skills preventing its irrelevancy. Continued efforts to provide access and opportunity for practice of acquired training skills is recommended. Accordance to National policies with research studies in national and international emerging trends should be a standard practice to study while designing training programmes. The involvement of environmental inputs from the educational stakeholders is equally important to design contextually relevant programmes that prepare human resources for present, future and challenging times.

Conclusion

Preparing Teachers for the present, the future and the challenging times is a joint responsibility of management, training centres administrators and principals in order to accord to national policies for implementation through human resource development in teachers through “Continuous Professional Development”.

Limitations and Future Studies

Continuity in follow-up and progress of individual schools and teachers to assess the gaps in training deliverances in classroom practices is a major limitation. Further studies will be required to understand the three major factors, the continuity, the professionalism and development holistically as an outcome of Teachers Continuous Professional development.

Acknowledgement

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Texts and Textuality – A Critical Engagement with Digital Humanities

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ABSTRACT

The intersection of texts and technology has become significant in today's context, especially when the world is braving an unprecedented crisis. Almost overnight classes have turned fully digital, libraries have become virtual, and teachers have customised themselves in a desperate attempt to grab the attention of the student on the other side of the world. This unique situation has made Digital Humanities gain momentum. This paper examines the efforts made in the field of Digital Humanities in India, with emphasis on the myths emanating from *The Ramayana*. The attempt here is to trace the digital preservation that has taken place using design languages, as also the role of digital imaging in the conservation of the ancient Indian cultural tradition based on *The Ramayana*. The aim is to trace the study of text encoding, concordance, e-publishing and archiving grounded in digital applications in the context of the classic text, demonstrating that the advantages of Humanities Computing far exceed the reservations.

Keywords: texts, technology intersection, Digital Humanities, *The Ramayana*, concordance

Introduction

Scholarship in Digital Humanities has gained momentum in the current pandemic-ridden world, when almost overnight classes have turned fully digital, libraries have become virtual, and the intersection of texts and technology has taken a cybernetic dimension. We have been telescoped into this futuristic world where books in their physical form do not exist, assessment is online and virtual proctors invigilate the shadow examinees. Teachers have customised and digitised themselves in a desperate attempt to grab the attention of the student on the other side of the world. In this novel and unique situation, the world of academia as a whole, and Digital Humanities in particular, emerge as major beneficiaries of the digital revolution. This paper examines the efforts made in the field of Digital Humanities in India, with emphasis on the myths emanating from *The Mewar Ramayana*. The attempt here is to trace the digital preservation that has taken place using design languages, as also the role of digital imaging in the conservation of the ancient Indian cultural tradition based on *The Mewar Ramayana*. The aim is to trace the study of text encoding, concordance, e-publishing and archiving grounded in digital applications in the context of the classic text, demonstrating that the advantages of humanities computing far exceed the reservations.

Literature Review

In *New Publication Cultures in the Humanities*, Jacques Dubucs cites some numerical data to prove this point. He says that since all the books ever written represent 50 billion bytes, the gamut of information that is being produced today will far outgrow this, and the fraction will decrease by the day. In May 2009 itself, the Internet has generated 500 billion bytes, points out Dubucs (2014, p.1). Hence, Digital Humanities is not just a technical procedure of transferring our print heritage into digital form, but it is a revolution in the world of knowledge creation and conservation. It is a change similar to, or more dramatic than the graduation from manual writing to machine printing, which made the written word easily available to millions. The move from offset printers and facsimiles to cloud storage and transmission is a tectonic shift and carries tremendous possibilities. Dubucs says, "the rate of recurrence of certain words, the subtleties of their progression and their synchronisation with other words enhance the scope of scholarship and impart access to features of cultural heritage that we were not equipped to detect in previous times" (p.22). In *My Mother was a Computer: Digital Subjects and Literary Texts*, Katherine Hayles (2005)

speaks of the array of concerns raised as a result of the association between Homo Sapiens and Robo Sapiens. She points out that computing has become universal, and with the flow of information in cyberspace, the usage of mobile communication devices and digital television networks have become widespread. This has led to a corresponding integration of the commercial and the communication channels into globally mediated networks. Hayles argues that the advent of the computational universe at this time in history, when digital gadgetry has achieved incomparable possibilities and position, is not coincidental. She draws a parallel of this phenomenon with the verdict of the 18th Century critics who studied Newton's laws of motion and the increasing sophistication of time-keeping mechanisms and decreed that the universe ran as efficiently as a clockwork. "In this context, *My mother was a computer* can be understood as alluding to the displacement of Mother Nature by the Universal Computer. Just as Mother Nature was seen in past centuries as the source of both human behaviour and physical reality, so now the Universal Computer is envisioned as the Motherboard of us all", says Hayles (p 3).

The 'Crisis of Humanities'

The interdisciplinarity inherent in Digital Humanities (DH) makes it address the 'Crisis of Humanities (Gutting 2013)', which is precipitated because Humanities subjects are erroneously seen as an inexact or fuzzy science, whereas Natural Sciences are considered scientific. This lands us in a situation where the labs are preferred over the libraries, and the students veer towards the natural sciences for better career prospects. The advent and spread of Digital Humanities provide a way out of this conundrum and attempts to solve the crisis. The marriage of Computer Science and Humanities has led to the revitalisation of subjects like History, Psychology and Sociology, and especially Literary Studies, making them work in sync with the requirements of today's day and age, which is digitisation. The breadth of thought that comes with the Humanities, and the skills that come with computing have made DH thrive today. This has led to greater ease of access of content, and better methods of conservation and improved archiving of texts. Also, the interest generated with the effective use of multi-media without doubt prove the efficacy of Digital Humanities. This paper studies the scope and potential of Digital Humanities in the overall advancement of the cause of research in humanities education and in the preservation of classics in India.

The Concept of Digital Forensics

Patrik Svensson (2016) raises the question of the academic and institutional challenges of Digital Humanities and reflects on the role of technology and infrastructure in the given situation. He observes that with the advent and popularisation of new-age computing machines, resources in all Humanities disciplines are increasingly available in digital formats. He notices that this is relevant for cultural records that are born on paper and later digitised, as also for records which are born digital. Svensson speaks of the tools needed to convert and analyse the texts. "Such tools can be modern forms of analog tools, systems such as concordances or library catalogs, or new kinds of tools that draw more distinctly on the attributes of modern digital technology", says Svensson. He suggests that digitally born material includes "archived e-mails, websites, online fan fiction, old games, surveillance data, on-line video, dance performance, sensor data and live data feeds—that can be useful for humanistic inquiry" (p. 2). Svensson sums up his argument with a reference to Matthew Kirschenbaum's concept of digital forensics, which comprise "a deep understanding of digital data both as material and as abstract, symbolic identity". Svensson proposes the curation of new methodologies and critical frameworks, which includes information technologies, digital media and different types of digitally enabled modalities, tools and expressions (p.5). These have led to cutting edge research in critical studies, media studies, gender studies, and ethnic studies and areas such as rhetoric and composition, asserts Svensson (p.6).

In his foreword to *A Companion to Digital Humanities*, Roberto A. Busa (2004) describes Digital Humanities as "... precisely the automation of every possible analysis of human expression in the widest sense of the word, from music to the theatre, from design and painting to phonetics, but whose nucleus remains the discourse of written texts". He recalls that his quest for machines for the automation of the linguistic analysis of written texts began in New York City at IBM and has led to the *Index Thomisticus* which delineates the entire process of miniaturisation. From electro-countable machines with punched cards, magnetic tapes, automatic photo-

compositor and CD-Roms, to Textual Informatics including the databanks, the Internet, and the World Wide Web, the infrastructures of telecommunications, it has been a breathtakingly complex and fruitful journey. Busa views the developments in multi-media and audio-visual technology as dramatic, and finds them contributing immensely towards the multiplication, distribution, instant retrieval of information and linguistic analysis, especially the use of informatics, to refurbish the traditional morphology, syntax, and lexicon of languages. He says that in the digital analysis of texts, methods of observation utilised in the natural sciences should be applied together with the apparatus of the statistical sciences, to organise texts in a general lexicological system with their probability index. In a collaborative Indo-UK Project, an attempt was made to digitally reunify the Mewar Ramayana and analyse it in a similar manner.

This exquisitely illustrated manuscript is of immense value as a source of information in myriad fields, which include art-history, religion, literature, social and economic life, and many others. It illuminates and informs life in 17th century Rajasthan, when Rana Jagat Singh ruled in Mewar. The digitisation and web-mounting of this work was undertaken by the British Library in association with Chhatrapati Shivaji Maharaj Vastu Sangrahalaya, Mumbai, the Baroda Museum and Art Gallery, Vadodara, and the Rajasthan Oriental Research Institute, Jodhpur. The ‘Turning The Pages’ platform has been used to make the manuscript available for the researchers, who will have access to the 1200 images and text folios. The ‘Turning The Pages’ platform, an interactive simulation of texts, allows the researcher to flip through the folios virtually in a realistic manner. The unique classification of folios in the document has been reconstructed by ‘interfiling’ the digital images from all contributing organisations. Customisation of the software allows the viewer to enjoy the old-style, unbound ‘pothi’ format of the manuscript. The ‘deep-zoom function’ of the TTP software permits viewers to appreciate the text and artworks of the plates in the most minuscule detail. Equipped with a customised toolbar for better navigation, folio numbers and shelf marks and explanatory pop-up text, this initiative is an excellent example of how the priceless textual heritage of a country should be preserved. The curatorial and technical expertise has been utilised to take the project further. “As part of the project, item-level metadata was created to the same standards for painting folios held in India and the UK. This ensures that anyone accessing the Mewar Ramayana on the Web will be able to search the entire manuscript using embedded key words e.g. a search on “Hanuman” will retrieve all images where the metadata includes a mention of Hanuman.” Introduced on the British Library website, the digitised Mewar Ramayana is available via hyperlinks on the sites of associated organisations. At first secured on dedicated servers, the project has been added to the Digital Library System for permanent placement. There is a dire need of similar projects to save the priceless tangible and intangible heritage of India, and salutary efforts are being taken in this direction, the results of which are being felt in the classrooms - yet the need for more initiative remains because of the sheer volume of work.

Methodology

This paper is based on a narrative research where both secondary and primary sources have been considered to check the ease of access and analysis in the context of using digital and virtual methods in Humanities Education.

Analysis

Digital Humanities entails the extensive use of computation and quantitative analysis of texts, which lend themselves to exploration of facets otherwise unmapped through traditional methods of research. The virtual re-creation of rare texts and the digital scrutiny of the same, as in the case of *The Mewar Ramayana*, or a deeper study of concordance, as of the fauna in *The Valmiki Ramayana* undertaken by South Asia archives, or similar studies which track likeness or variorum in other regional *Ramayanas* pave the way for further research enabled by technology.

Discussion

The digital resurrection and subsequent analysis of *The Mewar Ramayana* indicates that Liberal Arts as an academic discipline stands to gain immensely out of its alignment with the tools of Digital Humanities. To make Humanities education relevant and sustainable, Digital Humanities should cease being a fringe academic phenomenon and take center-stage. Given an online ‘avatar’, our Classic text will become more accessible and enjoyable. Whether

it is a serious analysis of concordance, or a real time strategy game that introduces Ramayana on Steam, interface between Humanities and Information Technology makes learning an exciting venture. Classrooms that are equipped with cloud-based systems, or with digital tools like Prezi, Wordle, Quizlet, Socrative, Kahoot, Adobe Spark and Mote, challenge students and make study a fun activity, leading to better reception of content and resurgence of redundant subjects.

Conclusion

We conclude that the impetus given to Digital Humanities today is the need of the hour, as humanists cannot afford to be just users of computational skills - they should also emerge as producers and developers of applications which allow them to analyse content in a nuanced and scientific manner. Analysis through computer apps, as in the study of concordance, will bring out facets that otherwise do not become apparent in qualitative research. The coming together of Humanities and Computer Science will impart saleable skills that translate into job opportunities, as the lack of the same is driving students away from studying the subject, leading to the said crisis where labs are preferred over libraries. The entry of digital and computational skills in humanities enable it to provide answers to real world problems and keeps the subject grounded. The day and age of keeping humanities isolated in an ivory tower, innocent of the skills needed in the marketplace have come to an end. Hence, to keep humanities relevant in this changing scenario, we must inject and encourage digital and computational skills in humanities studies.

Limitations and Future Studies

The growth of Digital Humanities in India has been rather organic and has not picked up the pace. The number of universities that teach Digital Humanities as a subject are limited. At this exciting juncture of Humanities research, IT and Computation, we must realise the possibility of making our priceless heritage available to the national and international community of researchers. Ramesh Gaur, Librarian, Jawaharlal Nehru University, writes: "The technological obsolescence, shorter and uncertain life-period for current storage media, information glut, and internet revolution are some of the major factors which have made preservation of digital information more complex and challenging." Though ambitious efforts of digitising our ancient manuscripts are initiated by National Digital Library of India (<https://ndl.iitkgp.ac.in/>) and National Virtual Library of India, as also by NDPP, we are yet to ride the wave and take advantage of the ongoing revolution. Since employing textual tools and computer writing programs to create meaning has been nascent in the study of our cultural landscape, it is important that the problem of inadequate metadata and customised software, as well as the resistance to machine learning should be addressed in the content analysis of our texts.

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Humour as a Pedagogical Tool in Higher Education Teaching Learning Practices: A Study

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ABSTRACT

This article explores the possibilities of utilising humour as a pedagogical tool to retrieve attention and interest in the teaching-learning environment. It further stresses that a touch of wit and humour, cleverly correlated with the subject being taught kindles a better learning experience and fosters healthy relation between the tutor and the pupil. To analyse and validate the same, a descriptive quantitative study was conducted across teachers belonging to higher education sector in India to find their views on using humour in classroom teaching. A survey was conducted through a self-designed questionnaire using Google forms. The data collected from 147 teacher respondents was used for discussion and analysis. The survey suggests that majority of teachers agree upon the significance of humour as a classroom aid for better engagement of students. Based on the evidences attained, this research argues and establishes that humour is a necessity in the teaching-learning process and teachers must know the art of correlating humour in their academic discussion. Thus, the study undertaken clearly demonstrates that humour can be an effective pedagogy in higher education and related implications.

Keywords: humour, classroom, learner, teaching, higher education

Introduction

No doubt, the rapid technological innovation and easy access to information has made significant positive impact on the education sector but on the other hand, it has become increasingly challenging to capture student's attention in a conventional classroom and online teaching-learning scenario. Whatsoever, classroom becomes a platform for both the teacher and student to engage in a dialogic academic discussion. With recent adaptations to online learning due to the pandemic, the challenge to engage students for a continuous period of time needs serious thought. In this context, humour can aid as one of the pedagogical tools for effective classroom engagement. Humour may be broadly defined as the quality of being amusing or comic; the ability to make other people laugh. And more specifically, it incorporates focused and structured amusing or comic words, actions, or reactions of a teacher in the act of teaching, engaging and interacting with students, managing a classroom, and/or setting a tone for timely and appropriate mirthful response to content or activities (Latta 1999; Berk 2002). Humour in education settings forms a significant strategy in garnering fruitful academic achievements. Although its importance is acknowledged in academia, there are very few practitioners. As Mary Kay Morrison (2008:73) points out to the fact that there exists a kind of "humour paradox" in educational sector, where academicians are reluctant in using humour and even find it uncomfortable to participate in humorous exchanges within the classroom dynamics. However, it is true that mirthful response or light-hearted statements sprinkled during a lecture brings freshness to any academic engagement.

Impact of humour on the dynamics of classroom teaching-learning activities is immense. Humour needs to be conveniently adopted in the teaching process and it is one of the teaching skills which kindles participation, interaction among learners and ensures classroom management. Humour can be utilised as a strategy to arouse interest and recover from boredom of continuous teaching learning hours in academics. With the added physical and psychological stress among student community and considering student's perspective, this article contests that the teacher, apart from solely engaging in technical discourses, must use those 'gaps', 'silent spaces' during lectures to evoke a sense of humour, laughter to uplift and ease the monotonous routine in the classroom environment.

Learning to use these spaces to generate subject interest and involvement for pedagogical transitions can be adopted for the benefit of the student community and better learning outcomes. Humour creates a better learning environment for students, thus encouraging their academic and behavioural performances (Lovorn 2009).

Literature Review

Research indicates use of applicable humour in teaching-learning scenario can yield better academic performance and generate confidence among learners (Harlin 2008: 125). Levine (2006) points that humour elevates classroom environment and increases motivation to learn further, thus making a comfortable situation to learn (Shiyab 2008: 623) and thereby increasing students' cognitive brain functioning. Research indicates that sense of humour in the class enhances learning experiences. To illustrate further, Wanzer et al. (2010) examined how humour, when instilled in classroom sessions, can assist learning capacities. According to Schmitz (2002), jokes that address universal elements of humour (e.g. exaggeration, hyperbole, irony etc.) are the easiest to understand for a language learner. Further, Banas, Dunbar, Rodriguez, and Liu (2011) described humour as something that co-relates verbal and non-verbal aspects to evoke laughter, joy and amusement. With respect to classroom humour, Wagner and Urios-Apari (2011: 400) consider it as "an act performed through linguistic or non-linguistic means by any of the participants (i.e., student(s) or teacher)." Another study by Abraham et al. (2014) pointed that humour enables creating teachers' rapport among students and the rapport allows to foster better relationship and makes learners more participative due to the appealing nature of the class environment. Humour has a stress easing health benefit and increases productivity in education (Cornett, 1986; Davies & Apter, 1980; Kher et al, 1999). Studies reveal that Humour aids as a salient technique to combat monotonous routine learning and to foster better learning situation. Although numerous researches have pointed its significance in the classroom, few studies have also cautioned the negative impact of using such a practice especially with respect to classroom control and management. For example, Grow (1995) and Steele (1998) in their study have found that teachers perceive humour as a distraction and fear loss of classroom control.

Considering these surveys and discussions, this study aims to explore the usage of humour as a pedagogical tool in classroom learning environment in an Indian higher education scenario. It is observed that numerous studies have been carried in this line of thought across the globe; however, less has been attended to considering the Indian perspective. In Indian curriculum and pedagogy, inclusion of humour has always been a neglected component though its positive impact on learners is recognised. This study fills the gap in the existing literature as it explores the factors influencing teachers' decision in using humour. Hence, this is a significant study in the light of innovative and best practices in educational domain.

Research Topic and Objectives of the Study

In the light of theoretical framework, this study focuses on the implication of Humour as a pedagogical tool in higher education teaching learning practices in India. Accordingly, the objectives of the study are:

1. To understand the perception of teachers' on humour as pedagogy
2. To understand teachers' willingness to employ humour
3. To analyse the significance of humour in higher education teaching-learning practices
4. To identify humour as an innovative teaching strategy

Methodology

This study includes a descriptive analysis of data collected through a questionnaire, used as a research tool to find the validity of efficacy of humour in teaching-learning process in higher education. For the said purpose, the researchers developed a self-designed close-ended questionnaire. In order to realise the objectives of the study, normative survey method was employed by the researchers. For quantitative data collection, convenience sampling method was used as it was deemed fit for collecting information from teachers across Indian universities and colleges. The target group for this study consisted of in-service teachers working in various higher educational

institutions across India. The responses to the survey were collected through Google form. Teachers’ questionnaire consisted of 11 close-ended questions concluding with one open-ended one. In six items, five-point Likert scale was used (from strongly agree to strongly disagree) and in the rest items, a three-point scale was used, ending with one open-ended item about their opinions on the identified topic.

Sample Size

The sample consisted of teachers teaching at UG/PG levels in various universities across India. Total 147 teachers from 86 universities/colleges/institutions from 21 states in India participated in the survey. Demographically, the sample is relatively small, considering the vast number of higher educational institutions in India and its total number of teachers; however, it covered a broad spectrum of the country having respondents from different states and institutions.

Data Analysis

As indicated, the data was collected through questionnaires and to ensure authentic responses, sharing of personal details like name, affiliation etc in questionnaire was made optional. The responses of 147 teachers were recorded and analysed using non-parametric statistical techniques such as percentage, frequencies of numbers converted into percentage and the same is represented through graphs, pie charts for analysis and drawing suitable conclusions by correlating them to the previous researches and theories on humour. However, in this study, almost all the teachers belonged to the domain subject area of English language teaching and literature. The statistical data has been presented in tabular and graphic forms.

Table 1. Demographic Profile of the Sample

Total respondents	Teaching program level			Gender	
	UG	PG	Both	Male	Female
Teachers (147)	72 (49%)	12 (8.2%)	71(48.3%)	75 (48.6)	72 (51.4)

The participants included 72 teachers teaching UG programmes, 12 teachers dealing with only PG programmes and 71 of them teaching both programmes. As observed, of total 147teacher respondents, there was almost a balanced gender distribution with 48.6 per cent males and 51.4 per cent female participants.

Do you think humour can be used as a pedagogical tool?



Figure 1. Humour as a pedagogical tool

Figure 1 shows that 92.5 per cent of teachers attributed humour to be used as a pedagogical tool. Very negligible i.e. 2 per cent teachers negated the statement whereas 6 per cent were unsure about its applicability and implication as a tool the in teaching-learning process. The figures represent that majority of the teachers recognise humour as a potential tool in the teaching-learning process and agree to the positive attributes of using humour as an innovative strategy for betterment of classroom discourses. This is suggestive of the necessity of inclusion of humour in academia.

Table 2. Teachers' Perception towards Humour and Its Inclusion as a Pedagogical Tool during Teaching

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean
Assigned score (Integer) →	5	4	3	2	1	
1. Subject-related humour is necessary to create interest. Do you agree?	14	6	41	58	28	
2. Can humour help in making online teaching interesting and effective?	100	40	4	2	1	
3. Do you feel humour can generate interest towards learning in the class?	81	50	12	2	2	
4. Humour brings a sense of bonding between teacher-student relations. Do you agree?	88	50	4	2	3	4.21
5. Do you agree English language teachers have larger scope in handling sessions in a humorous way?	81	46	15	2	3	
6. Do you think use of humour would destroy classroom environment or distract students?	101	39	6	-	-	

The tabular data shows that central tendency or average sentiment score of teachers towards all six Likert items reflected through mean is 4.21 which means that teachers' perception towards humour is fairly positive. Majority of teachers either agree/strongly agree to Likert item number 2, 3, 4 and 5 which signifies that teachers do consider that humour can help in making online teaching interesting; it can generate interest towards learning in classroom. Similarly, majority of teachers are of the opinion that the application of humour can create a congenial relationship and bonding between teachers and learners. Drew C. Appleby (2018) is of the view that "Humor can also lead to the establishment of student-teacher rapport, which is another characteristic of master teachers". As far as teaching English as a subject is concerned, teachers feel that they have greater scope in using humour in the language classroom. Despite this, some teachers, while responding to item, perceive that the application of humor during teaching need not necessitate interest. This is because humour is not the only means to generate interest. Many other factors such as use of graphics, animations, audio-visual tools, delivery of content, using appropriate non-verbal communication during instruction may aid in creating interest and motivation in the classroom. Using humour during teaching hours is not a routine practice for most teachers and therefore majority opines that its application in formal learning environment may cause hindrance, distract and divert student's attention. Nevertheless, as a whole, teachers' average tendency and attitude towards using humour for enhancing teaching-learning process is positive which is reflected in the Mean i.e. 4.21. This section shows that although most teachers demonstrated mixed opinions and fear using humour, there is an inclination towards attempting to use humour as a pedagogical learning strategy for effective delivery in the classroom dynamics.

Results and Discussion

The results of the present study show that there is a meaningful connect between humour and the teaching-learning process. Majority of teachers have pointed out that humour makes an impact in a classroom environment, especially considering the engagement of classes in the online mode. Teachers have pointed out that humour as a pedagogical tool can become an efficient strategy for handling classroom sessions, laying emphasis on how it generates interest and also creates focus in the class. Since the majority of teachers belonged to the subject domain of Language and literature, they claimed that they have better scope of using humour in the English classes. In the last section of the questionnaire, an open-ended question was included to understand their perception about humour as pedagogy. One teacher respondent articulates, "Humour is like an energy drink during the long hours of the teaching process".

Another respondent says “humour acts like a medicine to erase boredom and enable students to stay awake”. These responses communicated and validated the utility of humour in generating a better learning platform.

This study can be co-related to the New Education Policy 2020 which emphasises the adoption of newer techniques, strategies and good practices that can enable better teaching and thereby have a good impact on learning abilities of the students. In this line of thought, it is understandable that subject-specific humour, when efficiently and carefully handled, can yield good results for both the teacher and the student. However, it should be kept in mind that deliberate attempt to evoke laughter may appear artificial and unnatural. A classroom session should be made appealing. As a teacher uses different methods, techniques, materials, audio-video aids, models, power point presentations and so on, humour can also be used as an effective pedagogical tool.

Conclusion

The findings of the present study confirm the significance of humour in the Indian classroom scenario and indicate that if used aptly, can bridge the gap between teacher and student in the teaching-learning environment. Based on the evidences attained, this research argues and establishes that humour is a necessity in the teaching-learning process and teachers must know the art of correlating humour to their academic discussion. Thus, the study undertaken clearly demonstrates that humour can be an effective pedagogy in higher education and related implications. The findings also suggest that teachers should be encouraged to undergo formal training in understanding the nuances of using subject-specific humour for effective classroom management.

Limitations and Scope for Future Studies

This study has taken into account mostly teachers belonging to the language and literature domain. Hence, further studies can be undertaken by taking different perspectives and encompassing teachers from other subject areas.

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Innovative Technology for Effective Learning

Exemplifying the Applications of the Educational Institution Management System through Machine Learning – Education 4.0

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ABSTRACT

The study aimed to investigate whether machine learning, when combined with an educational institution management system, will help improvise students' learning and educational institution administration. For the study, the researcher adopted a descriptive research design wherein the data was collected from 13 international schools and 4 colleges adopting an educational institution management system combined with machine learning. Here 72 samples were considered, the samples either belong to the teaching faculty or administrative staff using a simple random sampling technique. Through the analysis performed on the dataset, it was understood that there is no significant difference in opinion among the respondents belonging to a different gender, experience and age group for questions framed to investigate whether machine learning when combined with educational institution management system, will help improvise the students' learning and institution's administration. Further, according to respondents, Machine Learning on EIMS is helping them in predicting student performance, grading students and testing students effectively. Also, machine learning when combined with educational institution management system provides effective decisions through computer learning is obtained from Machine learning. Further, there is the availability of sufficient historic data for future decision making and the overall workload for faculty and administrative staff is reduced.

Keywords: educational institutional management system, ML, student performance, institutional administration

Introduction

An educational institution's management necessitates the correct capture, processing, and updating of a large amount of data. On a daily basis, raw data or information in various formats comes in from all directions, and educational institutions manage it using a variety of automated methods in addition to manual or traditional methods. Academic communities in today's digital world rely heavily on unrestricted information exchange. Academic councillors may need current transcripts, bursary staff may need information on current and previous budgetary expenditures to determine fee structures and scholarship monies, and managers may need payroll access to process salaries, among other reasons. Generally, any typical Educational Institution Management System (EIMS) will have a wide range of core operations (or business processes) responsibilities and requirements. Then there are the information requirements, which differ substantially based on the type of user. EIMS frequently uses multiple software programmes for various reasons, resulting in large expenditures on licence acquisition and renewal. As a result, in order for everyone to operate properly, the EIMS must rely on information systems and regularise to invest in their management system (Somasundaram et al., 2020).

Throughout the years, many authors have written on a number of issues linked to information systems, particularly EIMS, such as data quality and management, design and development experiences, the impact of information on decision-making, online portals with curriculum material, and so on. Individual learning is an educational technique that aims to cater instruction to each pupil's unique needs, strengths, ability, and interest. Based on what he already knows and how he likes to study, each student is given a personalised learning plan. The study was conducted using a descriptive research approach. The data was collected from 13 foreign schools and four universities that had adopted a machine learning-based educational institution

management system. 72 samples were evaluated using a simple random selection technique, each of which belonged to either teaching faculty or administrative staff. As a result, each student will take his or her unique educational path. In order to meet the needs of accrediting organisations such as the USA and globally, NBA (India), and others, the assessment is further specified in terms of the attainment of Course Outcome (CO) and Program Outcome (PO). In Curriculum Design & Planning, the curriculum and syllabus will be the beginning point for planning. Curricular gaps are detected (using Outcome Based Education), and value-added training, such as new technological areas, new soft skills that are required, and so on, and scheduled for students. In Centres of Excellence, students have access to CoE. Faculty members are assigned to each course for teaching based on their qualifications and preferences (Tarik et al., 2021).

Review of Literature

Educational institutions have various data quality concerns and the requirement for an institutional data quality management strategy. Several writers have offered data models, linkages, and other information. Academic information systems, often known as student information systems, are designed and developed at the university level. An information system created in the city to collect data from 18 distinct EIMSS and derive common quality indicators. An information portal was developed in-house and successfully deployed. Although this portal is intended to aid researchers and lecturers, the endeavour itself demonstrates effective efforts to build internal applications. The success of any EIMS or AIS is determined by a number of elements, including the system's design and operation, active user involvement, and top-level management support (Ansari et al., 2018). A significant number of contributions on this issue have come from Indian States, where information technology penetration is lower than in first-world nations. Low literacy rates and learning resources are among the primary issues in Zambia's education system. Only a handful of other African countries may find themselves in a similar situation. If a government or funding agency wishes to interfere in the education sector to address current issues, they will need authentic "information and/or feedback" to identify the best course of action. Even auditing the quality of any individual academic programme at EIMS and comparing it to another such system requires a large amount of data. Clearly, such workouts need well managed AIS (Yaohua et al., 2018).

The schematic of a typical prototype requires technically equipped employees who can explain, among other things, operational procedures and training requirements. Following that, the technical team should create a functioning prototype that fits the bulk of the criteria while also automating crucial and necessary business operations. A prototype must have a three-tier client/server computer architecture, a well-designed database to store the data, and an application layer that encapsulates the primary business processes. A well designed firewall should then be implemented to govern traffic and data transmission. The entire system should be ready after extensive testing. The security of the system should be thoroughly examined. To uncover the faults and ensure that the system is safe enough, a few team members should assume the role of ethical hackers. Because AIS users differ greatly from those who use standard software, testing AIS may be problematic (Assuad et al., 2020).

The Objective of the Study

The study aimed to investigate whether machine learning when combined with an educational institution management system will help improvise students' learning and educational institution administration.

Methodology

For the study, the researcher adopted a descriptive research design wherein the data was collected from 13 international schools and 4 colleges adopting educational institution management system combined with

machine learning. Here 72 samples were considered, the samples either belonged to the teaching faculty or administrative staff using a simple random sampling technique.

The Quality Management System (QMS), which contained all of the processes and data gathered over the years, is now available on the Internet. For each of the following, a management information system (MIS) is provided. Data from previous MIS systems will be used as input for AI-powered data analysis and forecasting. Each student will receive a personalised learning plan based on the current lesson plan and changed based on AI data analysis and prediction.

Interpretation and Analysis

The purpose of this study was to see if there is a substantial variation in opinion among respondents of different genders, experiences, and ages for questions posed to see if machine learning, when paired with educational institution management systems, can assist students improve.

Table 1. Multivariate Test – EIMS & Machine Learning for Students

Tests of Between-Subject Effects						
	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Gender	Grading students	1.156	1	1.156	1.907	.173
	Improving student retention	.023	1	.023	.033	.857
	Predicting student performance	5.836	1	5.836	13.642	.008
	Personalised learning	.671	1	.671	.860	.358
	Testing students	.136	1	.136	.296	.589
Experience	Grading students	.707	4	.177	.292	.882
	Improving student retention	4.074	4	1.019	1.472	.223
	Predicting student performance	6.691	4	1.673	3.910	.007
	Personalised learning	1.458	4	.364	.467	.760
	Testing students	1.419	4	.355	.772	.548
Age	Grading students	2.856	4	.714	1.178	.331
	Improving student retention	.467	4	.117	.169	.953
	Predicting student performance	3.687	4	.922	2.155	.087
	Personalised learning	.881	4	.220	.282	.888
	Testing students	1.189	4	.297	.647	.631

Source: (Primary data)

The null hypothesis is accepted since the calculated significance value is higher than 0.05 [Std. Value]. As a result, there is no significant variation in opinion among respondents of various genders, experience levels, or ages when it comes to questions posed to see whether machine learning coupled with an educational institution management system can help students improve.

According to respondents Machine Learning on EIMS is helping them; predicting student performance, grading students and testing students effectively.

Herein analysis was done to identify whether there is significant difference of opinion among the respondents belonging to different gender, experience and age groups for questions framed to investigate whether machine learning when combined with educational institution management system, will help improvise the institution administration.

Table 2. Tests of Between-Subjects Effects

Tests of Between-Subjects Effects						
	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Gender	Availability of sufficient historic data for future decision	.941	1	.941	1.298	.260
	Effective decision through computer learning obtained from Machine learning	2.063	1	2.063	3.376	.072
	Better policy formulation	2.094	1	2.094	3.659	.061
	The reduced overall workload for faculty and administrative staffs	2.928	1	2.928	5.476	.023
	Reduced data handling problems	1.167	1	1.167	1.828	.182
Experience	Availability of sufficient historic data for future decision	3.664	4	.916	1.262	.296
	Effective decision through computer learning obtained from Machine learning	.940	4	.235	.384	.819
	Better policy formulation	4.563	4	1.141	1.993	.109
	Reduced overall workload for faculty and administrative staffs	2.476	4	.619	1.157	.340
	Reduced data handling problems	2.102	4	.525	.823	.516
Age	Availability of sufficient historic data for future decision	3.890	4	.973	1.340	.267
	Effective decision through computer learning obtained from Machine learning	.956	4	.239	.391	.814
	Better policy formulation	3.427	4	.857	1.497	.216
	Reduced overall workload for faculty and administrative staffs	1.926	4	.481	.900	.470
	Reduced data handling problems	3.352	4	.838	1.312	.277

Source: (Primary data)

The null hypothesis is accepted since the calculated significance value is higher than 0.05 [Std. Value]. As a result, there is no significant difference in opinion among respondents of various genders, experience levels, or ages when it comes to questions posed to see whether machine learning coupled with an educational institution management system can assist and improve administration.

Findings and Conclusion

The analysis of the dataset revealed that there are no significant differences in opinion among respondents of different genders, experience levels, or ages for questions posed to see if machine learning, when combined with an educational institution management system, can help students and institution administration improve. Furthermore, respondents claim that Machine Learning on EIMS assists them in accurately forecasting student performance, grading students, and testing students. This chapter has discussed many fundamental features of AIS that apply to EIMS from conception to implementation. The recommended technique, on the other hand, is to develop and build software that accomplishes the company's goals and also saves money. After all, EIMS is responsible for the care and development of highly skilled and talented human resources. EIMS that opts for in-house development will be able to identify the strengths and weaknesses of their critical business processes and, as a result, remedial action will be possible even during the planning phase. As a result, there are several opportunities as well as challenges. A number of academic institutions have had a lot of success using in-house process automation technology. Future machine learning technologies will be built on this foundation to provide students with a personalised learning path.

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Innovative and Effective Teaching and Learning by Implementing New Technologies in the Education System

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ABSTRACT

Education and training are a huge piece of each overall population. As an understudy, there are every so often difficulties that can be fit. With the emerging progressions in our current reality, the number essentially appears to be ceaseless. With different kinds of novel advancements showing up reliably, we should not be astounded to see a couple of bits of the world experiencing massive changes. Luckily, there are top contraptions that have been made to help them with getting their hindrances. Since the start of cutting-edge systems, learning has never been less difficult. The educational course of action of the current truth is the means by which it is today a result of these sweeping changes that various advancements have brought at home, understudies can transfer their schoolwork, and educators can access and view finished tasks utilising their workstations. Innovation is now moving through study halls as teachers and engineers make an ever-increasing number of items intended to improve instruction. With a deluge of new learning models accessible, conventional instructive strategies will undoubtedly advance in the following decade. The latest progressions related to tutoring for the improvement of progress and advancement have been addressed.

Keywords: technologies, AR, AI, CBE, 5G, gamification

Introduction

The most recent couple of years have seen an emotional change in the learning model. The manner in which understudies are being trained today is totally different from the instructing techniques that were in use years and years ago. Computerised substance can be appropriated across various conveyance directs and reach youngsters at scale. Schooling frameworks should get ready diverse reactions utilising all accessible advances print, radio, TV, versatile, on-line, and print using a mix of these mediums to guarantee understudies are locked in and learning. Taking it all together, for a blended mode conveyance to turn into the 'new ordinary' to reach all understudies, the distinct disparities in admittance to the Internet and gadgets should be tended to. A particularly difficult setting is nations that are delicate encountering struggle or viciousness (FCV), where proof shows learning neediness is more than 90 per cent among young women.

New Technologies Engaged with Education Framework

Augmented Reality [AR]

Augmented Reality [AR] is one of the greatest innovation drifts at the present time, and it's simply going to grow as AR cell phones and different gadgets become more open all throughout the planet. AR lets us see the genuine climate directly before us-trees influencing in the recreation center, canines pursuing balls, kids playing soccer with a computerised increase overlaid on it. Augmented Reality [AR] is an upgraded form of the genuine actual world that is accomplished using advanced visual components, sound, or other tactile boosts conveyed by means of innovation.

How Instructors Can Utilise Augmented Reality in Homerooms

Making classes more interactive

The general purpose of utilising innovation in study halls is to make learning more comprehensive. This is the advantage of using Augmented Reality innovation. It assists instructors in attracting the attention of understudies and it expands their commitment levels too. It rejuvenates dynamic themes, like set hypothesis and sensible thinking, and makes the teaching-learning process more successful than any other in recent times.

Being a guide

In contrast to other technological advances in education, Augmented Reality lets educators and coaches evolve as guides in the study hall. It isn't merely a video arrangement that limits the inclusion of instructors in the study hall, rather it allows them to manage the entire meeting in a better manner. It assists instructors in taking full responsibility for the study hall by tutoring the meeting, and not simply fulfilling requests and giving guidelines. Once the understudies get acquainted with the innovation, they take greater ownership of the course material.

Collaborating with students

When educators become guides, classes become fun and intuitive. Current understudies are more occupied with realising how they can utilise innovation in some structure or the other. Increased Reality in instruction has demonstrated to improve instructor-understudy coordinated effort in homerooms.

Adaptive Learning

Versatile learning or versatile instructing is the conveyance of custom learning encounters that address the extraordinary requirements of a person. An Educator can coach understudies and assist them with understanding a troublesome idea without a moment to spare input, pathways, and assets. Unavoidably this teacher will modify their clues and counsel because of verbal and non-verbal prompts from the student moving the exercise stream to oblige questions and waiting disarray, referring to recent developments or known understudy interests and inclinations, changing exercises at the time.

Advantages of Adaptive Learning

Quicker and better understudy movement

For educators, managing steadily growing class sizes, it might appear as though there are never sufficient hours in the day to give the entirety of their understudies individualised attention that they need. Having more understudies in the homeroom implies teaching a much more extensive range of scholastic information and abilities, and it tends to be hard to figure out how to compose educational plans that are sufficiently expansive to address the requirements of every understudy, along with checking in on each student to ensure that each individual's doubts are resolved.

Hones versatility

Perhaps the main schooling development that has been realised due to versatile learning is the capacity to quickly change guidance on the basis of the understudy's level of learning. As every understudy works with the program, the innovation will get on what the person is dominating or as yet battling with and change guidance accordingly. Along these lines, learning is enhanced in light of the fact that the versatile learning system can change its methodology on an individual level to ensure understudies are at par in their, despite differing learning abilities before moving on to the next topic.

Improves Understanding

At the point when instructors are remaining before a study hall, it tends to be hard to tell whether the understudies truly ‘get it.’ With versatile learning, the technique and speed of guidance is tweaked for every individual understudy, which improves their chances of grasping new scholastic ideas.

Artificial Intelligence [AI]

Man-made brainpower is beginning to be a part of our ordinary lives. We are encircled by innovation from programmed stopping frameworks, shrewd sensors for taking fantastic photographs, and individual help. Essentially, Artificial Intelligence in training is being felt, and the customary strategies are evolving. Today, understudies don’t have to go to actual classes as they have PCs and web association at their homes. Man-made intelligence is likewise permitting the computerisation of authoritative assignments, permitting establishments to limit the time needed to finish troublesome undertakings so the instructors can invest more energy with understudies.

Benefits of Artificial Intelligence in Education

AI allows guides to customise their classes

Perhaps the best thing about AI is it doesn’t interfere in classes as it makes the learning experience of understudies more interesting along with making the function of coaches simpler. Each understudy has their own requirements that must be met and it very well may be trying for a mentor to meet them all.

AI can be used to show understudies in study halls

Many colleges and universities across the world are utilising AI to instruct their understudies. Because of progressions in innovation, machines can now be modified to do the work of educators in the study hall as long as certain customisations are carried out.

AI can be customised to review understudy tasks

Out of the multitude of advantages AIs bring to the table, this is maybe the best one. Evaluating tasks or tests can be exhausting for certain coaches and it removes exercise arranging and expert turn of events. Surrendering it to the AI implies they can zero in on instructing, giving a superior learning experience to the learners. On the off chance that an understudy doesn’t discover an exercise intriguing, they can get tired of it easily. One approach to flavour things up and bring energy is to add innovation.

Usage of 5G Technologies

Instructive foundations are progressively carrying out enormous scope of IoT (web of things) gadgets; making study halls more astute. Shrewd study halls are enabled with a few associated gadgets like savvy sheets or shows, brilliant handheld devices, and that’s just the beginning, which gives a drawing in, intelligent and customised learning experience to understudies.

Benefits of 5G Technology

Network to more gadgets

While 4G innovation can uphold several thousand gadgets immediately with a couple of minor postponements, 5G can uphold 1,000,000 gadgets with no deferrals. This is vital for a school or college environment that has numerous grounds inside in proximity to one another. This implies that the understudies and coaches can utilise computer generated reality (VR) and increased reality (AR) with no issues.

Excellent exercises in computer generated simulation (VR) And expanded reality (AR)

To get the best out of these two structures, a college or school needs to have a functional. 4G web that can accommodate VR and AR for enhancing understudies' learning experience. By utilising 5G rather than 4G innovation, understudies will have a consistent encounter while they are learning. Guides can offer understudies to visit different planets or even take a visit through the human middle because of VR. With regards to AR, it tends to be utilised by understudies to investigate certain ideas they are learning through zooming, squeezing and surprisingly contacting.

5G Saves mentors, time while Instructing

Mentors realise how difficult it is to set up classes and keep understudies engaged and involved in the classroom. It is a challenging interaction even for the most experienced and seasoned guides. With the assistance of 5G innovation and IoT, coaches can sign in easily when they enter their individual study halls. A few managerial positions can be mechanised by using 5G.

Competency-Based Education (CBE)

CBE is a recent trend that has been recognised yet has gotten a lot of consideration in the course of recent years as more establishments foster projects. Like MOOCs, CBE has acquired ubiquity with students because of its adaptable construction and reasonableness. As the name proposes, these projects depend on the advancement of capabilities pertinent to a specific vocation.

Features of Competency-Based Education

Flexible

Skill-based projects are entirely adaptable as their construction relies upon each student individually. There is a relaxed timeline in these projects, with no set semester exams and classes. All things considered, understudies direct their learning and control when and where they complete undertakings and evaluations. CBE is additionally adaptable in that it permits understudies to enter a program at any level where they are given kudos for previous learning experiences.

Self-paced

The focal point of CBE is on the ultimate result. This empowers understudies to control their pace since they are not bound by a set learning measure. When an understudy feels they can demonstrate authority, they can take an evaluation, get credit and start on the following material at a self-controlled pace understudies can finish a degree when they are prepared.

Engaging

Perhaps the most grounded result of ability-based schooling is expanded understudy commitment. Understudies are more occupied with the material since they are responsible for the learning outcomes. They are enabled on the grounds that they have command over when, where and how they learn. CBE additionally advances individualised learning and obliges an assortment of learning styles, making it a genuinely customised process.

Learning Analytics

Learning is a wide interaction and requires productive following and investigating for the more likely results. As a new innovation, learning examination is presently being utilised by educators to more readily record the learning practices of understudies. In training, improvement is a vital factor that guides the

learning experience of each understudy. This is the thing that learning investigation can assist educators with conveying their understudies. Fortunately, by 2020, this will turn into a significantly utilised innovation.

Classification of Learning Analytics

Enlightening analytics

Enlightening examination offers responses to inquiries concerning what occurred. For example, a retailer will find out about the normal month-month deals and for a medical services supplier, the quantity of patients conceded in seven days. Distinct investigation group information from various sources to give bits of knowledge about past execution.

Symptomatic analytics

Symptomatic examination can be utilised to make inquiries regarding the reasons for occurrences. You can sort out the reliant components to distinguish examples to gain knowledge about a specific issue or opportunity. For example, information from symptomatic examination may show that an e-Learning seminar on client support experienced low finish rates among senior leaders while recently added team members thought that it was successful.

Prescient analytics

As the name suggests, prescient investigation determines what is probably going to occur. It expands on the discoveries of existing information to conjecture what's to come. In any case, recall that expectations can only gauge, and the exactness exceptionally relies upon the nature of information and security of the related circumstances. Thus, it is essential to examine the information cautiously.

Gamification

The standards of gamification require conveying learning targets utilising game mechanics that make learning fun. It is apparently a straightforward proposition and one that reverberates emphatically with students who appreciate higher efficiency and commitment levels. In the following year, we hope to that gamification gets simpler and faster to make arrangements with expansions in portable and microlearning.

Advantages of Gamification

Increases student commitment

Gamification in e-Learning challenges experts to make encounters that completely involve their students. Gamification should be such that it rouses and attracts them, given that they are endeavouring to arrive at an objective. At the point when students feel good about their learning cycle and realise that they will be remunerated and for their endeavours.

Makes e-Learning fun and inspiring

While you may have an assortment of learning objectives and targets you need to accomplish all through the e-Learning course, none of these results can be viably accomplished if the students aren't actually amped up for what they are learning. Gamification in e-Learning makes learning enlightening, yet fun and energising as well. It likewise adds an intuitive component to the e-Learning courses.

Improves information ingestion and maintenance

Regardless of whether you are planning an e-Learning course that revolves around consistent preparation or one that spotlights on 11th grade science, the objective is similar – to make students somehow ingest information.

Conclusion

With everything taken into account, tutoring is set to undergo gigantic reshaping as a result of many emerging developments. Understudies can use all of the above advancements by examining everybody. By investigating each one, they procure excellent pieces of information on precisely how they can get best utilise them. The rising of such endless new advances and refinements to existing examples makes 2020 a phenomenal year for guidance. As learning ends up being clearer and communitarian, we need to move our focus from data transport to executing imaginative and non-mechanical movements to help understudies boost their potential.

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Unfolding the Online Mode of Teacher Education in Context of the Indian Education System

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ABSTRACT

e-Learning plays a vital role in the present technological era as it leads to the development of individuals along with that of the nation. The concept of e-Learning evolved in the late 1990s by keeping in mind the objective of enhancing the knowledge of people through the usage of interactive devices (Vora, 2020). Due to its flexible nature, the demand for e-Learning has been increasing day by day. Conventional learning doesn't necessarily give the expected outcome i.e. quality education. Also, conventional learning doesn't allow teachers to be present at many places at the same time – e-Learning can remove the barriers that are innate to conventional learning such as limited to the physical space of a classroom, time-bound, limited learning etc. e-Learning leads to the intellectual development of an individual (Vivekananda, 2017). In a country like India, e-Learning is a boon and plays a vital role in developing critical thinking skills among students. In the Indian context, the entire focus in e-Learning is on the development and implementation of new methodologies in the context of technologies such as gamification, mobile e-Learning, cloud-based e-Learning, micro-learning, internet of things etc. The current study aims at 'Unfolding Online Mode of Teacher Education in Context of Indian Education System'. It is based on secondary data. Therefore, researchers did a review of the collected literature. In the present study, the research tool used for the analysis of data is content analysis and the research method is descriptive research. The findings of the study indicate that e-Learning is beneficial for all the stakeholders – teachers, learners, society and the nation.

Keywords: e-Learning, conventional learning, gamification, mobile e-Learning, cloud based e-Learning, micro-learning, internet of things (IoT)

Introduction

Online education provides access to a world-class learning experience. On the other hand, the conventional mode of teaching cannot provide such experiences due to constraints of time, finance and personal needs. A highly populated country like India needs to have online education in a formal mode. The term e-Learning is also coined as “virtual learning” or “online learning”. In layman terms, when we make the use of electronic devices for the purpose of learning it is called e-Learning. The use of electronic devices can be used to deliver a lecture or an entire course in schools and colleges, and that too in part or full distance learning course. e-Learning is a boon at every level whether it's for an individual or for society, as learners can conveniently learn at their own pace by making use of electronic devices such as smart phone, tablet, computers. The replication of physical books and physical library is done through the information provided on the internet. World-class resources are provided to the learners which give them the benefit of learning at their own pace. According to Vora (2020), advantages of e-Learning are as follows:

- **Communication:** e-Learning provides the opportunity to learners and teachers to communicate with each other and enhance their communication relation.
- **Virtual space:** It provides virtual space to learners, members and experts to meet and discuss on various issues and topics.
- **Accessibility:** e-Learning provides 24/7 access to course materials.
- **Access to information:** Learners can access information that is available on the database or university internet.

- **Training:** Learners can be provided the right sort of training at the right time which will be beneficial for them in near future.
- **Approach:** e-Learning makes use of learner-centred approaches.
- **Administration:** It reduces administration around the various courses.

Implementation of Online Teaching-Learning In Higher Education Institutions (HEIs)

Due to COVID-19, online teaching-learning has been extensively used. Therefore, it became a massive challenge for different stakeholders. These challenges need to be addressed for making each stakeholder technologically competent as per the present scenario.

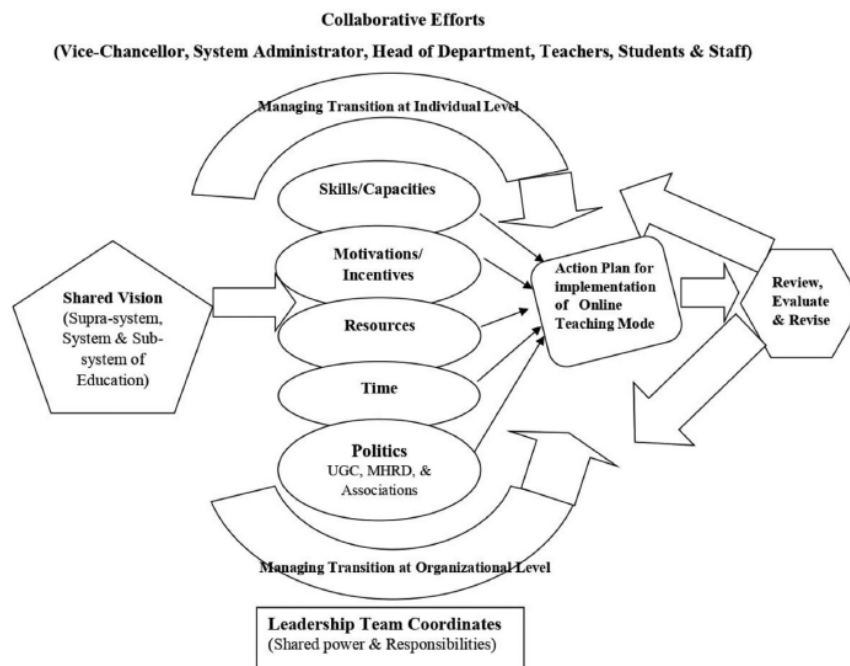


Figure 1. A conceptual model of the implementation process of online teaching-learning
Source: Adapted from (Speck, 1996)

The above figure discusses the implementation process of online teaching-learning at individual and at organisational level. According to Mishra et al. (2020), the implementation of e-Learning in the field of higher education began with UGC, MHRD and university and colleges initiatives. Motivation plays a vital role in the adoption of e-Learning platforms for fulfilling the needs of the learners. Various softwares and educational apps were embedded in HEIs such as, ZOOM, Google Meet, Cisco WebEx etc. Keeping in mind the need of the hour, the Government of India implemented online education across the country. To work during the pandemic, teachers too prepared themselves so as to work independently using the online mode.

Review of Related Literature

In recent decades, the impact of e-Learning can be observed, it has taken its shape that has made a huge impact seen on stakeholders. The conventional mode of learning has been completely changed due to this learning technique. In the field of e-Learning there are various articles and research papers that have been referred while writing this paper. For instance, FengWeng et al. (2010), suggest that most tough things become an easy to learn as well as remember for a long period of time when the learner plays simulated

games on computers in the process of e-Learning. Tubaishat & Lansari (2011), concluded that there is high acceptance of e-Learning by the students in their regional institutions. Ibanez et al. (2014) concluded that gamification plays a vital role in engaging students in various learning activities. Gamification also has a positive effect on knowledge acquisition. Further, the authors suggest that the same gamification technology can be used for other similar programming learning purposes for the students. Jain et al. (2014) concluded that Artificial Intelligence-Based Student Learning Evaluation Tool (AISLE) reduces the time taken in assessing a student's understanding of a concept and it also helps the instructor to compare variability of understanding among learners.

In the field of e-Learning, various technologies are emerging in teaching-learning practices. Therefore, it is relevant to explore the recent trends in online mode of teacher education. To answer these questions, we set out to conduct a systematic review of research related to e-Learning: What are the emerging trends in online mode of teacher education? How will the emerging technologies benefit the stakeholders? The goal of our research was to identify the emerging trends in online mode of teacher education, to provide ideas to fellow researchers on future research topics and issues for further exploration. In order to accomplish the above-mentioned goals, we conducted a systematic review of articles and papers published in the last decade. The researcher has further discussed about the emerging trends in the online mode of teacher education.

Scope of the Study

The article is based on the author's study and review of related literature. The inferences and suggestions presented here are based on thoughts, opinions and perspectives from the author's knowledge, experience and what was gathered from the literature.

Objectives of the Study

1. To find out the emerging trends in the online mode of teacher education
2. To find out the benefits of online mode of teacher education
3. To discuss the emphasis of National Education Policy, 2020 on online mode of teacher education

Methodology

For analysing the data, content analysis is used as a research tool and the research method is descriptive research. The qualitative aspects of the research study have been taken into consideration. The present study is based on secondary data. A systematic review was done for the collected literature by the researcher. Secondary sources of data that were used are: (a) journals, (b) search engines, (c) articles and (d) research papers.

Emerging Trends in Online Mode of Teacher Education

There are various technological trends of e-Learning in the present scenario. In the present time, a new trend is emerging and flourishing to provide fruitful learning techniques to the learner. The popular technological e-Learning trends are listed below:

- 1. Mobile Learning:** Stakeholders can learn by making use of personal pocket devices such as mobile phone's and smart phones. Other gadgets and devices having Internet connectivity can be used for the purpose of e-Learning. In the present era, everyone has a mobile phone which can be used in a desired way. They are portable in nature and can be carried around them without any hurdle. Mobile phones play a vital role in making e-Learning a successful venture in India and in other developed nations.

2. **Micro-Learning:** It is used in case of providing the content in small groups. In micro-learning, learners are in control of the context of what they are learning. Such content is designed in a learner-centric format. but on the other hand provides training that is available on various devices. It is ensured that the material is easily accessible to all the learners.
3. **Cloud-based e-Learning:** It leads to creation of ripples in the field of education. The user can log in and can have access to learning systems which are hosted on the Internet. The instructor uploads the course content by using an Internet browser. Instead of uploading the course content on learner's computer, it is uploaded on learning management system in which the creator has the ability to store the data and others (approved users) can have access to it.
4. **Gamification:** studies have shown that gamification is useful for learners to comprehend and apply new knowledge. It is done through a program and also depends upon the learners' choice. Gamification creates interest among the students and encourages them to do the task again and again. It helps the learners to acquire knowledge, skills and also provide them the opportunity to retain their knowledge in the long run.
5. **Adaptive e-Learning:** In adaptive e-Learning, computers are used as interactive devices for teaching. As per the required learning needs, these methodologies arrange the allocation of different resources for each learner. Therefore, it is known as intelligent tutoring and the origin of it is artificial intelligence. The use of adaptive e-Learning is made for distance learning and group collaboration. Adaptive e-Learning is used in the following areas: computer adaptive testing, adaptive hypermedia and intelligent tutoring systems. Benefits of adaptive e-Learning are: it acts as a time-saving resource and helps tutors in tracking their learners.
6. **Augmented Reality:** It is related to mediated reality. Augmented reality is considered a boon technology for learners in the present time. Whenever a person sees something in the real world, they can find out the information regarding it with the help of mobile phones. In augmented reality we need device, Internet and software of augmented reality. It was introduced in the year 1962. An example of augmented reality is Google Glass. Deep learning of things can be done easily with the help of augmented reality. Huge collection of database can also be created with the usage of augmented reality.
7. **Virtual Resources:** The learner can learn by watching the videos. Whenever we want to get some idea regarding a topic, we usually search the particular topic on YouTube. Therefore, this type of learning provides us knowledge through multimedia effects. Examples of video e-Learning are YouTube, CDs and TV, and these kind of resources save time as instead of reading whole content on the Internet knowledge is gained by watching videos.
8. **Artificial Intelligence:** AI is said to be an intelligent software which helps us in taking intelligent actions and acts as an instructor for each student. We can take example of SIRI, as it answers our queries. AI helps us in taking quick decisions along with providing us quality resources. AI in the field of education is helpful as it provides expertise to learners and leads to automated teaching.

National Education Policy, 2020 and Emphasis on Online Mode of Teacher Education

For the purpose of arranging the building of digital infrastructure, a dedicated unit will be created in the Ministry of Education to look after the e-education needs of different education levels. Since technology is rapidly changing, it is the need of the hour to encourage an ecosystem that creates solutions for solving India's challenges of scale, equity and evolve in keeping up with the rapid changes in technology.

Findings and Conclusion

Customised learning can be done with the help of e-Learning as it is adaptive and personalised in nature. To enhance the teaching-learning process, one can adopt an e-Learning platform. Recent researches indicate that educational material becomes handy with these technology which are helpful for teachers as well as for learners. e-Learning is beneficial to the following stakeholders:

- a. **Individuals/Learners:** e-Learning is beneficial for learners as it saves time and money of the individual. It provides easy access to learning material and these learning resources are freely available. Secondly, learners can learn at their own pace and such technology can transform the future of education.
- b. **Teachers:** A lot of time of a teacher can be saved and it acts as a boon for teachers as it helps them in dealing with stressful condition such as repetitive classes.
- c. **Society:** The society can take benefit of e-Learning to the maximum extent as e-Learning can reach out to any part of the world.
- d. **Nation:** When a learner acquires various skills through e-Learning it will lead to increase in competitiveness as well as employment by making our nation more attractive to foreign investments and also fostering a new business and entrepreneurial venture.

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Patterns of Use of Internet-Enabled Teaching Tools in English Language Classrooms in India

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ABSTRACT

The COVID-19 pandemic has challenged and forced teachers to explore innovative ways of online teaching. The present study reviews published studies on the use of various emerging teaching tools in English Language Teaching (ELT) in India. It aims to explore the patterns of their use, the knowledge of which can facilitate improved integration of suitable Internet-enabled technology in ELT. The researchers selected 50 India-based research studies on the efficacy of technology in ELT, published between 2016 and 2020. The following categories were identified for investigation: target language skills, the technology used, and conclusions of the selected studies. Manual coding through theme-based labelling and grouping of such codes for identification of these categories was carried out. Additionally, a corpus of the selected research articles was collected using *AntConc* software to facilitate an exploration of KWIC (Key Word In Context) related to the use of technology. The results revealed that the researchers concentrated on improving speaking, writing, reading, and listening, along with vocabulary and grammar through the use of technologies such as Google Classroom, YouTube, WhatsApp, Facebook, podcasts, language apps, etc. The results also revealed that there is a shortage of empirical research in the field. Overall, this review revealed that technology, when used appropriately, helps learners develop language skills.

Keywords: English language teaching tools, Internet, language skills, social media, technology

Introduction

As a part of the phenomenal rise of online teaching during the COVID-19 pandemic era, teachers need to ensure that learners do not miss human interaction. There needs to be a concerted effort to provide a structured online learning environment that uses a range of collaborative technological tools that promote inclusion, personalisation, and interaction. Against this background, the present article reviews published studies on the use of various emerging Internet-based technologies in ELT in India. It aims to explore the patterns of their use as well as the skills they focus on. This exploration can facilitate improved integration of suitable tools in ELT. Therefore, the study aims to find answers to the following questions: the different language skills investigated by ESL researchers in India; the existing Internet-based technologies that ESL researchers recommend for ELT in India, and the conclusions reached by ESL researchers with respect to the use of technology in ELT in India.

Methodology

The research articles were searched online using the following search terms in different combinations: 'technology', 'English', 'Internet', 'teaching', 'language', and 'India'. The following inclusion criteria were used for screening the selected articles: studies- 1. published between 2016 and 2020; 2. focussing on the efficacy of technology in ELT; 3. published in English and 4. carried out in the Indian context. Besides the electronic search, the researchers manually searched for related articles in some of the journals published in India, such as *Journal of English Language Teaching*, *FORTELL*, *Language in India*, *ELT Voices*. In total, 50 articles were selected after the screening process. Later, content in these articles was read, highlighted, and coded for the data of interest by labelling the concepts based on the themes of

this study. The following categories were identified for investigation: 1. target language skills investigated; 2. technology used; and 3. conclusions arrived at. Manual coding through theme-based labelling and grouping of such codes for identification of these categories was carried out. Additionally, a corpus of the selected studies was collected using *AntConc* software. Its concordance tool facilitated an exploration of KWIC related to the use of technology.

Results

Language Skills Investigated

In some of the reviewed studies, the researchers focussed on a single skill and in others on more than one. The total number of studies where a particular skill was focussed was found using *AntConc* software, and the results show that speaking is the most focussed skill in a total 34 studies. Writing, reading, listening, vocabulary, and grammar were investigated in 22, 21, 21, 17, and 8 studies, respectively. Grammar is the least focussed area in these studies.

Internet-Enabled Tools Used

In these 50 articles, 33 different types of technology were used 107 times in total. Table 1 shows the total number of studies where a particular technology was used.

Table 1. Internet-enabled Tools Used

S. No.	Tools Used	Number of Studies	S. No.	Tools Used	Number of Studies
1	<i>YouTube</i>	11	18	<i>Hangouts</i>	1
2	<i>Mobile phones</i>	9	19	<i>Zoho Writer</i>	1
3	<i>Skype</i>	9	20	<i>Remind</i>	1
4	<i>Blogger</i>	9	21	<i>Talk to Books</i>	1
5	<i>Email</i>	7	22	<i>Online Games</i>	1
6	<i>Podcast</i>	7	23	<i>MS Word</i>	1
7	<i>WhatsApp</i>	6	24	<i>Rosetta Stone</i>	1
8	<i>Facebook</i>	6	25	<i>LDOCE</i>	1
9	<i>Google Classroom</i>	5	26	<i>Speech Recognition Software</i>	1
10	<i>Twitter</i>	5	27	<i>Sonic Visualiser</i>	1
11	<i>MS PowerPoint</i>	4	28	<i>Flinnt</i>	1
12	<i>Instagram</i>	4	29	<i>Oxford English Grammar & English Listening</i>	1
13	<i>Smart Board</i>	3	30	<i>Hello Talk</i>	1
14	<i>Padlet</i>	2	31	<i>Utter</i>	1
15	<i>Duolingo</i>	2	32	<i>Babbel</i>	1
16	<i>Google Word Coach</i>	1	33	<i>Lingua Phone</i>	1
17	<i>Google Sites</i>	1			
Total = 107					

Usage of Internet-Enabled Tools in ELT

YouTube is the most explored tool for the teaching of speaking and listening skills. The studies by Chandrasekaran (2019), Konnur (2020), and Jayanthi & Kumar (2016) reveal a typical pattern of using *YouTube*, where the learners are exposed to language usage through *YouTube* videos that would generate ideas and thoughts in their minds. It also equips the learners with the correct vocabulary, pronunciation, and sentence structure, which may help boost their confidence while speaking, after watching the videos. Karkera & Chamundeshawari (2018) discussed four steps to follow while conducting a listening task using TED Talks and BBC News: teacher preparation, pre-listening activity, while-listening activity, and post-listening activity. *Skype* (Swamy, 2018; Chandrasekaran, 2019) is used to connect with native speakers. The feature of voice messages of WhatsApp (Kunnath, 2019; Kotamraju, 2019) is used to improve learners' speaking and listening skills. Teacher *podcasts* (Kordi & Jahanshahi, 2016), produced by teachers themselves, considering their students' needs, help improve listening skills. Tools like *Lingua Phone* (Akhtar, 2016), *Speech Recognition Software* (Parveen, 2016), *Sonic Visualiser* (Kumar & Jayaraj, 2016) are used to recognise the accuracy of the learners' speech and provide feedback and encourage them to practice for better proficiency. These tools were selected by the researchers in order to fine-tune the learners' pronunciation. Language learning apps (applications) like *Duolingo* (Suneetha et al., 2016; Banerjee & Das, 2020), *Babbel* (Banerjee & Das, 2020), *Hello Talk & Utter* (Suparitha, 2020) enable users to learn to speak languages interactively. *Padlet* (Nagamani, 2016) facilitates forming of virtual reading clubs, uploading of audio files, etc. Social networking sites like *Blogger*, *Instagram*, *Facebook* (Tomar, 2016; Ponnammal, 2016; Gohil, 2018; Chandrasekaran, 2019) provide learners with a platform to practice real-life use of language. *Skype* (Kordi & Jahanshahi, 2016), *Google Classroom & Zoho Writer* (Sofia, 2018) can be used for collaborative writing. Letter writing is easier to teach with the help of *email* (Varalakshmi, 2016). Reading and commenting on selected *blogs* (Hethesia & Gandhi, 2020) help learners in improving their reading comprehension skills, while the use of *Talk to Books* app (Suvarna Ragini, 2019) encourages students to derive pleasure through self-selected reading. Ghanta (2020) identifies *online games* as practical vocabulary learning tools. *Longman Dictionary of Contemporary English (LDOCE)* software 5th version (Kordi & Jahanshahi, 2016) provides many key learning features like word pronunciation, syllable division, phonetic transcription, vocabulary trainer, etc. Similarly, *Facebook* (Khatoon, 2018), *Twitter* (Dhanya, 2016) can make the learners aware of the new trends and styles of language in vogue. With a *Smartboard*, teachers can combine video, audio, Web browsing, and word processing to teach grammar (Kour, 2020) and vocabulary (Kordi & Jahanshahi, 2016) interactively. Learners can listen to lessons on grammar on tools like the *LDOCE* software (Kordi & Jahanshahi, 2016) and *Oxford English Grammar & English Listening app* (Suparitha, 2020). These researchers have tried to use student-friendly Internet-enabled tools to make the teaching-learning mode more contemporary and effective.

Conclusions of the Selected Studies

An important conclusion reached in the reviewed studies is that the use of technology in ELT can improve learners' language skills. It also helps learners gain a deeper understanding of complex topics and they are more likely to use it to solve problems in non-school situations (Tomar, 2016). Similarly, technology provides access to research, leading to learning by discovering (Varalakshmi, 2016). Swamy (2018) concludes that e-Learning leads to student-centred pedagogical strategies, fostering linguistic sensitivity. Technology enables teachers to cater to the needs of heterogeneous groups (Varalakshmi, 2016) and offers students the opportunity to develop as speakers, writers, and readers for an ever-widening range of purposes (Viju, 2018). However, Philipose & Rajagopal (2019) are apprehensive of the underlying assumption that students are technologically savvy and that they would quickly warm up to the idea of embracing technology for learning English. Instead, they observe that, learners need digital training.

Similarly, teachers may not be suitably equipped to use technology efficiently (Tamilarasan et al., 2019). Suparitha (2020) concludes that social media has certain disadvantages, such as quick addiction to social media, eye strain, hacking incidents, etc. Chinchole (2019) states that MALL (Mobile-Assisted Language Learning) is not a self-sufficient way of language pedagogy as it demands a wider spread of technological awareness and strengthening of infrastructure. While mentioning a word of caution, Khar (2016) advises following the ethics of using materials available on the Internet. Banu & Gandhi (2017) suggest that the role of a man and a machine in the growing educational enterprise should be demarcated clearly.

Conclusion

The present study reviewed 50 published studies on the use of various internet-based technologies to teach the English language in India, focusing on different language skills. The results revealed that the researchers concentrated on improving language skills like speaking, writing, reading, and listening, along with vocabulary and grammar through the use of various kinds of Internet-enabled learning tools and technologies such as *Google Classroom*, *YouTube*, *language apps*, *Skype*, *WhatsApp*, *blogs*, *Facebook*, etc. In some studies, researchers focused on one single skill and in others on more than one. Researchers paid more attention to improving their speaking skills. The results showed that, in 50 articles, 33 kinds of technologies were used 107 times (Table 1). It was found that the most explored technology was *YouTube*. Some of the researchers made simultaneous use of a variety of these technological tools to increase the overall productivity of the class like *Google Classroom* (Dewle, 2019), *Google Site* (Barathi, 2017), *Remind* (Sofia, 2018), *Flinnt* (Kumar & Jayaraj, 2016), etc. The present study also discussed the conclusions of various researchers. The concluded advantages and disadvantages of technology in ELT are discussed in detail. The results also revealed that the reviewed studies did not focus on creating technology-integrated study materials and mainly depended on what was already available, irrespective of their cultural and academic context. It could also be argued that there is a severe shortage of empirical and experimental research in the field of use of technology with regard to ELT in India, as most of the reviewed studies were speculative and theoretical arguments. Moreover, little research has been carried out regarding the psychological, socio-political, cultural, and economic implications of the increasing use of technology in language classrooms. Such investigations are going to be increasingly relevant with respect to the ever-changing teaching-learning scenario during and after the pandemic era.

However, as this review reveals, technology, if used appropriately, enhances the interaction between teachers and learners, provides comprehensible input and output, helps learners develop language skills, promotes learners' autonomy, and increases their motivation. The use of technology in ELT has a crucial role in developing learners' creativity and providing them with interesting and exciting ways to study the language. This review attempted to reveal patterns of use of technology in ESL classrooms, the knowledge of which can facilitate improved integration of suitable technology and Internet-enabled teaching in a language classroom.

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Full reference to the reviewed articles can be found at the following link:

<https://docs.google.com/document/d/1iumX3UeCw72jH9qGrn6bz8D2w1bDYdv3VrRaTDegxqE/edit?usp=sharing>

A Preliminary Study on the Use of Social Media in Higher Education

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ABSTRACT

The study focused on the influence of social media on students, faculty members and administrators and how they can adopt social media for their academic and work purposes in higher education institutes within India. We developed a conceptual model based on the UTAUT (Unified Theory of Acceptance and Use of Technology) model, by adapting a few constructs and customising to fit the context. 756 respondents attempted the online survey. Of these, 400 were students, 199 faculties and 157 administrators. Respondents from 105 cities spread across 25 states participated in the survey. Due to the onset of the COVID pandemic, we resorted to the online collection method. The study considers three constructs – Perceived Usefulness, Perceived Ease of Use and Social Influence as direct determinants that will influence the behavioural intentions of the users in higher education. We ran a series of basic descriptive analyses, T-tests and ANOVA (Analysis of Variance) for the data collected across all groups to determine if a significant difference exists in the perception, between groups. Results show that social media is perceived as a driver for innovation amongst all the three groups – students, faculty and administrators. However, there are differences in the positive-negative response ratio, which has however not affected the overall positive inclination of the combined responses of all groups. The current study may be an invaluable source of information for researchers to understand how the groups perceive social media.

Keywords: social media, higher education, perceived ease of use, perceived usefulness and social influence

Introduction

Educators and researchers are motivated to explore ways through which social media technologies ensure positive outcomes on teaching and learning in an educational set-up (Saini and Abraham 2019). Though integration of web-based tools and education is still nascent in India, its education system is exploring creative methods of learning and teaching (Bharucha 2017). Findings from researches show that despite the digital divide between the generations and social economic classes, social media will play a crucial role in the Indian educational sector (Bharucha 2018). Our scope of research pervades across three aspects:

- i. Examine if there is a difference in the perception of usefulness towards social media for students, faculty and administrators group.
- ii. Examine if there is a difference in the perception of ease in using social media among students, faculty and administrators group.
- iii. Examine if there is a difference in the perception of social influence to use social media among students, faculty and administrators group.

Literature Review

Use of social media in higher education, in a way, is about individual acceptance of technology or innovation. Theories and models have developed in the past years which attempted to understand the logical pattern of technology acceptance behaviour. As our study focussed on understanding the individual acceptance and perception of social media in higher education, we briefly reviewed individual acceptance models. Of all the models, we have been inspired to use TAM (Technology Acceptance Model) and UTUAT models'

approach towards studying the technology acceptance behaviour to our present study. The determinants individual behaviour from both the studies, seemed relevant and adaptable for our study. TAM is the most influential model of technology acceptance that states that two primary factors are influential in an individual’s intention to use new technology - perceived ease of use and perceived usefulness. Researches have said that TAM is too simple and does not include important variables although it is still recognised by many as a powerful and highly reliable predictive model (Legris, Ingham, and Colletette 2003). The UTAUT model integrates the theories and research on individual acceptance of information technology to create a unified view. It has four determinants of user acceptance and usage behaviour - performance expectancy, effort expectancy, social influence, and facilitating conditions.

Methodology

We ran a series of descriptive analyses, T-tests and ANOVA for the data collected across all three groups to determine the significance between groups. Random sampling method has been used to collect data, through a self-administered online survey. 756 respondents participated and completed the survey. Of these, 400 were students, 199 faculties and 157 administrators. Respondents from 105 cities spread across 25 states participated in this survey. Three constructs have been used for this study - Perceived Ease of Use, Perceived Usefulness and Social Influence. Table 1 shows the list of items categorised under each construct.

Table 1. The List of Items and their Constructs

Perceived usefulness	Social media helps me in accomplishing my tasks more quickly.
	Social media helps in improving my work performance.
	Social media helps in enhancing the effectiveness of my administrative work.
	Social media makes my administrative work easier.
Perceived ease of use	I find it easy to use social media.
	I find it easy to get social media to do what I want it to do.
	My interaction with social media is clear and understandable to me.
	I find it easy to become skilful in using social media.
Social influence	I am influenced by my co-workers for using social media in administrate work.
	My supervisor is very supportive of using social media for work purpose.
	My institution is very supportive of using social media for work.

These constructs have been adopted from earlier studies. Perceived ease of use, has been adopted from the study done by Ajjan and Hartshorne (2008), perceived usefulness, was adopted from the study done by Chang and Wang (2003) and social influence has been adopted from the study done by Dabbagh and Kitsantas (2012). The items under each construct were combined through additive methods and categorised accordingly. They have been measured using a five-point Likert scale. 1 indicates strong disagreement, and 5 indicates strong agreement.

Analysis

Descriptive and statistical analyses was done for all the responses. Tables 2, 3 and 4 show the construct-wise analysis for three groups. There was overall moderate level of positive responses across all three groups. However, the difference in the ratio of responses for all three constructs varied across all groups.

Table 2. Construct-wise Analysis for Students' Group

Students	Perceived Ease of Use	Perceived Usefulness	Social Influence
Strongly Agree	25%	11%	7%
Agree	42%	44%	31%
Niether Agree nor Disagree	20%	21%	32%
Disagree	7%	16%	19%
Strongly Disagree	6%	8%	11%

Table 3. Construct-wise Analysis for Faculties' Group

Faculty	Perceived Ease of Use	Perceived Usefulness	Social Influence
Strongly Agree	19%	10%	9%
Agree	38%	33%	28%
Niether Agree nor Disagree	25%	28%	40%
Disagree	12%	19%	16%
Strongly Disagree	6%	10%	7%

Table 4. Construct-wise Analysis for Administrators' Group

Administrators	Perceived Ease of Use	Perceived Usefulness	Social Influence
Strongly Agree	21%	18%	14%
Agree	39%	35%	28%
Niether Agree nor Disagree	25%	25%	35%
Disagree	11%	16%	16%
Strongly Disagree	4%	6%	7%

Tables 5 and 6 show the ANOVA and T-test results for the 11 items across three groups. Statistical analyses show a significant difference between the groups regarding their perception on social media being helpful, easy to use, and socially influenced to use it for education purpose.

Table 5. Item-wise ANOVA Analysis

Constructs	Items	ANOVA Analysis (P value)
Perceived usefulness	SM helps me in accomplishing my tasks more quickly.	0.033
	SM helps in improving my work performance.	0.089
	SM helps in enhancing the effectiveness of my administrative work.	0.24
	SM makes my administrative work easier.	0.002

Constructs	Items	ANOVA Analysis (P value)
Perceived ease of use	I find it easy to use social media (SM).	0.011
	I find it easy to get SM to do what I want it to do.	3.36E-06
	My interaction with SM is clear and understandable to me.	0.106
	I find it easy to become skilful in using SM.	0.86
Social influence	I am influenced by my co-workers for using SM in administrative work.	0.265
	My supervisor is very supportive of using SM for work purpose.	0.11
	My institution is very supportive of using SM for work.	2.18E-07

Table 6. Item-wise T-test Analysis ($\alpha = 0.0167$, adjusted using the Bonferroni correction)

Items	Students-Faculty	Students-Administrator	Faculty-Administrator
SM helps me in accomplishing my tasks more quickly.	0.073	0.208	0.009
SM helps in improving my work performance.	–	–	–
SM helps in enhancing the effectiveness of my administrative work.	–	–	–
SM makes my administrative work easier.	0.0006	0.0582	0.025
I find it easy to use social media.	0.007	0.0376	0.073
I find it easy to get social media do what I want it to do.	3.83-E06	0.0006	0.488
My interaction with social media is clear and understandable to me.	–	–	–
I find it easy to become skilful in using SM.	–	–	–
I am influenced by my co-workers for using SM in work.	–	–	–
My supervisor is very supportive of using SM for work purpose.	–	–	–
My institution is very supportive of using SM for work.	1.81E-05	3.08E-06	0.3304

Discussions

The survey has shown a positive inclination of the three groups towards using social media for their work purpose. Perceived Ease of Use towards social media had the highest number of positive responses from all the three groups. Though groups found social media helpful in quickly accomplishing the tasks, improving their work performance and enhancing work effectiveness, there was a slight disagreement in the faculty and administrative groups regarding social media making their work easy. This indicates that they viewed social media as a platform for building their personal skills, but have been hesitant to use it for work or classroom purpose. Also, all the three groups perceived social media as helpful in improving

their performance skills but viewed it as incapable of performing all preferred tasks. All problems may not be solved through social media; the nature of work and the solutions that a specific problem requires, determine whether social media can solve that particular issue or not.

Conclusion

Our study aimed to study social media as a driver for innovation in higher education institutions. To achieve this objective, an online survey was conducted among the three groups - Students, faculties and administrators in India. The results were statistically analysed to understand and determine if they conformed to our objective. We ran a series of statistical analyses on the responses collected. From the research data and analyses, it can be seen that the general perception of the use of social media in higher in education is positive across all groups. Perceived ease of use is the most influential construct among all three groups, followed by perceived usefulness and social influence. There is a need for institutional intervention to bridge this gap by formally training the employees. It may be a good idea if institutions encourage the faculties, students and administrators to formally explore the opportunities like social media tools, MOOCs and personal learning environments (PLEs) and include them in their curriculum.

Limitations and Future Studies

Extensive online survey can be approached covering all parts of the nation. Stratified random sampling could be used to obtain a sample population that best represents the entire population. The perspective differences across the groups in different domains like engineering, medicine, science and humanities can be investigated nationwide.

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Gamified Content and Language Integrated Learning Approach (CLIL): An Innovative Approach for Effective Language Teaching and Learning

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ABSTRACT

In recent times, educational approaches like Game-Based Learning (GBL) and Content and Language Integrated Learning (CLIL) have captured the attention of many researchers. However, very little research has been done on the learning process. The main objective of this study is to investigate how learning happens in an educational design that amalgamates these two firmly established teaching approaches. This paper also studies learners' motivation and engagement in a game-based environment. It is believed by many researchers like Ricardo Casan Pitarch (2017) and Kyriak Dourda et al. (2013) that this combination facilitates a cognitive and motivational foundation for learning since it signifies a meaningful and contextualised activity and allows learners to broaden their cognitive skills. During the last decade, the game-based learning educational approach has become well-established in the contexts of teaching and learning, capitalising on the characteristic of games to make learning more fun and effective. CLIL as a form of dual-focussed educational approach has gained popularity among teachers and researchers over the recent years. It is well-known for its integration of a non-linguistic curricular subject with a second/foreign language, providing the opportunity to teach both academic tasks and higher-order thinking skills in a safe and enriching environment. This paper aims to review the available literature and discuss the teaching potential attained from the amalgamation of GBL and CLIL. It is proved that game-based learning environments increase the effectiveness of language teaching and learning. This study concludes that with the integration of game-based learning and the Content and Language Integrated Learning Approach, teachers find an interactive model to provide more scaffolding to their learners. In addition, the use of games as a tool will significantly motivate learners to actively participate in the learning process.

Keywords: game-based learning, CLIL, teaching and learning

Introduction

The COVID-19 pandemic has brought various economic, social, political, and technological changes in the world. It has affected almost every aspect of our lives, including education and language learning. Language learning and teaching have been turning away from the traditional methods like grammar-translation method, audio-lingual method, direct method, etc. Researchers of language learning and teaching like Amela Dzemila (2021) are now working towards more communicative methods that integrate project-based, task-based, and content-based approaches. The way we are interacting with technology is also changing the way language learning and teaching takes place (Kyriaki Dourdaet et al., 2014). As a result, new innovative approaches like game-based learning (GBL) and content and language integrated learning (CLIL) have emerged. Though there is a stigma, that games are only for entertainment but not for learning, prevalent on using games for educational purposes in the countries like India, research has proved that Game-based learning improves learner engagement and intrinsic motivation (Sadeqa Ghanzal, 2016). On the other hand, CLIL has gained popularity as an effective dual-focussed approach that amalgamates both content and language (Kyriaki Dourdaet et al., 2013).

Even though CLIL has been established as an approach that bolsters language acquisition and content learning, certain aspects of it can be further improved in terms of implementation. For example, lack of time, materials, students' motivation, etc. (Ricardo Casan Pitarch, 2017). Even the learning potential of the GBL approach is yet to be studied adequately. Sadeqa Ghanzal and Smriti Singh (2016) state that there is

a need for further researches and pilot studies to analyse the effectiveness of game-based learning.

Ricardo (2017) developed a model for the Gamification of Content and Language Integrated Learning (G-CLIL) which leverages the benefits and eliminates the demerits of both GBL and CLIL approaches. He opined that serious video games (games meant for learning) could also be used as a workbook to increase the time of exposure, learners' motivation, and the opportunities to practice (Ricardo Casan Pitarch, 2017).

This paper has a bifold agenda: To review the available literature on the teaching potential of gamified content and language integrated learning (G-CLIL) and to analyse learners' perspectives on using a game-based approach and their participation and motivation in a game-based environment. The study has been conducted with 95 participants studying at a Tier 1 institute in India. A game from a free and open source software website called Nearpod (<https://nearpod.com>) has been used for this purpose. The initial section of the paper talks about the theory available on the Content and Language Integrated Learning (CLIL) approach followed by a brief discussion on Game-based Learning and Gamification. This is followed by a review of the Gamification of Content and Language Integrated Learning (G-CLIL) model provided by Ricardo (2017). Further, the paper also presents the method and methodology used for the experimental study, the results, and the implications.

Literature Review

CLIL

The origins of CLIL can be traced back to the 1970s when there was an emergence of communicative methods and the growth of content teaching in foreign languages (Anna Hurajova, 2015). However, the term CLIL was first coined in 1994 and introduced to European society in 1996 (Ai Ohmori, 2014). The idea of CLIL, which emerged around 20 years ago to meet the communicative needs of European society, has grabbed the attention of educational bodies across the world. The most famous definition of CLIL was given by Coyle, Hood, and Marsh (2010). They defined it as “a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language” (quoted in Ai Ohmori, 2014). According to this definition, a foreign or a second language is used as a tool to teach a curricular subject by giving prominence to both the language and the subject. Another popular definition of CLIL was given by Dalton (2011) who described it as an “educational approach where curricular content is taught through the medium of a foreign language”. In other words, CLIL can be seen as a way to learn a new language and a subject by giving the same importance to both. In a nutshell, CLIL is an innovative integration of both content and language.

GBL and Gamification

Game-based learning (GBL) is an approach that integrates the content with gameplay in a particular learning context. It is considered as a way to implement learner-centred pedagogy in the classroom to foster active participation and learners' motivation (Sadeqa Ghanzal and Smriti Singh, 2016). According to Kyriaki Dourda et al. (2013), game-based learning is an educational approach that leverages the ability of games to make the learning process enjoyable and entertaining. It also “provides learning environments that contextualise knowledge and immersive experiences for learners” (Kyriaki Dourda et al., 2014). GBL advocates the use of games for teaching and emphasises ‘playing and learning’. The idea behind this concept is that learners master knowledge and skills while they master the game.

GBL (Game-based learning) is often used as an umbrella term to describe both game-based learning activities and the gamification of regular lessons. However, according to S. Deterding et al. (2011), the term gamification describes the use of game-design elements in contexts that are non-playful (Pitarch, 2018).

G-CLIL (Gamification of Content and Language Integrated Learning)

Rodson et al. (2015) have developed a model of gamification that contains three elements: mechanics, dynamics, and emotions. Mechanics represent objectives, rules, setting, context, interactions, and boundaries of the game and it aims to encourage action in the game and generate engagement among the players. Dynamics describes how rules function in practice and configure the attitudes of the players that are involved in the experience. The last element in the model is emotions and deals with the affective states of the players and the reactions invoked by the game. These emotions and feelings make the players emotionally engaged in the game and foster their learning (Pitrarch, 2018).

In addition to the model provided by Rodson et al. (2015), other elements are considered while designing serious games. These elements were introduced by Butler (2016) and they supply necessary educational elements in serious videogames. The elements are Engagement, Autonomy, Mastery and Progression (Pitrarch, 2017). By integrating all the above ideas including the '4C' framework of CLIL proposed by Do Coyle (2005), Pitrarch (2017) through his study investigated the possibility of gamifying content and language integrated learning and developed a model that integrates content and language integrated learning with serious videogames.

Methodology

This study was based on the hypothesis that the use of games as a tool increases learners' motivation and engagement in the learning process and the integration of game-based learning with the content and language integrated learning approach could be effective. A mixed-method research design was incorporated and a questionnaire (provided in Appendix A) with qualitative and quantitative questions was used to collect data. This research was conducted with 95 students from a Tier 1 Institute (Institute of national importance, listed as Tier 1 by National Board of Accreditation) in India. The participants included 1st, 2nd, 3rd, and 4th year engineering students as well as 1st and 2nd year Master's students. From the discussions with the teachers and the semi-structured interviews with the participants, it was assumed that the participants belonged to different levels of language proficiency starting from Intermediate to Advanced. The game '*Time to Climb*' which is available on the Nearpod website was chosen and tailored for research. The results were analysed and compared with the previous studies done on Game-based Learning.

Procedure

The game was chosen and customised by adding 12 language-related multiple-choice questions to suit the purpose. Each question was provided with four options to choose from (one correct answer and three wrong answers) and a time limit within which learners had to answer. The game was later administered to the participants as a part of their language lesson. The teacher gave a brief description of the game before the start of the game. Then learners were asked to log into the game on their devices. Once all the participants had got connected to the game, the game was started. The teacher showed the dashboard through the gameplay to let the learners know their scores. Learners were then appreciated for their active participation and the scores they achieved. Immediately after the gameplay, learners were encouraged to fill in a questionnaire which was shared through a Google Form. The questionnaire comprised the questions on engagement, prior knowledge and experience, and other methods of learning.

Results and Discussion

Out of 95 participants to whom the game was administered, 84 participants responded to the survey by filling in the questionnaire forwarded through the Google form. It was observed that only 11 per cent of the total number of participants had experienced game-based learning in the past which shows that game-

based learning is still a novel concept in the Indian context. 86 per cent of the participants found the game challenging and 94 per cent of the participants stated that they were engaged and motivated while learning through games (see figure 1). This result is consistent with Ricardo Pitarch's idea that videogames could aid learners with problem-solving tasks within an enjoyable and engaging environment which would increase learners' motivation (Pitrach,2017). This is also in accordance with the explanation provided by De Freitas (2006) that game-based learning provides learners with engaging and immersive learning experiences (Pitrach,2018). It was also found that around 97 per cent of the participants (82 out of 84) were interested to learn through games in the future as well.

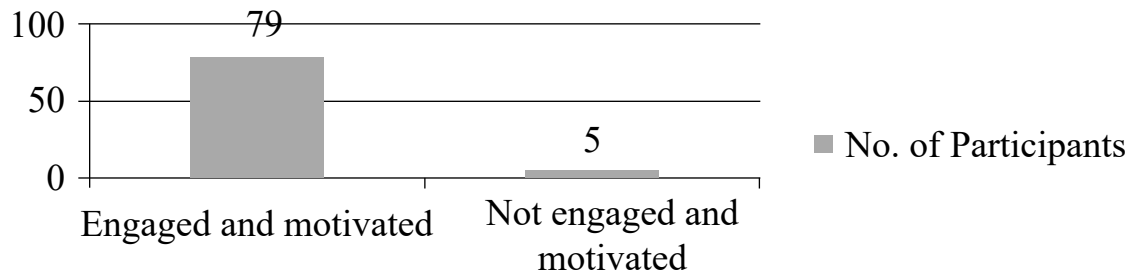


Figure 1. Learners' engagement and motivation

This research also found that 64 per cent of the participants preferred the game-based learning method which shows that the GBL approach to language learning is more intrinsically motivating when compared with other non-gaming approaches (Kyriaki Dourdaet et al., 2014). Nevertheless, 15 per cent of the participants voted for team-based learning and 8 per cent of the participants opted for computer-assisted learning. Around 30 participants opined that the experience of game-based learning was more intriguing and fun and they were excited and motivated throughout the process. However, some students faced difficulties with their Internet connection and devices. Overall results suggest that games can be used as a tool to foster learners' engagement and motivation and they can be incorporated as an effective aid to give diagnostic tests, practice, and assessment.

Conclusion

The above findings suggest that GBL is an effective approach to language teaching and learning and the use of games significantly increases the motivation of learners and their engagement in the learning process. This implies that the integration of game-based learning with the Content and Language Integrated Learning approach by using the model developed by Pitarch (2017) would be more beneficial to further increase the effectiveness of language teaching and learning. This combination could also eliminate the inadequacies of CLIL in terms of learners' motivation and materials, like lack of time, materials, students' motivation, etc. As Pitarch (2017) said, the gamification of CLIL could be developed as an innovative approach in the field of education.

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Effectiveness of Implementing Experiential Learning and Rubrics-Based Assessment in Microprocessors and Microcontrollers Laboratory Course

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ABSTRACT

Today's dynamic world demands the design and deployment of embedded systems and System-on-Chip design in various applications including both domestic and industrial areas, especially in the establishment of a smart and sustainable society. This necessitates the inclusion of hardware-based courses like digital electronics, microprocessors, microcontrollers and computer architecture as pre-requisite courses and pave way for students to develop keen interest, skill and proficiency. Critical thinking and programming skills are indispensable to gain proficiency in these areas. The challenges that lay before the course instructors are to kindle students' interest in these courses and also to make them industry-ready engineers. So, conducting the laboratory courses with the experiments beyond the curriculum and motivating them to complete the course with capstone projects helps the students to improve their programming and design thinking skills. Experiential learning methods like Project-Based Learning (PBL) and active learning methods such as Live Coding and demonstration are employed for Microprocessors and Microcontrollers laboratory course as the solution. A quantitative metric namely, "Coding Quotient (CQ)" is used to measure the critical thinking ability of the students. A post-laboratory student survey is conducted and the "Satisfaction Index (SI)" obtained from the survey validates the effectiveness of PBL.

Keywords: teaching-learning, project-based learning, rubrics based assessment, coding quotient, satisfaction index

Introduction

Embedded system design and development involves the integration of both hardware and software components for interdisciplinary applications such as telecommunication, automation etc. Hence, to strengthen the knowledge of students in the embedded system co-design, it is important to focus on its related laboratory courses such as Microprocessors and Microcontrollers laboratory course. There are many useful pedagogical methods available for enhancing the laboratory teaching and learning process, but it is important to choose appropriate methods wisely, so that they can be completed within the time frame allotted to the laboratory course. There is a critical need for undergraduate students to work in interdisciplinary teams to develop embedded systems, IoT based products and to take part in project design contests conducted by leading industries. New collaborative learning or active learning practices seem to engage students more effectively when compared to conventional teaching methodologies. One such methodology adopted in this study is Project Based Learning (PBL). PBL approach not only stimulates in-depth enquiry and experiential approaches, but also promotes interpersonal and intrapersonal competencies. If a laboratory course is planned thoughtfully, then it will serve as a good tool to implement PBL, as a corridor for a smooth transition from academic to industry environment, thereby making them future ready engineers. With rubrics based assessment, PBL can promote an atmosphere of excellence among the students, and ensure in-depth learning. The objective of this paper is to investigate the merits in adopting PBL based learning methodology and rubrics based assessment for the laboratory course on Microprocessors and Microcontrollers. The peculiarities of this proposal include, altering the curriculum to have a smooth transition from laboratory to real time projects. This study also attempts to introduce a quantitative metric called coding quotient in the implementation of PBL. The effectiveness of the implementation is in turn measured with the help of a satisfaction index.

Literature Review

Project Based Learning (PBL) approach is adopted in Davcev et al. to give exposure to students in designing embedded systems to meet real-time challenges. Djukic et al. elaborate the teaching method based on small group projects for the course Microcontroller Applications in Massey University. Naqvi et al. concluded that the PBL helps in attainment of the course learning outcomes for the course on embedded vision systems, which in turn maps to the attainment of Programme Outcomes (Rao). It is also proposed by Jin et al. that performance-based evaluation rubrics with four phases can be used to assess students and also to enhance students' design thinking skill. Orji et al., emphasise PBL to kindle the creative thinking of learners at all levels. Deepa et al., explain that active learning in online classes was ensured through enriched blended learning approach via open-source emulating environment.

Methodology

Course Overview and Outcomes

The laboratory course Microprocessors and Microcontrollers is offered for the under-graduate, Electronics and Communication Engineering students in the sixth semester. It is a 65 pupil cohort with 3 faculty members. Students were provided with microprocessor/microcontroller kits, to carry out the experiments. Active learning methods like emulator based learning (Deepa et al.) and live coding were adopted during the theory classes. This promotes programming skills and hands-on abilities of the students and lays a basic foundation for adopting PBL. At the end of this laboratory course, students should be able to:

1. Demonstrate programming proficiency using the microprocessor/microcontroller
2. Demonstrate working knowledge of interfacing peripheral devices
3. Design and develop microcontroller-based systems for solving real-time problems and work cooperatively in a team environment and develop their communication skills.

PBL in Laboratory Sessions

A traditional teaching practice does not ensure that a student has acquired all the necessary skills needed to excel in the industry. Instead of merely conducting experiments provided in the curriculum, the course instructors frame an application-oriented programming task, relevant to experiments prescribed in the syllabus. This helps in effective delivery of domain knowledge to students through practical examples. This also paves the way for a smooth transition from laboratory aspects to the PBL phase. Students were grouped into batches and were encouraged to brainstorm and develop an efficient algorithm for implementing the given task. Moreover, in order to implement PBL, the course plan was divided into three sections.

- **Introductory experiments:** Preliminary experiments for basic understanding
- **Intermediate experiments:** Interfacing based experiments to program the peripherals
- **Project work:** PBL is implemented to kindle students' interest in the subject while enhancing real time application development skills.

Modified Laboratory Course Curriculum Design

The experiments provided in the laboratory course curriculum are modified into application-oriented programming tasks in order to enhance the higher order thinking capability of the students. Guided inquiry is adopted to promote learning through student investigation. The students are exposed to the problem statements and are facilitated to write their own code to resolve the stated problem. Table 1 shows some sample curated experiments formulated by the faculty members to ensure seamless transition to the advanced topics.

Table 1. Sample Experiments and the Curated Application-oriented Programming Tasks

S. No.	Experiments Provided in the Curriculum	Application Oriented Programming Tasks Formulated	Learning Outcomes
Introductory Experiments			
1	Arithmetic operations, Square, Cube, Square root	Solve quadratic equation and generating syracuse/ Collatz Conjecture	Lateral and logical thinking, Coding practice
Interfacing Experiments			
2	Interfacing stepper motor	Rotate the stepper motor on reaching 50 per cent of the analog voltage	Hardware and software integration

Team Project

During the third part of the laboratory course, students completed a team project. The faculty compiled a set of embedded system related problem statements which were of recent scope, in the industrial and societal arena. Students were permitted to propose solutions for more than one problem statement which triggered their interest and thought process. Firstly, the students arrived at a work plan and methodology to solve the problems. Course instructors were available for guidance and required support. The students picked up the skill of collecting information from the literature, and organised it logically along with analyzing their pitfalls and advantages. Choosing a real-time problem developed their creative thinking and problem-solving skills in addition to working in a time-bound manner. The steps involved in facilitating Project-Based Learning (PBL) for the laboratory course have been explained below.

1. Preliminary Review Meeting: Students made a short presentation of the chosen problem statements, which included the following:

- Elaborate problem definition – to ensure precise understanding of the given problem
- Literature review – Exposure to the state-art solutions available for similar type of problems
- Proposed methodology – Application of technical knowledge to arrive at a feasible solution
- Work plan and estimated cost of the project – acquire knowledge on project management and financial aspects

Among the proposed ideas, the faculty members recommended the most feasible one for each team.

2. Interim Meetings: Interim review meetings were conducted to monitor the progress of their project work. The faculty members also validated the work done and suggested various other ways of enhancing a solution to the problem. The students also presented a simulation report using modern software tools with virtual devices such as Edsim, PICSimLab, ARM Emulator etc., for certain modules in their project.

3. Final Presentation: Final presentation and demonstration of the project was held at the end of the semester providing sufficient time to complete the work. The students submitted a detailed report of their project implementation with proper analysis and conclusion. As a part of self-assessment, students presented the challenges they faced and efforts made to overcome difficult situations during their project work.

Evaluation

Evaluation of the project work was done in order to track the learning experience of the students. The assessment was not only limited to the final project demonstration, but also included the formative examination of students' performance and involvement throughout the project phase. Rubrics based

assessment was followed to ensure consistent and unbiased assessment. The rubrics are designed to suit the following aspects namely problem definition, theoretical knowledge, proposed method and its societal benefit, programming ability, teamwork and collaboration, project management and cost-effective solution and final report and presentation.

Results and Discussion

This section presents the observations and the impact of adopting PBL and rubrics-based assessment for the microprocessors and microcontrollers laboratory course. Apart from assessing the performance of the students in the project phase, the classical assessment methods are also carried out in each laboratory class.

Programming Expertise

A metric called Coding Quotient (CQ) was used in order to analyse the critical thinking and coding skills of individual students. CQ (Eq. 1) is a weighted average of the programming performance of students in the laboratory experiments (10 experiments, each carrying 30 marks) and the software implementation in the team project, with a maximum of 45 marks.

$$CQ = \left(\frac{0.3}{30} \times \frac{\sum \text{marks obtained for performance in programming in all the experiments}}{\text{Total number of experiments}} \right) + \left(\frac{0.7}{45} \times \text{Software implementation in team project} \right) \text{ Eq. 1}$$

Higher weightage is given to team project as it involves creative application of concepts and implementation in a practical real-time system. Based on the CQ, the students can be divided into three categories as shown in Table 3. A high value of the coding quotient among the students implies a relatively high potential of the student to program effectively for the real-time needs.

Table 3. Coding Quotient Range and Student Categories

Range of CQ	Student Category	No. of Students (out of 65)
0.7 to 1	<i>Excellent coding skills</i>	28 (43.07%)
0.5 to 0.7	<i>Good coding skills</i>	33 (50.76%)
< 0.5	<i>Below average coding skills</i>	4 (6.15%)

Student Satisfaction Survey

The effectiveness of this PBL process is also validated through anonymous surveys at the end of the course to analyse the students’ perception. The survey questionnaire was framed as shown in Table 4. The students provided responses for the survey statements on a scale of 5. A metric called ‘Satisfaction Index’ (SI) was calculated from the survey responses. SI helps to measure the learners’ satisfaction after the implementation of the PBL strategy. It is calculated as,

$$SI = \frac{1}{12} \sum_{i=1}^{12} \sum_{j=1}^5 \frac{(\text{Total number of students responded as } j \text{ for the } i\text{th statement}) \times j}{\text{Total no of students} \times 5} \text{ Eq. 2}$$

where, ‘j’ represents the number of statements in the survey questionnaire and ‘i’ represents the points in the Likert scale. The satisfaction index was found to be 0.87.

Table 4. Course-end Survey Statements

S.No.	Survey Statements
S1	Laboratory sessions were interesting and engaging.
S2	PBL enables you to choose the right transducers for a system development.
S3	PBL motivates you to do a field study of the deployment environment.
S4	PBL provides the practical knowledge to interface memory and peripherals.
S5	PBL develops your expertise in integrating hardware components with application programs and in troubleshooting interface errors.
S6	Working on simulation/emulation tools for prototyping sharpened programming ability.
S7	Increases the flair to learn and provides a multi-dimensional approach to the problem.
S8	Rubrics based assessment ensured fair and consistent grading.
S9	PBL provided a scope for improvement in interpersonal skills through teamwork.
S10	The approach has been a motivation to solve more societal and industrial challenges.
S11	Project work has helped manage time better and fix deliverables while being cost aware.
S12	The overall experience was enjoyable.

Conclusion

This paper presents an elaborate study on the effectiveness of PBL applied to a Microprocessor and Microcontroller laboratory course. Students were provided with chunks of application-oriented independent tasks, as a part of the guided inquiry process, for each experiment in the curriculum. Besides, the students worked on a team project, under the mentorship of the faculty. Performance of the students was assessed based on the rubrics. The programming competence gained in the course was measured by a parameter called ‘Coding Quotient’. The CQ of 43.07 per cent of students was in the range of 0.7 to 1, which clearly indicates that the overall coding skill of the batch of students is significantly high and can be attributed to the PBL method. A post-laboratory survey to assess the learners’ satisfaction was done and a quantitative measure called Satisfaction Index was arrived at which measured 0.87, clearly indicating a high level of students’ satisfaction. In addition, to coding skills and satisfactory project completion, students picked up research culture and also got prepared to become industry-ready engineers.

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Comparative Analysis of Innovative Tools and Technologies for Online Teaching-Learning Process

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ABSTRACT

Most educational institutions around the world were temporarily closed to limit the spread of COVID-19. However, the teaching-learning process never stopped but was shifted to a new era of virtual and online teaching. This new era of teaching-learning includes various innovative teaching-learning tools and technologies which have filled the space created due to the absence of traditional teaching in this pandemic situation. Many technology-driven innovative teaching-learning solutions are proposed by various technology giants to provide support for all the activities of the teaching-learning process. The use of these innovative teaching-learning solutions is not serving as an alternative but can be considered as an add-on needed for the effective and better teaching-learning process. To facilitate meaningful insights about new teaching-learning solutions to the stakeholders, this paper covers a detailed comparative study of different online virtual meet platforms, various learning management systems and different online assessment tools. Primarily, the outcomes are based on cluster analysis over the data collected by surveys and interviews including a total of 687 teachers and students from various institutions across the state and outside.

Keywords: teaching-learning process, learning management system, online assessment tool, ICT tools for education

Introduction

Technology has played a very important role in transforming society by providing innovative solutions to the various challenges of a common man (Grabe, 2007). When the whole world was affected badly by COVID-19, technology saved the teaching-learning domain. ICT has proven to possess the strength to provide a vibrant environment for teaching-learning (Arnseth&Hatlevik, 2010) and hence many tech-giants like Google and Microsoft have developed ICT-enabled tools for the education domain. The main purpose of these technology-driven tools is not to replace quality teachers but instead, to act as a catalyst for creative and effective teaching and learning. The process of teaching-learning can be divided into five stages, namely content development, content delivery, material sharing, assignment or homework and assessment. Our study contributes by providing detailed comparative analysis of tools available for all the stages of the teaching-learning process (TLP), its functionalities and its usage preferences. The study aims to provide a ready reference for a user new to online teaching-learning platforms.

Methodology

Research Design: Our research work is non-experimental quantitative study based on data gathered through surveys and interviews. The inputs received are transactional and transversal because the data collection is done during a specific time instance. The questionnaires were carefully designed to gather responses from the participants covering the insights of the usage and effectiveness of the tools and technologies used for the online TLP.

Population and Sampling: Our student survey covered a total of 574 students from 13 different institutes affiliated to 9 universities across the state of Gujarat. Whereas, faculty survey includes 113 faculty participants from 40 institutes affiliated to 17 universities situated across the geography of India. A total of 50 interviews were conducted in person or via video conferencing tool from 4 different institutes from the state of Gujarat.

Instrument: The data gathering process involved a mix-method approach of conducting interviews and a questionnaire survey. The questionnaire survey aimed to gather statistics related to the modern tools used for all the stages of the online TLP. The questionnaire survey with a total of 22 and 15 question items was the main source used to collect data in this study to analyse the effectiveness of innovative tools and techniques for the online TLP. The interview method was adapted specifically to address the inherent challenges of the questionnaire survey. Interviews also enabled us to ask and understand the why part of the inputs that we received from the participants.

Data Collection and Analysis Process: The questionnaires were sent to participants via email and social media platforms available. The cluster-analysis method was then employed to analyse and infer various aspects of the online teaching-learning tools and techniques by using the SPSS (Statistical Package for the Social Sciences) tool from IBM. The analysis is statistical, descriptive and inferential in nature.

Table 1. Student and Faculty Survey Statistics

Student & Faculty Questionnaire	
Q-1) Do you enjoy online Teaching & Learning?	
a) No, not at all	<u>19.33%</u>
b) No, there are few challenges	<u>25.87%</u>
c) Yes, but I expect changes in few things	<u>40.70%</u>
d) Yes, Fully enjoying	<u>14.10%</u>
Q-2) What amount of theoretical understanding Students get from online learning?	
a) 0%-25%	<u>14.24%</u>
b) 26%-50%	<u>28.05%</u>
c) 51%-75%	<u>45.78%</u>
d) 76%-100%	<u>11.92%</u>
Q-3) What amount of practical knowledge can students get from online learning?	
a) 0%-25%	<u>31.69%</u>
b) 26%-50%	<u>31.98%</u>
c) 51%-75%	<u>27.76%</u>
d) 76%-100%	<u>8.58%</u>
Q-4) Which digital approach do you like to have during lectures?	
a) Learning with PDF of material	<u>23.90%</u>
b) Learning with PowerPoint presentation	<u>27.10%</u>
c) Learning with Smartboard	<u>27.74%</u>
d) Learning with short animations/videos	<u>21.27%</u>
Q-5) Which type of assessment method is more effective for testing students' understanding?	
a) Writing descriptive answers on paper which can be scanned and submitted to faculty	<u>18.59%</u>
b) Writing short answers on paper which can be scanned and submitted to faculty	<u>14.57%</u>
c) Online quiz with short answers	<u>14.95%</u>
d) Online quiz with MCQ pattern	<u>51.88%</u>
Q-6) What is your most preferred method for clearing students' doubts during online learning?	
a) Not comfortable in asking doubts in online learning	<u>21.16%</u>
b) Raise hand option	<u>30.86%</u>
c) Writing query in chatbox	<u>25.57%</u>
d) by unmuting yourselves	<u>22.42%</u>

Results & Analysis

Table 1 shows that nearly 40 per cent of the faculty members and students are enjoying online teaching with few changes. 25 per cent of the participants believe that there are challenges and they do not enjoy the online TLP. 20 per cent say that they do not like the online mode at all whereas 15 per cent of the students

and faculties say that they are fully enjoying the online TLP. A vast majority of the participants believe that online teaching-learning can serve as a good alternative for covering theoretical knowledge but is not an effective measure for practical knowledge transfer.

Learning with PDF material, PowerPoint Presentations, Smartboards and animations or short videos are preferred equally by all faculties and students. Considering video lectures, 45 per cent of the students prefer video lectures of their faculty members for more relevant understanding and 40 per cent like videos available on YouTube by YouTubers. For evaluation, online quizzes with MCQ patterns are preferred by slightly higher than 50 per cent of the students and teachers. This could be due to multiple reasons like ease of access, instant result generation and MCQs being objective type in nature etc. Online quizzes with short answers are liked by almost 15 per cent participants. This is due to the fact that it is descriptive in nature and hence reduces the chances of malpracticing during the exam. Easy interaction with the faculty is very important for online classes. Almost 20 per cent of the students are not comfortable asking doubts in online mode. Of the others category, 31 per cent prefer raising hands and remaining are equally divided groups who make use of the option of writing a query in the chat box and asking questions directly by unmuting themselves. Majority of the faculty members (almost 80 per cent) prefer Office tools like MSOffice or Open source office, to prepare materials for their reference and sharing purposes.

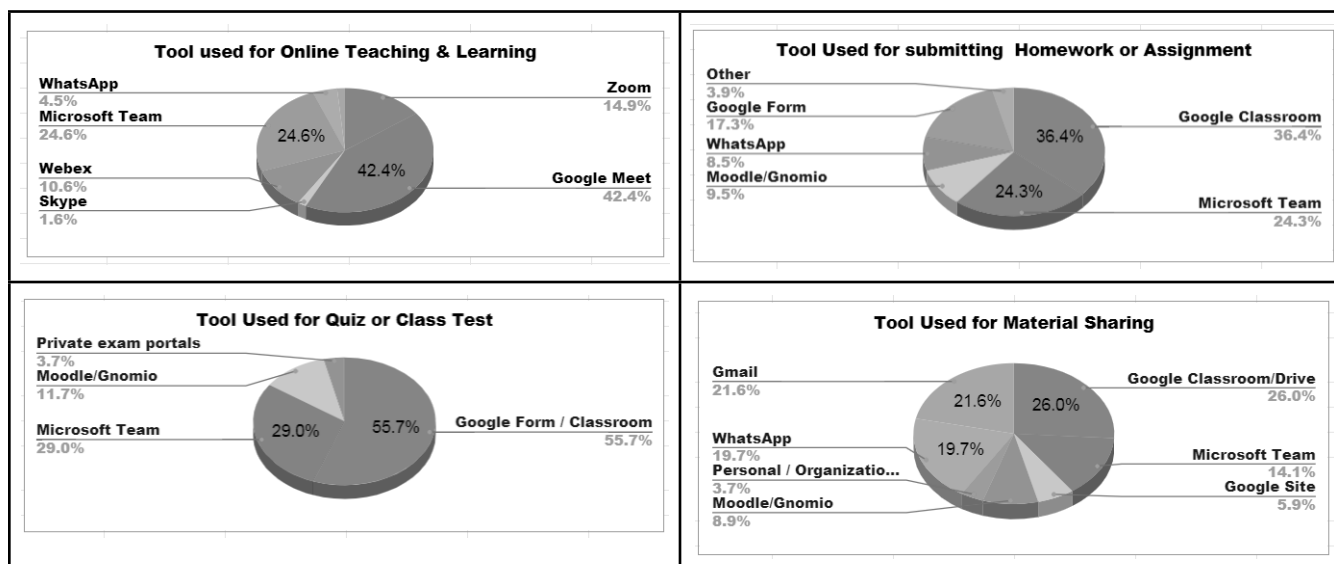


Figure 1. Usage statistics of various tools used for teaching-learning process

Figure 1 depicts the tools usage pattern analysis from the survey. For online conduction of classes Google Meet is preferred by 42 per cent participants whereas MS Team is preferred by 24 per cent, remaining prefer platforms like Zoom, Skype, Webex and Whatsapp. Material sharing is done via Google Classroom/ Drive by 26 per cent, Gmail is used by 22 per cent, MS Team has a share of 14 per cent and the remaining use Moodle/Gnomio, Google Site, Whatsapp and other personal platforms. For online quiz, the highest share of 56 per cent is with Google forms/Classroom followed by MS Team with 29 per cent share and remaining are making use of Moodle/Gnomio and Private exam portals. For home work and assignment submission most (37 per cent) prefer Google Classroom followed by MS Team (24 per cent) and remaining makes use of platforms like Google Form, Whatsapp, Moodle/Gnomio and similar applications.

Table 2 shows the comparison of most commonly used tools from various tools that we have studied during our work.

Table 2. Comparison of Online Teaching-Learning Tools

Tools→ Specification↓	Zoom	Google Meet	Skype	Webex	MS Team
<i>Common features*</i>	Yes	Yes	Yes	Yes	Yes
<i>Number of User Supported</i>	100# 1000\$	100#	100#	100# 3000\$	2500, 25000
<i>Support for Multiple Parallel Meetings to incorporate large number of participants</i>	No	Yes	No	No	Not Req.
<i>Maximum Meeting Length</i>	40 min.#,30 hrs\$	24hrs	4hrs	50min	No limit
<i>Live Captioning</i>	No	Yes	Yes	No	No
<i>Attendance Management</i>	No#, Yes\$	Yes	Yes	Yes	Yes
<i>Polling</i>	No#, Yes\$	No	No	Yes	No
<i>Co-Host Support</i>	No#, Yes\$	No	No	No	No
<i>Live Streaming Support</i>	No#, Yes\$	Yes	No	No#	Yes

*Schedule Meeting, Screen Sharing, Record Meeting, Whiteboard, Raise Hand, Chatboard, Virtual Background, Blocking Anonymous User, Waiting Room, Breakout Rooms, Host Control

In free version, \$ In paid version

Discussions

Our study resulted in multiple findings discussed below in detail.

Challenges: The above results show that the issues related to Internet connectivity, video quality, audio disturbances, disturbance by other participants and lack of student-teacher interaction are faced by many of the participants and need to be addressed. While it would be great to have a recording option available for the scenarios where we have more frequent connection issues, downloading and sharing the file instead of directly sharing online can help in video quality related challenges. Host control and co-host support can be very helpful in controlling disturbances caused by other participants. Lack of student-teacher interaction is more of a subjective matter than the technical limitation for the advanced tools. Polling can be a very effective tool for interacting with the audiences and hence can make the class more engaging.

Enhancement: Stages like assessment need more specialised features like disabling navigation to any other tab or app while the assessment is going on. Additional attribute tagging to the questions like CO-PO (Course Outcome - Program Outcome) mapping, complexity mapping and chapter/unit tagging can be very helpful while setting up question papers as well as evaluation. Such attributes can be most helpful for automated question paper setting.

Good practices: It is quite evident that a bookish approach in adopting the new tools and techniques cannot be an effective solution in many cases, rather, it may defy the core purpose in cases like online exams and class conduction. Hence, one needs to follow certain good practices to make the TLP more effective. The good practice may include sharing of the materials in advance, use of special features like polling, effective use of host control mechanism, use of soft boards during class conduction, well-defined process and organised materials for sharing and the use of scheduler for timely assignment of work.

Assessment can be more effective if the faculty uses the randomise question and options feature. They can also make use of the one-word answer option and set different types of questions exploring all the type options available.

What matters most: Availability of all the innovative tools and technologies will not be enough if they are not put into practice properly and methodically. The extent to which the main stakeholders adopt the tools and technologies is the main driving force. Hence, the perception and response of the faculties and students is the key which will determine the effectiveness of the process.

Conclusion, Limitations and Future Studies

Comparative analysis of innovative tools and technologies for the online TLP is presented in the paper. The study presents many statistical results for a clearer picture of the usage patterns and preferences of the tools and technologies. The paper further discusses the challenges faced by the stakeholders and provides suggestions to handle and fix those challenges. Our study further explores and provides a list of good practices to be followed in order to make the online teaching and learning process more effective.

This research work involved random sampling of the population. The data gathered for this study is primarily from the engineering domain. This study does not include the social and psychological implications of the online TLP. The effects of online TLP are deep and have affected not only the educational aspects but the personal, interpersonal and psychological aspects of the stakeholders involved. Studying these areas of implications is the future aim of the researchers.

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A Study of the Indispensable Role of Non-verbal Communication for MBA Students Seeking Jobs during the Covid Scenario

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ABSTRACT

The study of non-verbal communication has become one of the major aspects for an HR manager in an organisation to judge the professionalism and kinesics psychology of a new candidate at the time of recruitment. Despite being strong in subject knowledge, many MBA students, especially from tier-II or tier-III business schools struggle with non-verbal communication and are not selected during the recruitment process due to inefficiency in their professional etiquette and overall body language. The present paper studies the methods for training MBA students from a tier-II business school in non-verbal communication for one semester (6 months); the effectiveness of the methods; and how successful was it in upskilling students in their recruitment process, especially during the pandemic of COVID-19. The author studies various modes of training through online presentations and video calling and identifies the gaps in students' performance in job interviews. After assessing the effectiveness of the modes, remedial steps were taken in which various effective techniques such as learning videos on body language and online etiquette; role-play practice through video chat; etc. were introduced to students. The learning outcome of the aforesaid activities at the end of six months included enhancement of non-verbal communication in almost 60 per cent of the students and a conversion rate of 75 per cent against 67 per cent in the previous year.

Keywords: non-verbal communication, COVID-19, kinesics psychology, recruitment process, online etiquettes

Introduction

A common saying that “actions speak louder than words” has become most important in communication in the present scenario. In this competitive environment of jobs, excellence over only hard skills will not give fruitful results in getting placements (Lazarus, 2013). In a famous study of Albert Mehrabian, the elements of communication are divided into standard ratios-7 per cent of information received is through the words spoken, 38 per cent is through voice modulation, and 55 per cent is through bodily movements. According to this study, 93 per cent of what is communicated is done through non-verbal communication (Mehrabian, 1981). Non-verbal communication plays a very important role in professional degree or diploma courses. During this pandemic COVID-19 scenario, there is a high demand of skilful talent in the market. In addition to the reputed degree, not only knowledge of the subjects and verbal communication but non-verbal skills have also become indispensable.

Literature Review

Non-verbal communication helps in determining the social and emotional behaviour of an individual Howard S. Friedman, (2019). In one of the studies, it was proved that how knowledge of non-verbal messages can affect successful communication in the real world (Eaves et al.,1997). In addition to the research of Mehrabian, A. (1981), a deep study was conducted where it was found that the correct use of body language serves as an effective non-verbal communication tool to convince superior, peer and subordinate groups in workplace which eventually leading to overall organisational success through self-development (Rane, D. B. 2010).

Need for Non-verbal communication

Non-verbal communication is as important as verbal communication. Non-verbal communication makes up about two-thirds of all communication between two people or between one speaker and a group of listeners Gupta, N (2013). Important elements of non-verbal communication are:

- **Appearance and facial expressions:** Appearance and dressing matter a lot as they create a first impression in the minds of others. Another important and influencing channel of communication is facial expressions like anger, fear, joy, disgust, sadness, and surprise. A person's eyes also can convey speak many things.
- **Kinesics:** The gestures and postures we use to communicate effectively come under kinesics. Gestures and postures refer to body movements. Our gestures and postures reveal our personality. For example, if we fake our body language, then we may not be considered as a true or real person.
- **Proxemics:** It refers to the state wherein the interpersonal space or distance is maintained between people who are either from different or the same cultural backgrounds. Different countries have different zones in which they communicate. For example, if we talk about the U.S., generally there are four interpersonal zones. They are: *intimate zone; personal zone; social zone; public zone.*

During placement of MBA students in their fourth semester, it was observed that they were focusing only on sharpening their subject-based knowledge. The total number of selected students in each company was lesser than the strength of the class. There was a fall in the number of students selected in personal interview(PI) round than the students selected in the group discussion (GD). A departmental discussion analysed that students needed to pay attention to their professional grooming along with course knowledge. Further, a proper learning system for the current second semester students (MBA 2018–20) was designed so that they could polish such gaps through regular practice and can achieve fruitful results during their final placements.

Because of the COVID-19 pandemic, most of the companies have been following an online work culture. As a result, companies have modified their recruitment process. But on the other hand, students were not prepared for this online recruitment. To identify the non-verbal gaps in students, an online experimental analysis was done on an MBA (2018–20) batch of 44 students in which various abstract topics were given to the students to prepare. After 10 days, an online presentation session was held in an online video mode. Two experts from PDP (Personality Development Program) department were asked to analyse and rate the non-verbal communication skills of each student individually. The outcome of the presentation session was not good. 35 students were in the category of non-satisfying performers. SWOC (Strengths, Weakness, Opportunities and Challenges) analysis, another assessment of the same sample was done on individual basis. The analysis from the two activities led to the outcome that there was a necessity to overcome the present method of grooming for the post-graduate students to become MBA professionals.

Problems: We identified four problems for the study. First, students of MBA were not aware of non-verbal protocols used in professional etiquette. Second, the qualitative assessment of the students was done as per the old teaching aids (i.e. written examinations). Third, in professional sessions the main focus was on improving only the verbal abilities of the students. And finally, the confidence level of the students was very low in expressing themselves. Evaluating the performance of the students and realising the need of the corporate sector during COVID-19 scenario, a compulsory online six-month PDP session (non-verbal) for the second semester students of MBA was introduced. The curriculum purely focused on sharpening the non-verbal skills of students by introducing effective training techniques like role play through video chats, online mock interview sessions, etc.

This paper aims to study the non-verbal training methods for MBA professionals from tier-II business school. Furthermore, it elaborates on the applications and results of making the non-verbal communication

an essential learning subject for students to get good jobs in renowned multinational companies, especially during the COVID-19 pandemic scenario.

Research Methodology

Objectives

The study aims to

- identify the non-verbal gaps that hinders the communication and confidence of students.
- make the students familiar and well-versed with the concepts of non-verbal communication.
- minimise the preceding problems of students by modern learning techniques and practices.

Research Design

Sample size for the study was 44 MBA students of the 2018–20 batch. We were concerned with making the class equipped in non-verbal etiquette in order to groom them with demanding skills of body language and provide competitive edge to each individual with non-verbal skills. The study included online observation and evaluation as tools for assessment. The first step of the research design was problem identification or diagnosis followed by planning of the activities, then executing the activities on students, next step was analysis of the students, and finally students' feedback.

Action Plan

A purely online interactive grooming session was scheduled for students on a regular basis where students learned through video sessions on body language, online etiquette, etc. and practiced role plays through video chats, participated in online mock interviews practice sessions and the assessment of the learning was made on monthly presentation by students individually. Some of the methods followed during the training session are as under:

- i. **Role play through video chats:** In this activity an online interaction among students was conducted. Students were given various roles like interviewer, interviewee, manager, marketer, etc. and were asked to perform the given respective roles in different situations via the online mode. A recorded video of students involved in role play was shown to the students after this activity got over. The trainer through the recorded video explained every single body language mistake made by the students and helped the students to understand the situation and develop their professional etiquette.
- ii. **Imaging YouTube:** Online mock interviews of successful entrepreneurs, motivational gurus, celebrities, MNCs' leaders, etc. were shown to the students to give them clarity about these concepts which would upgrade their non-verbal skills, and then everyone was asked to write-up a short description of what is going on in the video by paying attention to the gestures, body movements and facial expressions. Participants were also asked to read aloud their description. Students practically enjoyed the activity.
- iii. **Your picture my story:** The gestures and postures we use while communicating plays a very essential role in communication. Different signs, expressions, eye nodes, hand movements, locks, etc. are a part of expressive language. Students were given verbal online lectures of professional communication skills repeatedly.
- iv. **Online mock interviews:** In keeping with the proverb, "Practice makes a man perfect", professional faculties from management and PDP departments were selected to conduct mock interviews. Three faculty members were given a group of 10 students to take one-one interviews in an online visual mode. The teachers took structured interviews and critically noticed the non-verbal communication of the students.

Evaluation

Evaluation of non-verbal skills was based on one-one interaction with the students during the online mock interviews and presentations. Each student was evaluated and awarded marks. Out of 50 marks, with an equal weightage on kinesics (body language), facial expressions, confidence, gesture/posture, and attire. Students scoring more than 40 marks were under the category of satisfying performers and the remaining were categorised under non-satisfying performers.

Table 2. Evaluation of Non-verbal Techniques on Students

Activity/Techniques	Benefits	Satisfying Performers	Non-satisfying Performers
Role Play	Professional Non-verbal etiquette	28	16
Imaging YouTube	Expressing through gestures	26	18
Your picture My Story	Body language protocol	24	20
Online Mock Interviews	Real-time Practice; Instant feedback on non-verbal gaps.	18	26

As shown in Table 2, evaluation of non-verbal techniques on students clearly depicts the outcomes that the enhancement of non-verbal communication was seen in almost 60 per cent of the students.

Data Analysis

For data analysis, a comparative study of placement status of two year batches of MBA (2019, 2020) was taken into consideration, as is shown in Figure 1 and 2 wherein the strength of the students of Batch 2017–19 was 54 and the strength of the students of Batch 2018–20 was 44. The results of the analysis are discussed below:

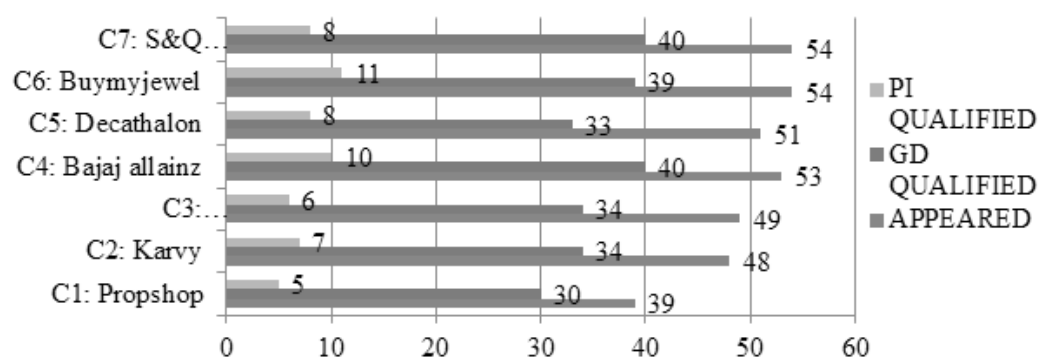


Figure 1. Placement data for MBA batch (2017–19)

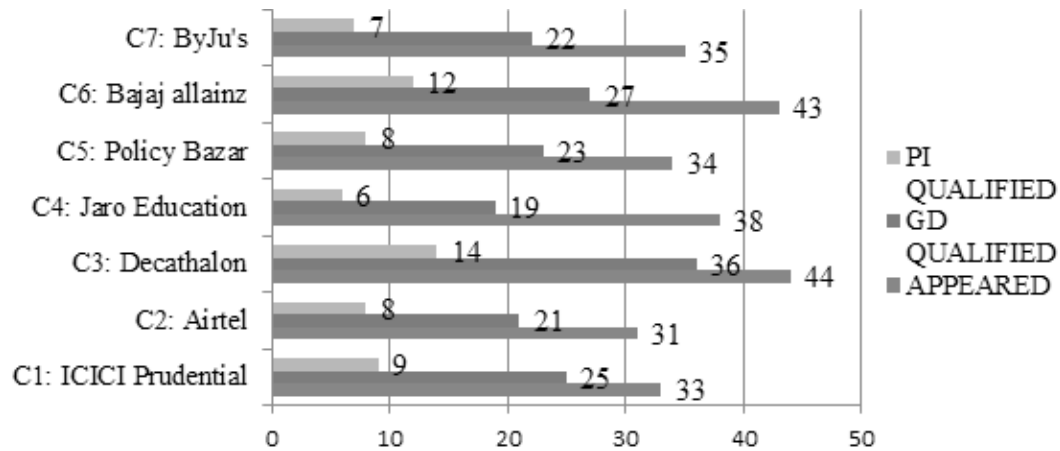


Figure 2. Placement data for MBA batch (2018–20)

By comparing the data of two batches of MBA as shown in Figure 1 and 2 it can be observed that the number of students who appeared and qualified GD is more than the students who qualified the PI which means there is a huge difference between the students who qualified GD and PI of those who appeared in 2017–19. The results were different of the 2018–20 batch. It can be observed that the ratio of the difference in number of students who appeared, qualified GD and qualified PI is reduced.

Discussions/Findings

It is clear from the analysis that after getting training on soft skills, the students were able to crack the PI sessions smoothly and got placements (compare Figure 3 and 4). On the basis of observation and evaluation, it was found that the use of various techniques employed in developing non-verbal skills generated professional etiquette in the learners by making them confident, well-versed with the concepts of non-verbal skills and reduced the gap of non-verbal deficiencies like informal body language, lack of knowledge of expressions, etc. in students which resulted in a positive increase in the placement of MBA Students (as shown in Figure 5). In 2019, the placement rate of students’ 2019 batch was only 67 per cent and after introducing a well-designed non-verbal training/learning programme to the second semester students of 2020 batch, there was a remarkable increase in the placements-the placement ratio increased to 75 per cent and only 25 per cent of the students could not secure campus placement.

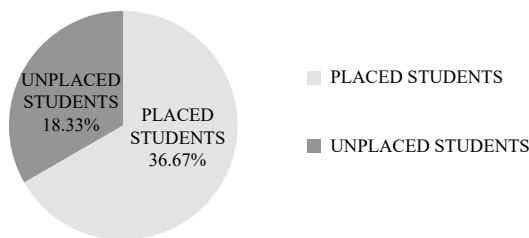


Figure 3. Placement Ratio For MBA batch of 2017–19

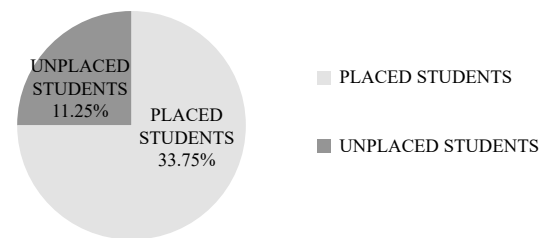


Figure 4. Placement ratio for MBA batch of 2018–20

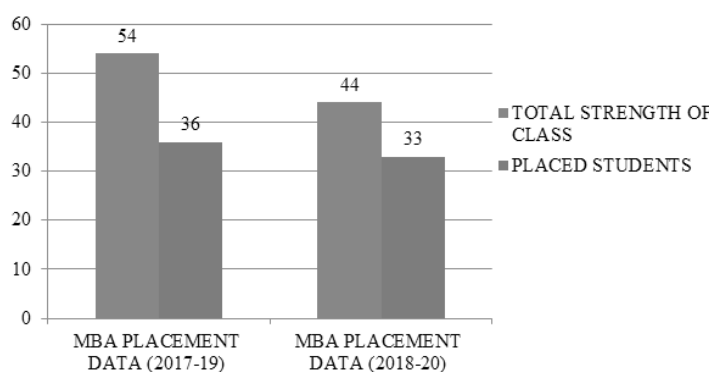


Figure 5. Comparative analysis of placement data of MBA students (2017–19), (2018–20)

Conclusion

The study attempts to understand non-verbal skills gap, due to which the MBA students were facing difficulties in their placement. Some key hurdles like unprofessional body language, informal dressing, improper dinner table mannerisms, etc. were identified. Considering the pandemic COVID-19 scenario and online recruitment challenges, a remedial step was taken by the concerned department of the University in which various effective techniques such as learning videos on body language and online etiquettes; etc. were introduced to the students. The study evaluated that the learning outcome of the aforesaid activities at the end of the semester (of 6 months) proved beneficial for almost 60 per cent of the students out of 44 students for 2020 batch and conversion rate of 75 per cent against 67 per cent in the previous year.

Limitations and Future Studies

The study was limited to MBA students only. Such studies can also be carried out on undergraduates. More innovative techniques of learning could be structured to get students placed in reputed companies. Additionally, the paper has not studied the role of the verbal part of communication skills.

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Automatic Generation of Math Word Problems for Assessing Learner Skills in Adaptive Learning Systems

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ABSTRACT

Assessments form an integral part of the learning management system and influence every individual's learning process. Experts spend enormous amounts of time generating a variety of questions as the same may not be reused repeatedly to assess the knowledge levels. At the same time, manually creating questions on an ongoing basis is a tedious task even for the experts. Generating questions is both an art and a science as one must be very creative in designing and at the same time meet the learning objectives. A new field of research namely, Automatic Question and Answer Generation (AQG) evolved to address this need in fields such as Medicine, Philosophy, English language, etc. Depending on the type of questions such as Multiple-choice questions (MCQ), Fill-in the blank, short answer questions, etc., template-based, Natural Language Processing (NLP) based semantic, syntactic approaches have been explored in the literature. Unlike other fields where there is a lot of textual information to clarify a concept, subjects like Chemistry, Physics, Mathematics, and Statistics have numbers, symbols, equations, etc. which makes the task of AQG challenging. Recent studies in generating Math Word Problems using Natural Language Generation (NLG) based Artificial Intelligence (AI) methods have shown very encouraging results. In these methods, questions are input to generate more questions of similar difficulty which will certainly help to build the question bank; however, it would be more useful if we can generate questions with varying difficulty levels. In this work, we propose to conduct a comparative study of various neural network methods for Math word problem generation. To improve the model learning, we had experts validating the relevancy of the generated questions. The proposed method when included in personalised learning systems would enhance the learner's skills.

Keywords: automatic question generation, math word problem generation, deep neural language generation

Introduction

In the pre-COVID-19 era, online education was perceived as the 'poor cousin' of face-to-face training. Some of the reasons as stated by (Natalie et al., 2020; Dhawan, 2020). The online delivery was hampered by the tools available to content creators, limited exposure to tools and many felt distracted with this mode of teaching. On the other hand, a class of educationists felt that online training was revolutionary in terms of accessibility, scalability and a very cost-effective way of teaching. When the pandemic hit globally, there was a pressing need to innovate and implement alternative educational and assessment strategies. To make learning impactful, several online learning platforms have the built-in capabilities to provide personalised content based on learner background, cognitive and non-cognitive skills. Assessments form an integral part of these systems to test one's understanding levels and help the learners improve. Non-trivial amount of instructor's time goes in building the content, activities, practice exercises, and various questionnaires to assess the knowledge levels. But in the online mode, since the assessments are conducted remotely, it is challenging to find authenticity of the work (Dhawan, 2020). One way to tackle this is to build a large repository of questions so we can assess learners in a variety of ways. But this also means instructors must double their efforts to create questions to build a rich questions bank. Additional constraints of adaptive systems are to present personalised content and design assessments to evaluate the knowledge

levels of individuals. In language-based assessments, template-based and rule-based methods were used to extract the semantics and syntactic elements for modelling and to generate questions (Yao et al. 2012). Deep learning models such as Recurrent Neural Networks (RNN), Long Short Term Memory (LSTM), Transformer Networks and other advanced methods have been devised to generate questions from given passage-answer pairs using pre-trained masked language models. In this work, we present a comparative analysis of the state-of-the-art text generation models such as Generative Pre-trained (GPT-2), GPT2 Model transformer with a language modelling head on top (TFGPT2LMHead) and Character level LSTM (CharLSTM) for automatic generation of Math Word Problems (MWP). To the best of our knowledge, application of these methods for Math Word Problem question generation has not been explored. We used expert tutor feedback to evaluate the fluency and answerability that determine the relevancy of the generated questions.

Literature Review

Literature study has been divided into four sections-(1) State-of-the-art AQG models (2) Evaluation metrics and (3) Math Word Problem QG to provide an overview of different aspects of the research and proposed strategy of our work.

State-of-the-art AQG models: Early research in question generation (QG) tasks focused on textual inputs, especially declarative sentences, explained by the original application domains of question answering and education. (Pan et al. 2019) have presented a survey of developments in Neural Question Generation (NQG) for factoid-based questions, focusing on three emergent trends that deep learning has brought in QG. Another survey, (Kurdi et al. 2020) has provided a complete landscape of AQG for educational purposes, there were as few as four studies that involved QG in MWP that include geometry, elementary algebra, and set theory. A popular evaluation metric namely Bilingual Evaluation Understudy (BLEU) (Kishore Papineni et al. 2002) and many other metrics were used to evaluate the similarity between the generated question and ground truth. Some of the popular datasets used in literature are SQuAD (Rajpurkar et al. 2016), 30M Factoid, SciQ, QGSTEC, MCQL, and Math23K etc.

Evaluation metrics: Given the rapid developments and importance of AQG, (Preksha Nema et al. 2018) have provided the limitations of existing similarity measures and introduced the ‘answerability’ element in the measure. The ‘answerability’ measure in turn depends on relevant content words, named entities and question types and function words to address the relevancy of questions. While many studies included the context-answer-question tuple for the QG task, (Tom Hosking et al. 2019) have suggested disassociating the ground truth from training and using adversarial discriminator to generate questions that are different from real examples.

Math Word Problem QG: Many of the recent studies have focused on automatic generation of MWP question-and-answer pairs or solving math problems given the context and Math Word Problems (MWP). Due to the complexity involved in Math Word Problems statements, most of the initial research work involved semi-automated ways such as template-based and rule-based methods for MWP question generation which required a fair amount of instructor time as described by (Polozov. et al. 2015). But in recent times, the research has increased many folds due to wide applications of neural network-based models for natural language understanding (NLU) and text generation tasks. (Liyanage et al. 2019) have used character-level LSTMs to generate Math Word Problems in English and Sinhala languages. Further (Liyanage et al. 2020) added language-specific constraints to the model and reported better quality of questions. To account for mathematical operations, numerical quantities and other symbols while generating relevant questions, (Liu et al. 2021) have proposed an end-to-end neural model to generate linear

equations of two variables without any constraint from common sense knowledge graphs and equations. Gated graph neural networks (GGNN) are used to learn the embedding from equations and output the graph structure. Later used the conditional variational autoencoder (VAE) framework to generate diverse latent states. The novel self-planning module enabled the decoder to pay different portions of attention to the equations and the commonsense Knowledge Graphs to generate relevant MWP. Inspired by the recent works in this area by (Klein et al. 2019) our proposed work involves the following tasks:

- Compare MWPs generated by GPT-2, TGGPT2LMHead and CharLSTM.
- Questions only input - from both Algebra.txt dataset and AQuA-RAT datasets
- Analyse the performance of three models by comparing the Quality of questions generated.

Methodology

Dataset: We use two different datasets for the purpose of generating more questions. The Algebra Dataset created by (Liyanage et al. 2019) is a collection of 1350 elementary level English Medium MWPs, a dataset consisting of 2350 GCE Ordinary Level English Medium MWPs. The Second Dataset is the AQuA-RAT (Algebra Question Answering with Rationales) by Deepmind, which consists of around 100,000 questions along with corresponding options, rationale, and answers.

Char-LSTM: We used the Character level LSTM Model implemented by (Liyanage et al. 2019) as our baseline model and applied the same model on a random sample of 3000 Questions of the AQuA-RAT. The implementation details of two text generation language models GPT2 and TFGPT2LMHead are discussed in Table 1.

Table 1. Details of Models Used

Language Models	GPT-2 (124M)	TFGPT2LMHead
Model	Predicts the next word given in the sequence of text	Completes the sentence given partial text.
Data Preparation	Appended the delimiter <end> to separate every question Input: delimited MWPs	Input: single math word problem with delimiter <end> Target: input sentence with one position shifted left
Generated output	500 words with several MWPs separated by the delimiter	For every given partial MWP, the model generated a complete MWP

We obtained relevant questions with fine-tuned GPT-2 when the number of steps was 400. The Temp=0.7 across models was used to generate MWPs with enough variation. The model hyper-parameters for TFGPT2LMHead and Char LSTM used were ADAM optimisers trained for 40 epochs using categorical cross-entropy loss.

Results and Analysis

BLEU (Kishore Papineni et al. 2002) score is used in text generation to compare the generated text with the reference text. The loss values indicate the error, where smaller values represent a better model, as indicated in Table. 2.

Table 2. Loss and Average BLEU Score across Models and Datasets

Model	Dataset	Loss	BLEU Score
Char-LSTM	AQuA-RAT	1.3157	0.089
TFGPT2LMHead	Algebra	0.1533	0.117
TFGPT2LMHead	AQuA-RAT	0.439	0.1483
GPT-2	Algebra	0.04	0.265
GPT-2	AQuA-RAT	1.39	0.273

Human Expert Evaluation

We randomly selected a few instances of generated MWP from different models and had the two human experts rate them on a scale of 1 to 3 and obtained an average score of 2.4. Metrics used were, *Relevancy of Generated question*: measured in terms of solvability and number of corrections required to make the question meaningful. *Language fluency*: measures if the generated question looks grammatically correct.

Table 3. Generated Questions and Highlighted Corrections as per Relevance

Model	Dataset	No. of Questions Input as Seed	No. of Questions Generated	No. of Questions that Needed Correction
Char-LSTM	AQuA-RAT	25	1	2
TFGPT2LMHead	AQuA-RAT	25	17	8
TFGPT2LMHead	Algebra	25	14	11
GPT-2	Algebra	Not required	24	9
GPT-2	AQuA-RAT	Not required	16	7

We ran all the experiments on GPU servers to address the complexity of the models with respect to time and computation. While the training samples were entire MWPs from respective datasets, we randomly chose 25 MWPs for testing purposes. Here (<https://mwpeexamples.weebly.com/>) are a sample of generated questions.

Conclusion

We conducted a comparative study of language models such as char-LSTMs, TFGPT2Head and GPT-2 Simple to evaluate the fluency/relevancy of the generated MWP. Although the generated text looks ad hoc in some instances but with hyperparameter tuning, we were able to avoid repetitions of text and generate meaningful MWPs.

Limitations and Future Studies

Although we could generate a good number of MWPs, there is further scope to reduce the ad hoc instances. Generating questions with varying difficulty levels would be an essential aspect to make it more relevant in practice. We would also like to focus more in this area as a next step. In adaptive learning systems, given the student background and performance at every stage, we display personalised content to improve the learning. It would be very useful in this context if the generated questions could be categorised by the difficulty level, easy, intermediate, and difficult using classifiers and style transfer methods.

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Integrating ICT for Effective Teaching and Learning in the Online Pedagogic Environment: An Empirical Study

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ABSTRACT

The coronavirus pandemic has catalysed changes in the teaching-learning methodology in higher education globally, leading to a hybrid interface between tutors and learners through the use of unique and innovative teaching methodologies. The NEP 2020 refocuses the objectives and role of HE towards developing contributing citizens who are capable of building an equitable, inclusive, and plural society. In keeping with this mandate, there is a need for advanced teaching and learning strategies in the delivery of HE to combine the synchronous methodology with asynchronous interactions through virtual and real-life media to promote effective and retentive learning. In the pandemic and post-pandemic era, therefore, the future of learning is likely to be more dependent on technology. Integrated open-source digital solutions and learning management software are thus facilitating a seamless bridge between the conventional learning patterns and its cross-integration with the virtual classroom. This paper explores and documents the use of the virtual platform as a tool for new-age pedagogy in learning that engages learners and develops creative and critical thinking abilities for life-long learning. In this empirical study, a data sample of 338 students have been collected from the various Professional Courses at the University of Petroleum and Energy Studies to study the impact of Information and Communication Technology for Effective Teaching & Learning in the Online Pedagogical Environment. The Statistical tool 'Multiple Regression Analysis' has been used to test the impact of Independent Variables i.e. Innovative Pedagogy, Student-Centred Teaching Methods, Constructive Assessment on Dependent Variable 'Effective Teaching & Learning'. The study findings show that all three factors i.e. Innovative Pedagogy, Student-Centred Teaching Methods, Constructive Assessment contribute significantly towards Effective Teaching & Learning, with the exception of 'Constructive Assessment System'.

Keywords: innovative pedagogy, student-centred teaching methods, constructive assessment system, synchronous and asynchronous interactions, effective teaching & learning

Introduction

A new dawn is breaking in Higher Education in India, and we need to possibly thank a virus for that! The COVID-19 pandemic has forced academic bodies and educators worldwide to 'relook' at teaching, learning, and assessment as we know it, facilitate it and deliver it (Dhawan, 2020). COVID-19 is possibly the catalyst that is enabling educators to finally address the entire education ecosystem; its role, purpose and usefulness in a perspective that may finally take it comprehensively out of the haloed halls of academic worship into the more contextual arena of everyday living (Li & Lalani, 2020). The UNESCO press release of 20 March 2020, indicates that more than 87 per cent of the world student population has been affected due to the closure of educational institutions because of the pandemic. This accounts for almost 1.5 billion learners across 165 nations worldwide. An educational disruption of this scale requires innovative solutions to support learners and teachers, that have not just short-term, but the long-term impact on education globally. Institutions were already addressing the need for the students to be able to communicate, innovate, ideate, and become the change-agents of the new world order. The pandemic only seems to have escalated this need to face the new reality (Woolliscroft, 2020). To address this need for the future and a post-COVID-19 world, educational institutions at primary, secondary and university level are

going to have to fast-track the changes in curriculum design and delivery that were already in need of being addressed. Learning as a whole, needs to become more project-based and problem-and-solution-driven, rather than teacher-centred and textbook-driven. What may seem like a short-term solution in a crisis may become a permanent one with the brick-and-mortar classrooms giving way to virtual classrooms (Teras et al, 2020). The role of Information and Communication Technology appears to be the prime solution for the future of the entire education ecosystem to address the metacognitive learning needs of twenty-first-century learners (Alayyar & Fisser, 2019). Technology as an enabler for teaching and learning has been with us for a while now however, there is a need of developed teachers with the knowledge of integrating Information and Communication Technology into their teaching practice. The reluctance to adopt this as a norm rather than an exception has probably limited its presence in our classrooms and institutions of higher learning (Ghavifekar & Rosdy, 2015).

Literature Review

In the wake of the pandemic, implementation of Information and Communication Technology (ICT) in effective teaching-learning environment was the need of the hour. To study the impact of the same structural conceptual model has been developed to do a systematic literature review.

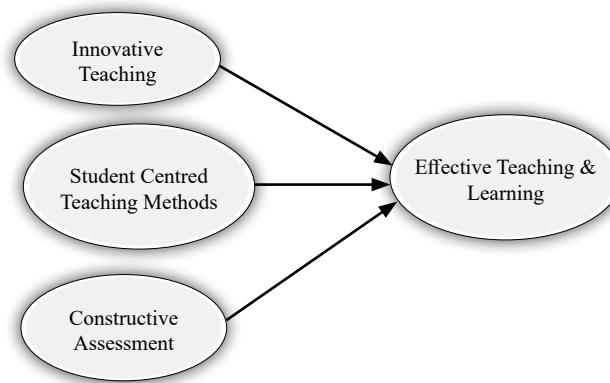


Figure 1. Conceptual model

Innovative Pedagogy: The use of Information and Communication Technology (ICT) for teaching and learning is not a new pedagogic practice, but with the onset of the coronavirus pandemic its scope has grown. Churchill & Churchill (2008) argue that, ICT has been integrated into the teaching curriculum to incorporate innovation, depth and reach within the education system since a long time now. However, there are continuous and dynamic changes taking place in the pedagogy as per the emerging needs of the learner, and learning systems. Over and above this, the use of e-Learning technology in higher education can be wide and varied. The role of digital learning is a workable solution and possibly the future of the entire education ecosystem as we know it. Godfrey, Valcke & Tondeur, (2010) argue, e-Learning platforms and tools enable different methods for varying innovative teaching/learning practices. E-portfolios, Capstone projects, reflective writing, and e-Journaling improve knowledge engagement and grow better skill sets. E-learning can be synchronous, where the classroom can be a virtual one, but the learning takes place in ‘real time’ that is fixed; or asynchronous ‘flexi-timed’ learning where the learner can choose to learn at his own pace, space and time. Thus, Godfrey, Valcke & Tondeur, (2010) summarise the potential of ICT in education as, “a rich learning environment, allowing the learners to adopt multiple perspectives on complex phenomena, to foster flexible knowledge construction in complex learning domains.”

Student-Centred Teaching Methods: E-platforms, for teaching and learning, are redefining the role of a teacher to that of a mentor and a facilitator, someone students look up to beyond the confines of a brick-and-mortar classroom space. The sophistication of ICT enabled teaching tools and their creativity enhances the connection between the tutor, the taught content, and the learner. This empowers the teacher to moderate and formulate teaching environments where a student learns more than just academic knowledge but also advanced skills (Starko, 2017). The use of ICT in the “classroom” today solves many issues faced by students and teachers alike. The connection between technology-based learning, teaching and content dissemination and access is leading to a better understanding of the subject (Alayyar & Fisser, 2019). The asynchronous method of Tech-enabled learning is more student-centred in its approach. This teaching and learning strategy combines self-study with asynchronous interactions through the electronic medium to promote learning (Corfman, Timothy & Beck, 2019). The integrated network of the learners and the various electronic platforms with the help of which they communicate thus pushes the onus of learning onto the students by involving them to construct their own learning (Wu et al., 2008). This further enhances the creative skills of the learners more than just textbook knowledge.

Constructive Assessment System: The constructive assessment approach is applied to combine formative assessment with summative assessment. The purpose of formative assessment is to evaluate the student’s ability in the form of knowledge, understanding, and skills. It is used to facilitate the student’s learning growth and to check the student’s strengths and weaknesses from a developmental perspective. Summative assessment evaluates the composite learning outcomes of the course. The assessment methodology relates to and is appropriate with the learning outcomes assessed, as well as the level at which the assessment occurs. In the course, effective tools are applied for evaluating students’ progress. The Module Aggregate Marks is the weighted average of the markings earned from the varied assessment tools employed. Based on the level of learning and the assessment tools used, the number of formative assessments and stages of review are built into the course specification. Written feedback based on rubrics is provided for the student’s understanding, as well as for record of progression through a module after each formative and summative assessment is completed (UPES, 2020).

Methodology

In this empirical study, a data sample of 338 students has been collected from various professional courses of the University of Petroleum and Energy Studies (i.e., Management, Engineering, Law, Health Sciences, Mass Communication, Design, Computer Science) to study the impact of ICT for Effective Teaching & Learning in the Online Pedagogic Environment. Statistical tool Multiple Regression Analysis has been applied with Software SPSS 22 to test the impact of factor ‘Innovative Pedagogy’, Student-Centred Teaching Methods, Constructive Assessment on Effective Teaching & Learning.

$$\text{Regression Equation: } Y_{\text{ETL}} = \alpha + \beta_1 * \text{IP} + \beta_2 * \text{SCTM} + \beta_3 * \text{CAS} + \varepsilon$$

Y_{ETL} = Effective Teaching & Learning, α = Constant, $\beta_1 * \text{IP}$ = Innovative Pedagogy, $\beta_2 * \text{SCTM}$ = Student Centred Teaching Method, $\beta_3 * \text{CAS}$ = Constructive Assessment, ε = Error Term **Hypothesis**

H1: Integrating ICT into Innovative Pedagogy is significantly contributing to Effective Teaching & Learning among learners in an online Pedagogical Environment.

H2: Integrating ICT into Student-Centred Teaching Methods is significantly contributing to Effective Teaching & Learning among learners in an online Pedagogical Environment.

H3: Integrating ICT into Constructive Assessment System Methods is significantly contributing to Effective Teaching & Learning among learners in an online Pedagogical Environment.

Regression analysis is the technique to study the impact of Dependent Variable on Independent Variable. Here an attempt has been made to know the linear relationship between Independent Variables: Innovative Pedagogy, Student-Centered Teaching Methods, Constructive Assessment on Dependent Variable ‘Effective Teaching & Learning’. The “R” column in Table 1 represents R’s value, which is a multiple correlation coefficient. R is considered as a measurement of the quality of the prediction of a dependent variable. A value of 0.903 in this model shows an adequate level of the prediction. R², the proportion of variance in a dependent variable explained by an independent variables are 0.816, which indicates that independent variables explain 81.6 per cent variability of the dependent variable. Durbin-Watson test value (1.930) shows there is no auto-correlation in the residuals of the regression analysis.

Table 1. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.903 ^a	.816	.815	.46315	1.930

a. Predictors: (Constant), Innovative Pedagogy, Student-centred Teaching Methods, Constructive Assessment

b. Dependent Variable: Effective Teaching & Learning

ANOVA of the regression model shows the overall significance of the model. The statistics indicate whether the independent variables reliably predict the dependent variable or not. Table 2 shows that the p-value of the f statistics is 0.000, which suggests our independent variables in the model reliably predict the dependent variable MSME growth.

Table 2. Descriptive of ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	318.170	3	106.057	494.423	.000 ^b
	Residual	71.645	334	.215		
	Total	389.814	337			

a. Predictors: (Constant), Innovative Pedagogy, Student-centred Teaching Methods, Constructive Assessment

b. Dependent Variable: Effective Teaching & Learning

Coefficients of the regression model presented in Table 3 indicate that Independent Variables Innovative Pedagogy (t= 12.42, p = 0.000), Student Centred Teaching Methods, (t = 4.273, p = 0.000), are significantly contributing to the dependent variable-Effective Teaching and Learning. Whereas the Independent Variable Constructive Assessment (t= 1.632, p = .104), fails. Results reject our null hypothesis for these variables except for the third variable. The results motivate us to design the following regression model:

Table 3. Unstandardised and Standardised Coefficients and Different Models

Model B	Unstandardised Coefficients		Standardised Coefficients		t	Sig.
	Std. Error	Beta				
(Constant)	-.059	.101			-.587	.558
1 IP	.652	.052	.621		12.425	.000
SCTM	.250	.058	.231		4.273	.000
CFS	.090	.055	.084		1.632	.104

$$\text{Effective Teaching \& Learning} = -0.059 + 0.652 *_{IP} + 0.250 *_{SCTM} + 0.090 *_{CAS} + 0.101$$

Discussions

This study shows that the Integration of ICT for effective teaching and learning in the online pedagogic environment plays a significant role in today's pedagogic environment. This was tested through three key factors used to examine - Innovative Pedagogy, Student-Centred Teaching Methods, and Constructive Assessment. As per the result of analysis, Innovative Teaching Pedagogy, Student-Centred Teaching Methods are significantly effective for learning but Constructive Assessment has failed to prove its impact on the same. This indicates a need for engaging with students effectively, to ensure the efficacy of constructive assessment for effective learning.

Limitations and Future Studies

This study has been done with UPES students who maybe having limited scope in the content of larger prospective, but the results indicate a huge scope of future study in this context.

Acknowledgement

We would like to extend our heartiest thanks to the Leadership of our (UPES) senior faculty members Prof. Ram Sharma and Prof. Manisha Mohan, who have guided us throughout this study.

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Attitude of Researchers towards Information and Communication Technology in Pursuing Research

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ABSTRACT

This research article studied the attitude of researchers and their dependence on Information and Communication Technology (ICT) for pursuing research. The purpose of this study is to motivate the remote aspirants to pursue their research with the support of ICT and to identify the strength of ICT in doing research. A study was carried out with researchers of Arts, Science and Engineering discipline candidates, in a student's or teacher's capacity in a higher education institute situated at a rural village in India. Normative survey method and statistical package for social science (SPSS) were applied to study and analyse the attitude of researchers about ICT at that time of research with respect to age, gender, discipline, marital status, full time/part-time candidature and PhD, completed peer/ongoing peer category. Findings concluded that ICT can be a powerful tool to bridge limitations such as distance, economy, expert personalities, resource insufficiency, natural hazards and pandemic situations for learners.

Keywords: attitude, discipline, gender, researcher, Information and communication technology

Introduction

Information and Communication Technology (ICT) is a perfect blend of information, communication and technology. ICT aids help to communicate, engage, enable a process, manage as well as exchange data, information and skills. It provides an opportunity to access scholarly information to attain quality research outcomes. About authentication, ICT components create digital identity and integrity among all the stakeholders in the field of education. Earlier, technology gave us Radio, Telephone and Television. Advanced form of ICT include Smartphones, laptops, Desktop, Internet, World Wide Web, e-mail and Video Conferencing. Virtual learning environments made it easier for the stakeholders to find, share and utilise resources among the community. The objective of this study is to find out the existing researchers' attitude towards ICT and to motivate remote research aspirants towards ICT to pursue their research.

Literature Review

Irinki. MK (2021) had done a detailed study about pandemic-driven changes, opportunities, and challenges. MHRD associated statutory bodies regulations and directions regarding the function of higher education system in India. Habib H. (2017) highlights various impacts and future developments of ICT on higher education. Thapliyal U. (2013) discussed challenges and adaptation difficulties of implementation of ICT in the Indian higher education system. Oliver (2013) insisted on his paper about the significant role of ICT in the pedagogy of higher education system. Arokyasamy (2012) reported on changing trends in use of ICT for instruction in higher education institutions with a mini case study. (Agarwal, 2006) reviewed the public policies for higher education in India in the changing context.

Location and Respondents of the Study

KSR group of Institutions, where the samples were collected for study is situated at Thokkavadi village

in Namakkal district of Tamil Nadu India. Study population would be selected from one Arts and Science College, one College of Engineering and one College of Technology.

Hypotheses of the Study

- Null hypothesis (H_0): There is no significant difference between the attitude of researchers with respect to corresponding demographic variables.
- Alternate hypothesis (H_1): There is significant difference between the attitude of researchers with respect to corresponding demographic variables.
- This study considered six variables which have been discussed in the following sections.

Methodology

Proper choice of methodology, appropriate tools and techniques define the efficiency factor on inference. Applied normative survey method has been used in this study, to describe and interpret what exists at that instant of investigation. To conduct the survey, a questionnaire was set as the preferred research tool and the respective data was authentically collected by the researcher in person. Study consists of 60 respondents from various Arts, Science and Engineering disciplines. Samples were selected using the random sampling technique, so each sample forms a representative sample of entire population. According to the respondent's age, gender, marital status, discipline, nature of candidature and status of research, the attitude of researchers towards ICT in their research process were tested individually on the above-stated hypotheses.

Analysis

Statistical tools ANOVA, T-test, Mean and Standard Deviation were used to analyse the data. Specifically, for descriptive analysis, Mean and Standard Deviation) and for differential analysis ANOVA and T-test were conducted on data of respective demographic variables. There are several arbitrary standards to analyse the hypotheses according to the researcher's convenience and these arbitrary standards are called level of significance. Among them the most commonly used level of significance is 0.01 and 0.05 level. This investigation used 0.05 level of significance to analyse the existence of hypotheses. All the variables were analysed by testing their existence with null hypotheses (H_0) as well as with the respective alternate hypothesis (H_1). Table 1 describes the complete analyses on all variables.

Table 1. Variable Classification with Corresponding Analysis Inference

Variable	Sample	Number	Percentage	Test	Significance	Inference
<i>Age in years</i>	Below 25	1	1.7	ANOVA	.690	H_0 Accepted
	25-30	27	45.0			
	30-35	19	31.7			
	Above 35	13	21.7			
<i>Gender</i>	Male	34	56.7	T-test	.920	H_0 Accepted
	Female	26	43.3			
<i>Marital status</i>	Married	36	60.0	T-test	.205	H_0 Accepted
	Unmarried	24	40.0			
<i>Discipline</i>	Arts	24	40.0	ANOVA	.741	H_0 Accepted
	Science	25	41.7			
	Engineering	11	18.3			

<i>Nature of research</i>	Full time	32	53.3	T-test	.402	H ₀ Accepted
	Part time	28	46.7			
<i>Status of research</i>	Pursuing	36	60.0	T-test	.849	H ₀ Accepted
	Completed	24	40.0			

Discussions

As on analysis inference, there were no significant attitude differences among the variables on each test. In specific 45 per cent of (25–30) years old researchers, 56.7 per cent of male researchers, 60 per cent of married researchers, 41.7 per cent of science researchers, 53.3 per cent of full-time researchers, 60 per cent of Ph.D pursuing researchers were the majority peer category under analysis. When compared this statistics with rest of the corresponding respondents on every variable exhibits certain lacuna about their preference of ICT such as with researchers aged 30 above, female, unmarried and part time peer categories. The following recommendations may help to overcome the defects. Academic research institutions, by periodically conducting familiarisation, hands-on training workshops and conferences on various applications and simulation software tools could give proper guidance and motivation for the researchers about ICT tools. Institutions should inculcate the practices for a paperless culture such as e-administration, e-Teaching & Learning environment through intranet and internet services to break the barrier on the use of ICT tools. Higher education institutions by developing e-resources and facilities for the remote research aspirants through digital platforms like education research network services (ERNET), national digital library of India's N-List and e-SODHSINDHU to aware and direct them in the right path.

Conclusion

The attitude of researchers towards ICT showed a positive trend through the status of null hypothesis inference on all the variables which ensured that definitely ICT can equip the researcher to become a competent and confident personality. In turn ICT enhanced the quantity and quality of research outcomes. Today, our world is quickly adapting to digital media, making the role of ICT in education especially in research the most important factor and this importance will develop in future. Based on the statistics in the discussion section, this survey research concluded that young age group, male, full-time researchers were highly aware of ICT for their research and irrespective of all the demographic variables, most of the researcher's preferred ICT tools strongly to achieve speed and accuracy in their work. In addition, the present pandemic situation proved that ICT is the only option to aid and promote work in the field of education as well as in other social need-based services.

Limitations and Future Studies

Common problems which can be faced by the ICT users were ranked in Table 2 based on respondent's experience. Frequent utility of ICT tools caused harmful psychomotor defects on user ranked first. Power cut is the major drawback to approach ICT tools ranked second. Network coverage issues and traffic conditions are the significant problems ranked third. Natural hazards may cause significant defect on ICT tools ranked fourth. Authentication issues while accessing information through ICT tools ranked the least. This study was limited with one particular group of instructions and can be explored widely. Conducting relevant survey research could be the transparent platform to create awareness, find researcher's strategy about ICT tools for research and to motivate remote aspirants to pursue their research with the aid of suitable ICT in an effective way.

Table 2. Ranking of Problems

Problem	Mean	Standard Deviation	Mean Rank
<i>Power cut</i>	3.73	1.10	3.47 (II)
<i>No network & traffic</i>	3.75	.84	3.22 (III)
<i>Authentication issues</i>	3.57	.89	2.89 (V)
<i>Natural hazards</i>	3.67	.99	3.17 (IV)
<i>Psychomotor defects</i>	4.32	.85	4.38 (I)

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Blended Learning: Can We Achieve the Expected Learning Outcomes from Students?

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ABSTRACT

The present era of the COVID-19 pandemic has shifted the focus of universities and schools from the traditional form of classroom learning pattern to an innovative, technology-enabled online mode of education. This paper aims to understand the most important enablers and barriers for online learning during COVID-19 and adoption of effective criteria in the long run in the education system from the unique outlook of college students. The study addresses the future of blended learning from students' perceptions. It has been studied from two dimensions – (1) Learning Experiences via online mode, (2) Learning Outcomes from online mode. The students' perception of their learning in various experiences to the context of Blended Learning has redefined the concept of education in their approach. It identifies perceived barriers and enablers in the new learning environment in the Indian context. Community-Based Participatory Research has been conducted along with the community considering them as full or equal partners in all the steps of the research process with a group of vulnerable populations. Findings suggest that quality learning experiences are important in the long run but not enough to provide better quality for the overall student's experience. Students consider assistance to be a comprehensive concept that integrates both academic and apostolic views.

Keywords: blended learning, COVID-19, online education, learning outcomes

Introduction

The global pandemic due to the Corona Virus has commuted the working and processing of the entire world much sooner than anyone could have anticipated. In India, the imposition of lockdown in the country in March 2020 hugely impacted the entire economy along with the global connections. It has led to the closure of educational institutes that has brought a sudden shift in the students' learning pattern and the way of delivering knowledge. A transformation has taken place from the face-to-face and traditional learning method of learning to an online kind through Open Education Resources (OER), Active blended learning (ABL), and Massive Open Online Learning (MOOC) via various initiatives of ICT's. Along with the time constraint, having no other immediate remedy to cope up with such an unprecedented outbreak, prolonged closures of educational institutions, the short-term impact on the learning outcomes from students was expected to create unacceptable consequences for the future. To cope with the situation and to continue the learning process among students, the education system has inclined towards innovative and technology oriented online or blended learning methods. In the wake of the pandemic, various innovations in education have brought forth various learning solutions. The current worldwide trend is to attune the education sector to automation and technology-based virtual means of teaching and learning. Accessibility, flexibility, and compatibility are the key components that advance in with such learning approaches. However, the implementation of blended learning requires systematic planning of curriculum, designing, and formulation to achieve aims and objectives for effective learning. This paper discusses the scope of the blended learning method to explore whether the learning outcomes are more satisfactory from the students' perspective when compared with the learning outcomes from the traditional pattern of education.

Literature Review

Till now several studies have been conducted on how blended learning has evolved the concept of education in the 21st century and what are its expected rewarded experiences. Garg (2020) has explained the impact of COVID-19 on education and how blended learning is now a new norm in the education sector. Hass and Joseph (2018) in their study have examined the perceptions of students and their relevance in comparison with face-to-face learning and online education offered at business schools. Peake and Reynolds (2020) explained the benefits enjoyed by students after blended learning was adopted in the university. A qualitative survey has been conducted on 408 students to evaluate their responses towards the adoption of the blended learning method of education for the long term. Agrawal et al. (2020) in their study have focussed on the well-being of students of higher education during COVID-19 lockdown and concluded that it had a huge impact on the psychological and mental well-being of students. According to Garrison & Kanuka (2004), the trend which complements face-to-face classes with online or electronic classes is termed blended learning. Gjostvang et al. (2021) in their study considered the blended learning method to be a solution for higher education learners who are working and have family responsibilities too.

Topic

The present research article is an attempt to understand the current pattern of blended learning. It attempts to explore the scope for adoption of blended learning methods and understand whether such an innovative technology-enabled method of teaching-learning will have similar impact as the traditional method of teaching in terms of learning outcomes of learners. The study addresses the research question: will blended learning sustain in the long run and achieve the expected results in terms of knowledge and skills in students?

Subtopic

The above theme comes under the subtopic as specified and comes under the preview of scope and a subcategory of the main topic of blended learning. It includes:

- Pandemic-driven educational research
- New technologies and education

Methodology

This present study reveals the perception of first year undergraduate students of the technical institute in Jaipur district, Rajasthan. In order to follow the guidelines of social distancing during COVID-19, we have focussed on the approach of Community Based Participatory Research (CBPR) which is a community-centred, community involved, and collaborative method of research. In this paper, CBPR is implied among the youth community members for co-creation, co-research, and co-learning and to achieve the common goal towards the objective and to enhance the local knowledge of the community. At the time of the pandemic, it is worthwhile to pay attention to the learning outcomes of students.

Analysis

The study is based on an online discussion with 75 undergraduate students of which 28 are female students and 47 are male students. Based on the discussion, seven main enablers were identified namely; Internet (n= 31, 41 per cent), technology (n=18, 24 per cent), communication (n=40, 53 per cent), group discussions (n=45, 60 per cent), equal opportunity (n=55, 73 per cent), social media (n=66, 88 per cent)

and regular exams and assignments (n=47, 62 per cent). Ten barriers to the online education pattern during pandemic were highlighted. These are: technological issues (n=41, 55 per cent), Internet access (n=38, 51 per cent), future uncertainty (n=66, 88 per cent), monotony (n=55, 74 per cent), impact on well-being (n=72, 96 per cent), unproductive (n=61, 81 per cent), lack of interaction among peers (n=48, 64 per cent), less interest (n=67, 89 per cent), less understanding of topic (n=38, 51 per cent) and motivation of learners (n= 63, 84 per cent).

Table 1 shows the distribution of students according to their gender and place.

Table 1. Demographic Profile of Students

Gender	Urban	Rural	Total
Female	19	09	28
Male	33	14	47
Total	52	23	75

Table 2 shows the percentage of students who attended online classes regularly and sincerely. It shows only 54 per cent of them have attended online classes on a regular basis and 65 per cent of them were not interested in attending the full lecture.

Table 2. Distribution of Students Who Attended Online Classes

Gender	Attended Online Classes regularly	Not attended regularly
Female	35%	19%
Male	19%	46%

Meanwhile, in the discussion, when asked about their preferred mode of learning, 68 per cent of them opted for face-to-face and classroom learning and another 15 per cent were comfortable with both the mode and 17 per cent opted for online.

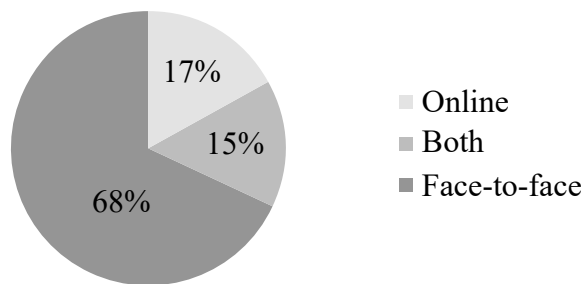


Figure 1. Distribution of students according to their preference between classroom and online teaching

However, in the discussion about the effectiveness in learning in comparison with the traditional method, a total of 65 per cent of students considered online education as the least effective, 20 per cent considered both, and 15 per cent considered it as an effective way of learning and way to achieve learning outcomes as shown in Figure 2.

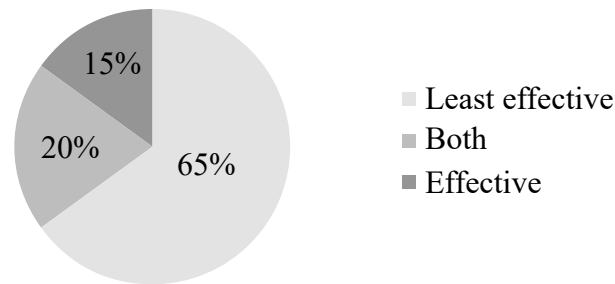


Figure 2. Effectiveness among online and face-to-face learning

According to the students, most of them have considered online or blended learning as least effective and did not achieve the learning outcomes in comparison with the traditional method. They believe better learning outcomes can be achieved through the traditional method where educators and learners are at the same place and exchange knowledge.

Discussion

The study reveals that face-to-face learning in the education sector in higher education is important. Even though it is a new normal to go in accord with the ongoing pattern. However, majorly students are more likely to opt for face-to-face education and the experience gained via online mode is both negative and positive. It has allowed students to continue their learning, skills, and experience but on the other side, it has affected them negatively on various parameters. However, the learning experience of learners during the time of the pandemic by opting for innovative learning patterns enhanced effective delivery of content. Majority of the students showed their inclination towards face-to-face learning instead of opting for online or blended methods. In order to impart academic knowledge and experience, face-to-face learning is the way they would opt for in long run. The absence of co-curricular activities, sports, going for competitions accompanied by friends, and cultural festivals is the huge loss for them in opting for the online mode of learning.

Conclusion

In developing countries like India, with specified challenges to meet the need in current circumstances the “one-size-fits-all” method may not be successful to adopt. Therefore, before implementing certain blended learning activities into practice, one must consider various variables related to targeted learners, their social, economic, cultural, and family backgrounds, their age, access to the Internet and other required technological assistance, and their level of acceptance of learning via such a medium. The research has witnessed a major change in the attitude of learners in the case of the preferred mode of evaluation. In the long run, they consider blended learning to be a mode of transfer of knowledge. Universities and colleges give a real-life experience to students where they learn life lessons apart from academics that can not be replaced or substituted by the blended form of education. Further, it is required for the students to sustain themselves in the real world with real-world challenges, opportunities, cognitive thinking, developing skills, and building communication skills.

Limitation and Future Studies

The study has some limitations in terms of sample size. In the present study we have considered only technical institutes. In future studies a particular subject area can be considered as a sample size. Perception of students from primary, secondary, and postgraduates from non-technical institutes can be studied further.

There is ample scope for future research by studying the impact of recent technologies used in blended learnings on students, their well-being, and efficiency along with reformed policies for the new educational reform considering COVID-19 as a new normal.

Acknowledgment

I would like to express my gratitude to all the community members for their insightful contribution in terms of opinions, knowledge, and frequent discussions that have benefitted us to complete this study successfully.

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Education Policy and Administration

Effectiveness of an Emotional Intelligence Training Programme for Undergraduate Medical Students

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ABSTRACT

In today's healthcare environment, terms like empathy, compassion, communication, and patient satisfaction are gaining more importance. Apart from the delivery of quality health care, aspects like a conducive relationship between doctor and patient, clear communication, empathy, compassion, etc., determine the level of patient satisfaction. In this context, Emotional Intelligence (EI) competencies are considered important for the personal and professional development of medical professionals. EI is said to enhance a gamut of soft skills like communication, conflict resolution, empathy, teamwork, resilience, etc., of medical professionals. Given the important role played by EI in the health care sector, medical schools have started using EI assessment as a criterion for admitting students into medical schools. Research studies stress the need to include EI training in the medical curriculum. With this background, the present study aimed to evaluate the effectiveness of an Emotional Intelligence training module for undergraduate medical students. The sample (N = 127) consisted of two groups, namely, a training group (n = 96) and a matched control group (n = 31). The Emotional Intelligence training program was delivered to the training group. The Emotional Intelligence Test for Medical Students (EIT-M) was administered to both groups and results were compared. EI scores of students who underwent EI training were significantly higher when compared to those who had not undergone EI training ($p = 0.12$). It was also found that among the three components of EI, namely, perception, appraisal, and regulation, the regulation (R) component of EI was significantly higher among the students of the EI training group as compared with the control group ($p = 0.20$). The inclusion of training programmes for the development of EI during the undergraduate medical course would help allow students to imbibe these principles and integrate them along with clinical skills and later into their professional lives leading to patient-centric health care.

Keywords: emotional intelligence, patient-centric care, medical students, professional competence

Introduction

In today's dynamic environment, the healthcare sector is striving to provide patient-centric care and is emphasising an effective physician-patient relationship. Apart from the theoretical knowledge and clinical expertise, medical professionals should also possess the ability to be aware of, control, and regulate their emotions and also others' emotions, to establish and sustain effective relationships with the different stakeholders. This ability is called Emotional Intelligence (EI) and is defined as the ability of an individual to perceive various emotional stimuli associated with his/her self and environment, appraise and regulate them, to produce appropriate behavioural responses, resulting in improved intrapersonal and interpersonal outcomes (Krishnaveni & Deepa, 2011). Research has indicated the importance of developing EI in medical students before graduation (McMullen, 2003). Kadadi and Bharamanaiker (2020) suggest that physicians should be equipped with Emotional Intelligence (EI) to manage their emotions and their patients' emotional states, to deliver patient-centric care. EI is an important attribute which fosters the patient-doctor relationship (Syed, 2011), academic achievement (Altwijri, Alotaibi, AlSaeed, Alsalam, Alatiq, Al-Sarheed, Agha, & Omar, 2021; Deepa & Panicker, 2021), well-being (Doyle, Davis, Quadri, Mann, Sharma, Wardop, & Nahar, 2021), and ethical decision-making (Hopkins & Deepa, 2018) of medical professionals. The World Economic Forum (2020) has identified Emotional Intelligence as a trending skill in its future of jobs report. Thus EI emerges as an important skill that has to be inculcated among medical professionals.

Research studies have shown that EI can be improved by systematic training programmes. However, in the Indian context, limited research has been reported about the implementation of an Emotional Intelligence training programme for undergraduate medical students. The present study describes the implementation and effectiveness of an Emotional Intelligence training module that was designed for undergraduate medical students.

Literature Review

Medical students face a lot of emotional challenges on the academic and personal front during their undergraduate studies. They also require support to manage these challenges (Deepa & Panicker, 2016). Tandon and colleagues (Tandon, Chauhan, & Chaturvedi, 2019) opine that medical professionals need EI skills to cope with the challenges encountered in their profession. Delivering patient-centred care is the predominant focus of health care institutions. On these lines, EI has been related to improved empathy in medical consultation, doctor-patient relationships, and patient satisfaction (Kadadi & Baramanaiker, 2020; Arora, Ashrafian, Davis, Athanasiou, Darzi, & Serdalis, 2010). Higher EI was found to be positively associated with compassionate and empathetic patient care, effective coping with organisational pressures, leadership, improved teamwork, doctor-patient communication skills, and professionalism (Harper, 2011).

Taking into consideration the integral role of EI in the medical profession, it is important to integrate the development of EI into the undergraduate medical programme. A comprehensive EI development programme that included pre-assessment, training, follow-up and post-assessment was found to be effective at the University of South Florida (Monroe & English, 2013). A series of longitudinal studies have shown that emotional intelligence competencies can be significantly improved. A seven-month-long EI training given to medical students resulted in participants scoring significantly higher on EI than medical students in the control group (Fletcher, Leadbetter, Curren, & O'Sullivan, 2009). Based on the premise that EI is an essential skill for physicians and that it can be developed through systematic training programmes, the present study describes the implementation and effectiveness of an EI intervention for undergraduate medical students.

Methodology

The study was conducted in a private medical school in South India. The study protocol was approved by the Institutional Human Ethics Committee (IHEC) (Study Proposal number: IHEC 17/362). The data was collected during the period from January 2018 to February 2018. The study included all the 135 students who had completed their first year examinations. Out of the 135 students, only 127 agreed to participate. These were divided into 4 groups of 31 each. Three groups ($n = 96$) constituted the experimental group and one group ($n = 31$) constituted the control group. The Emotional Intelligence Test for Medical Students (Deepa & Panicker, 2021) was used to assess the EI of the respondents. The test consists of 12 items which measure the constituents of emotional intelligence namely appraisal, and regulation. It has two levels: low emotional intelligence (12 to 36) and high emotional intelligence (37 to 60). The statistical validity of this tool has been established, with a reliability of 0.8 (Cronbach alpha = 0.8). The sequence of events are shown in Figure 1.

Analysis

Statistical Package for Social Sciences- Version 19 (SPSS-19) was used for analyses. The data was found to be normally distributed. Independent samples t-test was done to evaluate the differences in total EI as well as the individual components of EI, namely appraisal and regulation, between the training and control groups.

In the pre-assessment, there was no significant difference in the emotional intelligence scores between the two groups. However, in the post assessments, the EI training group was found to have significantly higher EI scores compared to the control group. The EI component of regulation was found to be significantly higher in the EI training group. Details are indicated in Table 1 below.

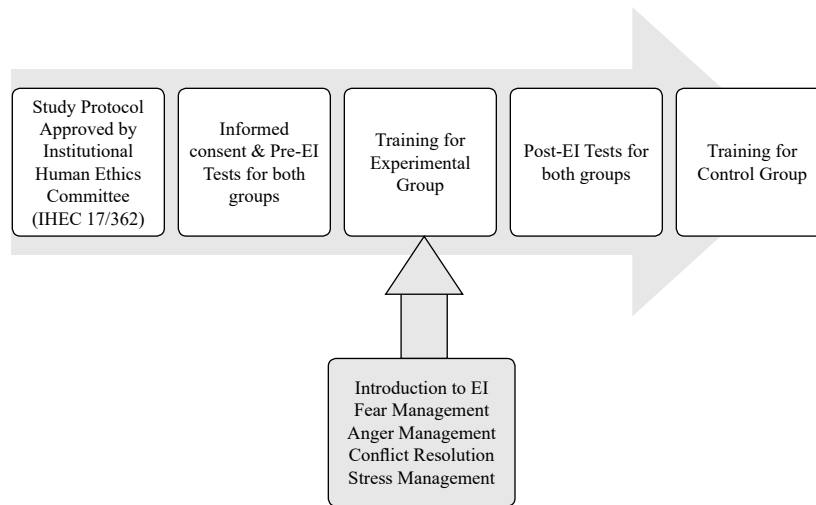


Figure 1. Procedure followed in the study

Table 1. Comparison of EI Total and EI Component Scores

Groups	Appraisal		Regulation		Emotional Intelligence	
	Pre	Post	Pre	Post	Pre	Post
Training Group (n = 96)	15.85	19	17.73	21.31	33.58	40.31
Control Group (n = 31)	16.29	17.77	17.42	18.74	33.71	36.52
Significance Value (p<0.05)	0.389	0.155	0.669	0.020*	0.89	0.024*

Discussions

The study has shown the effectiveness of the EI training programme, which is in line with the previous studies carried out at the University of South Florida (Monroe & English, 2013). The study also replicates the findings by Fletcher and colleagues (Fletcher et al., 2009), who had also used an experimental and control group to establish the effectiveness of an EI training programme. Given the fact that healthcare institutions are focussing on delivering patient-centric care, training the healthcare professionals in EI would certainly add value for the organisations and would yield effective and empathetic healthcare professionals to the society. Based on this, the study recommends that the medical schools include an EI training module in their curriculum.

Limitations and Future Studies

The current research does have certain delimitations. The sample was selected from a single centre. The selection of data from multiple centers could have added validity to the results. The EI training programme focussed more on regulation and less on the other two components of EI, namely perception and appraisal. This factor could have influenced the current findings. Future studies can involve modifications of the training module to incorporate an additional session for the development of appraisal skills. Further research can also look into the sustainability of EI over time.

Conclusion

The present study indicates the effectiveness of introducing EI training for undergraduate medical students. In many situations, EI can be considered as a factor that gives an individual the competitive edge. The lack of EI explains why some people, despite having a high intelligence quotient, faced difficulties in their personal and professional

lives (Singh, 2006). The undergraduate period of medical school is a phase of learning and training for practical and professional skills. The inclusion of a training module for the development of emotional intelligence during this phase of their career would help allow students to imbibe these principles and integrate them along with clinical skills later in their professional lives.

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National Education Policy 2020 – Roles and Competency Framework for Academic Leaders

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ABSTRACT

The higher education institutions will undergo a major paradigm change in the next 20 years. Academic leaders at different levels of governance, heads of the institutions, deans, heads of departments, educational programme heads and team leaders will play a significant role in implementing innovations, reforms and a major change in institutes to achieve quality, accreditation and excellence in education. Effective leadership at all levels in an institute does not happen naturally on the basis of the experience and qualifications of the person. Leaders are trained and developed to accept the challenges of change as envisaged in the national education policy 2020. The leaders are mentored to stretch their capabilities to perform their best. The leadership roles and competency framework developed in the paper are based on the provisions of national education policy 2020, literature review and experiences of the authors. These roles and competencies are validated by five senior faculty members working in the area of higher education for designing and implementing the reforms. Roles and competencies are articulated at three levels-governors and head level, senior professors level, and assistant professor level. All roles and competencies are articulated in the context of innovation, reform and major change. These roles and competencies will be useful to the institutions for selecting, deploying, redeploying leaders for different innovative purposes, training and development, mentoring, coaching and guiding, succession planning, performance appraisal, assigning a higher level of leadership responsibilities, and giving recognition for achievements. The role and competency framework will be useful to ensure continuity of the innovations till the vision of the institute is achieved. The right selection, deployment, and redeployment of the right person will make a difference in the design and implementation of innovations at the same time ensuring the satisfaction of the person.

Keywords: Academic leader, role, competency, NEP 2020

Introduction

The academic leaders play a significant role in conceiving, designing, implementing, and evaluating educational innovations to achieve the vision of the institute and departments. The roles of educational leaders will be different in different institutions and at different stages of innovation. At the institute level the roles may be classified as routine or innovative, one time or regular, mundane or enriched, familiar or new, certain or uncertain, static or dynamic, patterned and shifting, and permanent or rotational. The status of the institute and the collective aspirations of the people in the institute decide these roles. The roles will evolve with the progress of the innovation in the institute.

The performance of leaders is directly related to the clear articulation of the demands of the role, the required competencies to perform these roles, willingness to perform the roles, and favourable or unfavourable conditions that exist in the institute in a particular role context. The academic leaders are expected to create a conducive environment for faculty members to excel and give their best to the students and to develop programme outcomes joyfully with their valuable experience.

In the second decade of the 21st century, many qualitative changes have been introduced by the University Grants Commission (UGC) (UGC, 2021), All India Council for Technical Education (AICTE) (AICTE, 2020), National Assessment and Accreditation Council (NAAC) (NAAC, 2018) and National Board of Accreditation (NBA) (NBA, 2019). These changes and many other reforms and innovations are incorporated in the national education policy (NEP) 2020 (MHRD, 2020).

In the last 20 years, a number of concepts and models of leadership evolved in the manufacturing, software, and service industries. These concepts and theories of leadership have been adopted in the education sector. Notable developments in leadership are: visionary leadership, shared leadership, value-based leadership, transformational leadership and the like.

In future, higher education institutions (HEIs) are going to be quality-driven, accreditation-oriented and autonomous to offer a wide variety of educational programmes ranging from certificate to post-doctoral programmes. Research, entrepreneurship, and vocationalisation will be an integral part of the educational programmes of higher education institutions.

A major change in the curriculum design of educational programmes is promoted by NAAC and NBA which is using the philosophy of outcome-based education in curriculum design, with learner-centric approaches in the curriculum implementation, and outcome-based assessment of learning. The HEIs will organise events at the national and international levels for faculty members and students. These events will be led by senior faculty members. The HEIs will encourage faculty members and students to take up domain-specific and pedagogical research studies. The HEIs will embolden the use of educational technology and technology to improve the efficiency, effectiveness and relevance of the functioning of the institute.

The HEIs need to clearly define the role of educational leaders working at different levels in the changing context of higher education to accept the challenge of the change, design the change, lead the implementation of the change and evaluate the impact of the change. The competent and professional academic leaders will rejuvenate, innovate, reform, and change the institute to implement the provisions of NEP 2020, meet the challenges of industry 4.0 and use the digital technology for education, training, and development of students and faculty members.

The clearly defined roles and competencies in the context of reforms, innovations, and change envisaged in the NEP 2020 will be useful for designing the capacity building programmes of academic leaders, select them for the right positions, deploy them for changing tasks, increasing role efficacy and evaluating their performance (Gupta, 2011).

Literature Review

The authors have reviewed the significant literature on the role and competencies of academic leaders in HEIs.

UGC, (2021) issued guidelines for induction and mentorship for teachers of higher education in which the objectives of mentoring are stated. One of the objectives is to build academic leaders. MHRD, (2020) a mission on mentoring is envisaged in NEP 2020 to prepare the faculty members to assume key higher positions in the institutions. There is a provision of establishing a national academy for teaching, learning and leadership to build capacity in faculty members to assume academic leadership. Aggarwal K. K, (2020) stressed developing academic leaders with vision and extraordinary skills to lead the higher education ecosystem from the front. Ngoc Bich Khuyen Dinh (2020) concluded that commitment and personal power are core features of academic leadership. The personal and interpretational capacity, leadership capabilities academic capacities and leadership styles are the characteristics needed for academic leadership. Kin, (2019) identified 12 critical leadership competencies for school principals. These competencies are-leading for learning, integrity and accountability, communication, collaboration, critical thinking, creativity and innovation, decision-making, problem-solving, managing change, entrepreneurship, digital literacy, and emotional intelligence. UGC, (2019) issued guidelines for induction of faculty members in higher education institutions. Faculty members are prepared to become professional teachers and assume academic leadership at level three as defined in this paper. Ten modules are offered to them of approximately 175 hours. MHRD, (2018) launched leadership for academicians' programme (LEAP) to prepare the second tier of leaders to take up the leadership position at the institute level. The general topics of management are covered in these three weeks of the training programme conducted by premier institutes of the country and world-class universities. AICTE, (2018) declared a comprehensive policy for technical teachers training in which there is provision to develop teachers to take up leadership positions in the institute. Benayoune (2017) defined competency framework as a set of competencies to achieve the goals of innovation, reforms and change (adapted). The author also stated

the benefits of the competency framework for managing the human resource activities in the institution. The author stated the issues in developing and implementing the competency framework in the institution. Kęstutis Trakšelys (2016) suggested a theoretical model of interconnection between the development of school heads' competencies and school improvement. The authors suggested stages of leadership career such as emergent leader, entry to headship, established leaders, advanced leadership, and consultant leadership. Dorrell J. Ross (2016) studied the principals' core competencies on the basis of Green's 13 core competencies. The 13 core competencies are highly prevalent in the principles, positively influence the climate, professionalism was the topmost competency and five competencies are significant. These are professionalism, curriculum and instruction, diversity, collaboration, and assessment. Cook (2016) recommended that each institution may have its own definition of leadership; distributive leadership is an effective model, collegiate style is an effective style, academic leaders should empower the academic community, and leadership development opportunities should be provided to leaders throughout their career. Connor (2016) investigated the use of competency frameworks for recruitment and selection in financial services organisations in Dublin and concluded that there is a relationship between core competence and organisational effectiveness, the framework is useful in recruitment and selection. Muhammad Midhat Ali (2016) suggested a seven-step competency map development process, testing phase and performance evaluation phase for technical competencies. Aithal, (2015) defined four levels of leadership in higher education institutions. These are academic, programme organising, sports and games and cultural activities leadership. The author has stated ways to groom leadership in the institute. Daniela Drugus, (2014) stated that leadership is the capacity to inspire people to act. The author quoted B. P. Smith and stated that leadership is the ability to influence the behaviour of individuals and groups to achieve desired outcomes. They quoted P. F. Drucker and stated that leaders are expected to do what needs to be done. Abu Daud Silong (2011) described the competencies, roles and effective academic leadership in a world-class university. The authors cited Mintzberg and defined the managerial roles such as interpersonal, information processing, and decision making. The authors cited Yang and listed personal characteristics and skills, administrative skills, social responsibility competencies, and institutional competencies. Jacqueline Fields (2019) stated insights on educational leadership. These are affective qualities, mentoring and empowering, teaching excellence, research and scholarship. The author developed a framework for educational leadership comprising these insights.

Qualities of Academic Leaders

Academic leadership in the reform-oriented institution is altogether different from academic leadership in conventional institutions. The theories and models of leadership guide academic leaders to perform their roles effectively and efficiently. In a reform-oriented institute, the academic leaders are expected to possess qualities stated in Fig. 1.

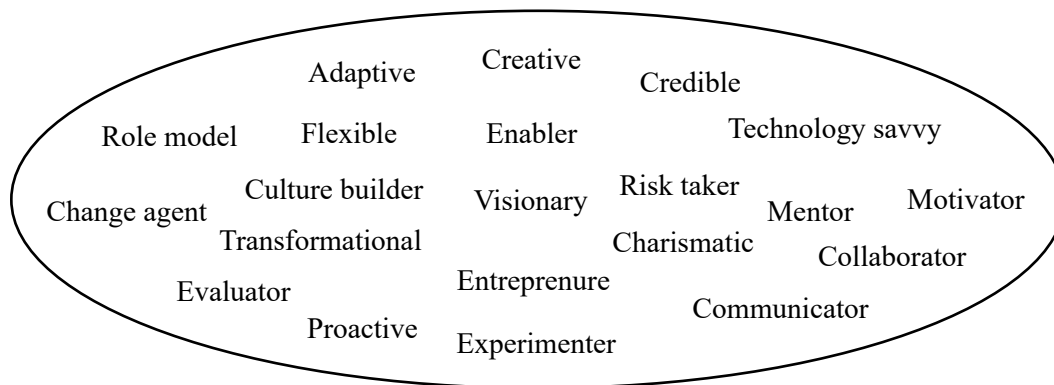


Figure 1. Qualities of academic leaders

Academic Leadership Roles and Competencies

In the context of NEP 2020 and innovations taking place in the higher education system, the roles of academic leaders are going to be reform-oriented and different from the conventional roles of the leaders. Thirteen roles and 37 competencies are identified for governors, directors, principals, deans and heads of departments. Six roles and 20 competencies are identified for professors and associate professors. Six roles and 28 competencies are identified for governors, directors, principals, deans and head of the departments.

Conclusion

In reform-oriented educational institutions, academic leaders perform generic and specific roles for implementing the reforms in the institute. The nature of the role will be different at different stages of the reform. Generic roles will be performed by all academic leaders working at different levels and specific roles will be performed by the designated leaders for the purpose. The concept of visionary leadership, shared leadership, distributive leadership, democratic leadership, charismatic leadership, participative leadership, transformational leadership and so on should be used to conceive, design, implement and evaluate the impact of academic innovations in the light of the NEP 2020. The focus of academic leadership should be learner-centric and research-oriented.

Limitation and Further Scope of Research

The roles and competency framework developed in this study are based on the literature review, experiences of authors and validation by five experts. A holistic exploratory research study may be undertaken to standardise the competencies and framework developed in this study. Another study on competency analysis is recommended which may be further used for designing the training and development activities for the academic leaders.

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Audit of Mentoring Programme for Faculty Members

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ABSTRACT

The higher education institutions will implement a mentoring programme for faculty members to train and mentor them for implementing the provisions of the national education policy (NEP) 2020 (MHRD, 2020). The University Grants Commission (UGC) has already issued guidelines for induction and mentorship of teachers of higher education (UGC, 2021). All India Council for Technical Education (AICTE) has also issued guidelines for mentoring the teachers of technical courses (AICTE, 2020). Training and mentorship at the national level will enable faculty members to prepare themselves for accepting the challenges of higher education in the context of national education policy 2020. Higher education institutions will have a unique vision to achieve in the next 20 years, therefore they will build and develop the capacity and capability of the faculty members to implement innovative approaches in academics and research to achieve their unique vision. This will call for a professionally designed mentoring programme for faculty members, which is effectively implemented, audited, evaluated, and improved during the cycle of implementation and in the next cycle of implementation.

Keywords: audit, mentoring programmes, audit report

Rationale

The higher education institutions will implement a mentoring programme for faculty members to train and mentor them for implementing the provisions of the national education policy 2020 (MHRD, 2020). The University Grants Commission has already issued guidelines for the induction and mentorship of teachers of higher education (UGC, 2021). All India Council for Technical Education has also issued the guidelines for mentoring the technical teachers (AICTE, 2020). Training and mentorship at the national level will enable faculty members to prepare themselves for accepting the challenges of higher education in the context of NEP 2020. Higher education institutions have a unique vision to achieve in the next 20 years, therefore they will build and develop the capacity and capability of the faculty members to implement innovative approaches in academics and research to achieve their unique vision. The capacity building and capacity development should be done in an institutional context which will result in people building and culture-building in the context of the internal and external environment of the institute and the vision and strategic plan of the institute. Capacity-building and culture creation will become means for change and cause for change. Capacity-building and implementation of institutional innovations will move forward in an integrated manner. The mentoring programme designed at the institute level will play a significant role in capacity building and capacity development at the institute level. A scientifically designed and effectively implemented mentoring programme will make a difference in achieving the vision of the institute. The audit of the mentoring programme for faculty members at three phases viz design, implementation and impact phase will continuously improve the capacity-building, capacity-development and culture-building in the institute.

Literature Review

UGC, (2021) has very recently declared the guidelines for the induction and mentorship for teachers of higher education. It is a comprehensive document for designing the instrument and using the secondary data. S. S. Pattnaik, (2021) developed a comprehensive guideline document encompassing the requirements of mentoring newly inducted teachers and mentor preparation. This document comprehensively covers the need for mentoring,

mentor selection process, incentives for the mentor and mentees, training of mentors, mentoring process, evaluation of mentor and mentees, and digital platform. Shaykhutdinova, (2019) described various models of mentoring as situational, partner mentoring, group mentoring, goal-directed mentoring, swift mentoring, reverse mentoring and school of mentoring. Andrew, (2016) stated that mentoring framework should be developed in line with the goals of the mentoring programme. The mentoring framework is useful for the selection, support, and training of mentors. Rosemary (2015) described the benefits and advantages of the academic mentoring system, methods used in mentoring, the relationship between mentoring and education, mentoring and quality assurance and implications. Thomas developed a programme handbook for mentoring newly-inducted teachers for the school education system covering all the aspects of the mentoring programme. This handbook contains theory as well as practice-ready reckoners. Gaines, (2020) compiled the best practices in teacher mentoring based on 24 resources and concluded that prioritisation of outcomes helps mentees, gain equitable outcomes for all students, reflection, clear direction, model teaching, role play, provide support, strong relationship and ground coaching with instructional practice. Hanover, (2014) described a variety of effective mentoring models, their elements, and their effective implementation at the institute level. The reverse mentoring model is thoroughly described. Simon, (2014) developed a comprehensive tool kit on mentoring encompassing aims of the supreme programme, success factors, mentor-mentee relationship, advantages, and implementation. A Goodlad model of relationship viz., initiation, cultivation, transformation and separation is described. Pirjo-Liisa Lehtela (2014) described the holistic student-centred guidance model comprising career, educational and personal guidance. A student-teacher moves towards the role of a teacher and then a partial teacher and then an expert on all three aspects. Hudson (2013) concluded that mentoring acts as professional development and it should be taken on a priority basis. Mentoring must be recognised and rewarded as professional development. Gupta, B. L. (2011) describe the process of design, implementation and taking corrective and preventive actions for improving the quality of academics. Several audit inventories are given in the book. The book was useful in developing the audit of the mentoring programme. Phillips-Jones (2003) described skills for successful mentoring for mentors and mentees. There are specific skills for mentors and mentees and commonly shared core skills. The brief review of the literature revealed that no mention of audit of mentoring programme of a higher education institution is found in the literature. The literature gap motivated authors to take up a study on evolving an audit system for a mentoring programme in higher education institutions.

Research Objective

To evolve an audit system for the mentoring programme of faculty members and academic leaders of higher education institutions.

Research Methodology

A descriptive research study was used in which researchers designed a semi-structured research instrument to gather views. The semi-structured questions were responded to by 340 faculty members of higher education institutions.

Data Presentation

The data collected using Google forms is rearticulated maintaining the spirit of the responses and classified under the different heads of the research questions. Criteria and sub-criteria for auditing the mentoring programme are stated in measurable terms quantitatively and qualitatively. A particular criterion is audited on the quantitative and qualitative parameters stated in the findings.

Findings

Audit of mentoring programme is a systematic and scientific process of designing, implementing and evaluating the mentoring programme at the institute level. It is a process of gathering information on the design, implementation and impact of the mentoring programme.

The purpose of the audit of the mentoring programme is to assure the quality of mentoring, improve implementation of the mentoring programme, solve mentoring related problems, add value, and evaluate the impact of the mentoring

programme. The mentoring is audited on its design, implementation and impact on the individual professional capacity development, capacity building and core competence of the institute. The design of the mentoring programme is audited on the rationale of the mentoring programme; goals of the mentoring programme are audited, roles of the head of the institute, roles of mentors and mentees, orientation and training of mentors and mentees for implementing the mentoring programme, guidelines for the planning of mentoring by mentors and mentees, mentoring methods, mentoring approaches, impact of the mentoring programme, incentives and mentoring audit report, implementation of the mentoring programme, impact of the mentoring programme.

Audit process: A three-stage audit is proposed for the mentoring programme of the institute. In the first stage, the scientific design of the mentoring programme at the institute level is considered as it plays a significant role in the success of the mentoring programme. In the second stage, implementation of the mentoring programme is considered and at the third stage, impact of mentoring is considered. The mentoring cycle is completed in five stages-design of the audit system, preparation for the audit, conducting the audit, preparing the report, and taking corrective action.

Audit team: The audit is conducted by a small team (three-five members) of senior mentors (internal as well as external) selected for the institute.

Frequency: The frequency of the audit should be six-monthly so that significant progress in mentoring takes place and at the same time six months are sufficient to implement the corrective and preventive actions based on the audit report.

Assumptions for audit of the mentoring programme: The audit of the mentoring programme will provide the best results in the following conditions:

1. The institute has prepared an institute development plan in the context of the national education policy 2020 and wants to implement it effectively and efficiently.
2. The institute has designed mentoring programme for faculty members in the context of the institute development plan following the mentoring guidelines issued by UGC and AICTE and the provision of national education policy 2020. The innovations, reforms and change needs have been identified.
3. The institute head is committed to provide resources and lead the mentoring programme to develop core strengths of the institute for innovation, reform and change.
4. Faculty members volunteer for capacity development and stretching their capability through participating in training and mentoring programmes of the institute.
5. The mentors are professionally trained and volunteer to offer their services in the context of national education policy 2020.
6. The co-development of mentors and mentees is essential for implementing the institute development plan.
7. Mentoring of all faculty members is essential in core areas of innovation i.e. education, research and services (large group mentoring) and specific mentoring to perform specialised roles related to innovations, reform and change.

Limitations

As there was no research study and document available to guide the study, the developed mentoring system is based on responses of a limited number of respondents that are involved in individual mentoring and not as a mentor under the institutional mentoring programme. The higher education institutions will design the mentoring programme in their context and implement it in the next five years. The standard mentoring audit system will be developed based on the mentoring experience in the context of the national education policy 2020.

Implications for Higher Education Institutions

A formalised beginning for mentoring of faculty members of higher education institutions has been made through policy initiative at the country level. The UGC and AICTE have come out with guidelines for implementing

mentorship programme at the country level with a major focus on induction of teachers at entrance level and higher level through training programmes and use of learning of training under the guidance of trained mentors at the institute level. Each higher education institute is expected to have a unique vision within the framework provided in the national education policy 2020. Institute-specific mentoring programmes need to be designed to achieve the vision of the institute and satisfy the capacity development and capacity building requirements of the faculty members and develop the core competence of the institute and align it to the vision. The latent potential of the faculty members needs to be identified and harnessed for their professional development and professional satisfaction. The mentoring programme at the institute level will facilitate academic culture-building and institution-building. The audit of the mentoring programme suggested in this paper will be useful for designing, implementing and evaluating the mentoring programme of the institute.

Areas for Future Studies

A standard audit system for mentoring programmes of faculty members of higher education would be useful research work. On the same lines, a standard audit system for the mentoring programme of students can be evolved based on empirical study. Professional mentors play a significant role in the success of the mentoring programmes, so developing a profile of the mentors in the context of the national education policy 2020 will be a great help for higher education institutions.

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Innovative Pedagogical Practices for Teaching Legal English

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ABSTRACT

Language functions according to the demands of the sociocultural environment. There is a rise in the number of people using English as their first or second language. This shift indicates the trend of embracing the language as a professional requirement. Teaching and learning English is not only a global necessity but also a cross-disciplinary phenomenon. It is imperative that learners of English get acquainted with the customised usage of the language present in different registers. English for Specific Purposes acronymed as ESP in academics involves creating need-based curricula of teaching and learning English for specific vocations. Legal English is one such register that has evolved over a period of time and developing a learner-centric curriculum for the same is a challenge. Introducing innovative pedagogical practices directs one to mitigate this challenge steadily. The present research thereby seeks to analyse multiple ways to ensure effective learning of legal English. The objective of this study is to promote collaborative efforts even while teaching remotely and to make the pedagogical practice of Legal English more engaging and an enriching experience. The research will involve a descriptive and analytical methodology to delve deeper into the domain of Applied ELT (English Language Teaching). The study aims to initiate Outcome Based Education by integrating a task-based approach for teaching phonology, morphology, syntax, semantics, and pragmatics to law students. From this research, it can be inferred that through the medium of incorporating unique techniques like role-play method, synchronous as well as asynchronous instruction – legal maxims, politeness maxims, and even remedial grammar can be taught efficaciously.

Keywords: ESP, Applied ELT, innovative pedagogy, OBE

Introduction

Students are the focal point of innovative pedagogy. Creating an indelible mark on the minds of learners through various teaching techniques is the motto of instructors who circumvent the traditional chalk and talk method. In today's fast-paced and evolving learning environment, the style of teaching a language must be ameliorated. Learning a language is a socio-cultural necessity but learning a language for a specific purpose expedites one's need to be competent in that particular register. A register is the customised and contextual use of English in a particular profession. The register of Legal English is a sub-branch of ESP (English for Specific Purposes) that involves the use of words, phrases, sentences, and discourses functioning in the legal arena. Acquiring proficiency in Legal English is the constituent element of Applied ELT (English Language Teaching). The research presents ways to develop innovative pedagogical practices for teaching Legal English. Additionally, it will suggest certain changes in the administration of the course that can be implemented under the framework of NEP (New Education Policy) 2020.

Literature Review

By definition, Applied ELT imbibes a transdisciplinary approach to investigate the connection of ELT with other disciplines and charts the usage of English by envisioning the role of language teachers. Pishghadam's book on Applied ELT (2011) is certainly a movement beyond Applied Linguistics where the author expands the territory of language education. But, as a sub-branch of Applied ELT, the book does not deal with ESP in its entirety. On the other hand, while *The Lawyer's English Language Coursebook* by Mason (2011) deeply explores the curriculum of English for Law, the book fails to discuss the implementation part of the course. Since it is crucial to know

more about the ways of doing ESP in a classroom, especially for the digital natives, and relooks at the tactics of how to engage the Google generation through web tools, an article by Connell (2006) proves to be very beneficial. However, it does not cover the accurate methodology to use similar tactics while teaching a course like Legal English to the undergraduates.

Although there are scholarly articles written on innovative teaching pedagogies in law (2018) but surprisingly, there is no literature available on teaching Legal English innovatively. There is ample material on critical analysis of tools and methods required for teaching 21st century English in general but there is paucity of research in the area of teaching legal English in particular. Not many scholars worldwide have published reading material related to the topic of the present study. Thus, the researcher has made a humble attempt to develop an introductory research article for generating scholarly reference material, so that it can help theorists and practitioners of ESP to get an insight into the domain of Legal English pedagogy.

Methodology

Students now days have a dynamic thinking process. Consequently, to capture the attention of learners for a 45-minute/60-minute contact hour is indeed a challenge for the instructor who prepares double the classroom talk-time to succinctly deliver the technical content. Therefore, the teaching process must be such that it ignites the learners’ interests and builds curiosity in them to explore more about the topic. Once this ‘need to know more about the concept’ is sparked in their minds, half the battle is won – this kind of analogy is ostensible because getting students interested into any topic is actually an uphill task. To identify the students’ inclination towards ‘doing’ ESP and tap their interest in Legal English, a pilot study was conducted keeping in mind certain inferences that are usually drawn before and after completing a course.

The researcher conducted a survey for students from two law institutes – one was a government-aided law school and the other was a law school run by a private university; both situated in Pune region. The rationale behind selecting two different kinds of institutes was to emphasise the flexibility of the process of revamping the syllabus. Out of the two institutes selected for the survey, the former is bound to follow the syllabus prescribed by the collegiate public state university whereas the latter is at liberty to update the syllabus as per the changing demands of the global pedagogy. So, in this survey, law students were supposed to answer only two questions by choosing the most appropriate option for each. The survey demonstrated a balance of perspectives as far as teaching of Legal English as a mandatory subject is concerned. The questions asked and the options provided for replying are illustrated in the figures below –

What was your perception about Legal English before studying it as a subject?

95 responses

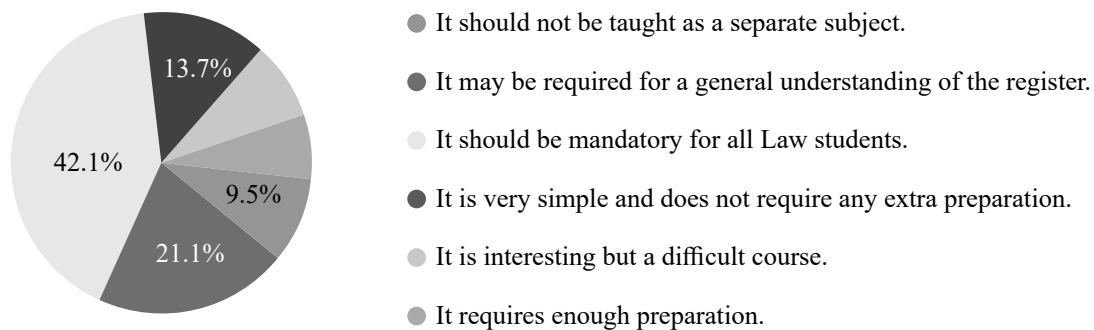


Figure 1. Pictorial representation of responses to the first question in the survey

What was your perception about Legal English after ‘doing’ it as a subject?

95 responses

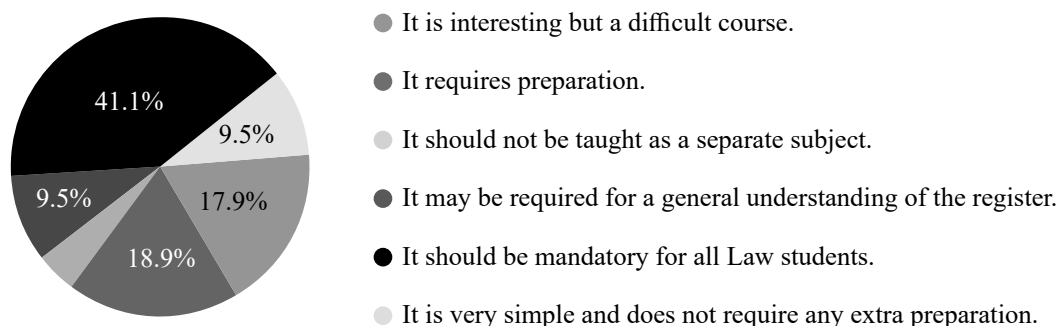


Figure 2. Pie diagram representing the total no. of Responses to the second question in the survey

This pilot study indeed proves the need for having Legal English as a compulsory subject in the law curriculum. Nevertheless, there are two facets to this framework of Legal English that need to be examined – ‘what kind of content is supposed to be delivered to the target group?’ and ‘how is the content supposed to be delivered to the target group?’ While designing the syllabus of Legal English, it is therefore, affirmative for the subject expert to consider students’ expectations. The part highlighted in red in figures 1 and 2 states the notion that ESP is no more underrated and students acknowledge the amount of preparation required to comprehend the discipline of English for Law.

Analysis

The ability to communicate in Legal English requires a special training and personalised attention to foster an engaging and enriching experience. As a manifestation of this abstraction, out of the two law schools selected for the pilot survey, the researcher herself incorporated innovative teaching practices for teaching Legal English in College B. After completing the course in one of the institutes as part of her action research, she collected student opinions regarding the Legal English pedagogy. The table below exemplifies some of the views received through the pilot study from those who wished to honestly express themselves post the study.

Table 1. Select Subjective Responses of Students (survey participants)

Name of the Institute	Name of the Course	Student’s Feedback/Student’s Suggestion
College A	BA LLB	“more emphasis on debating and writing skills is needed”
College A	BA LLB	“There should be a proper focus on grammar and writing skills”
College B	BBA LLB (Hons.)	“The subject was taught in an extremely engaging way and that made it so interesting.”
College B	BBA LLB (Hons.)	“It has helped us to get a better overview of the legal aspects and its correlation to the English language.”
College A	BA LLB	“Legal English is not being taught properly in government law colleges.”

College B BBA LLB (Hons.) “It felt great when legal English was taught as a separate subject in our Law course. I didn’t know that there could be so much to learn in this subject. Legal maxims, drafting research, and many more were taught to us and that made me realise the importance to Legal English. [...]. It made me realise that this subject is as important as other legal subjects like contracts, family law, consumer law, etc. Legal English as a subject has its own depth, weight and importance as a whole. One who can develop their grip and can have command on Legal English will surely excel in the field of law.
I felt lucky to have gotten the opportunity to learn Legal English with such a professor who has a very good command on the subject and also taught everyone with personal attention.”

College A BA LLB “Legal English can be a easy subject for those who are well versed with the language. But for the rest who barely speak English, legal English becomes a tough subject. Also remembering the maxims is always a tough task.”

College A - government-aided law school; **College B** - law school run by a private university

Discussions

The course content has already garnered enough attention but the willingness to satisfactorily complete the course is directly correlated to the way the course is taught. Hence, simply sticking to the prescribed syllabus of Legal English is not sufficient. The instructor has to discover the comfort of the learners with numerous teaching styles by trial-and-error method thereby forming an amalgamation of the most conducive teaching strategies that augment the technical competence of learners in terms of using legal jargon. In the arrangement of blended learning, screen sharing has become the new norm and form of disseminating knowledge. Be it synchronous teaching or asynchronous teaching, collaborative PPTs and online polls are gaining momentum. So, the teaching of legal terminologies can happen in an interesting manner by maximising learner participation in activities conducted to reinstate the jargon.

Legal maxims shape legal communication and lay a strong foundation for building logical arguments. The best way to teach legal maxims is through the role play method, irrespective of online or offline instruction. Legal maxims like ‘damnum sine injuria’ and ‘injuria sine damnum’ can be projected in an exciting way by asking groups of students to dramatise the Gloucester Grammar School case (1410) and Ashby vs. White case (1703). The minute differences between the two maxims too can be elucidated through the following mathematical formulae: [i] “defendant’s act + defendant’s malice + plaintiff’s loss – plaintiff’s legal injury = damnum sine injuria” [ii] “defendant’s act + plaintiff’s injury – plaintiff’s loss = injuria sine damnum” (Asthana, 2020). Here, not just the students’ mind but even their body is actively engaged in learning legal semantics and pragmatics. There is a total psycho-physical response to the situation assigned to each group for role-play of designated maxims that works as a mnemonic device.

In a simulated environment, learners learn the technical aspect of the legal language faster and retain better. Apart from the legalese, task-based approach to the teaching of Legal English aids in improved pronunciation as well as comprehension of Latin foreign expressions. Task 1 could be counting the number of syllables in the word by enjoying simultaneous beats on the table or the bench. Task 2 could be practicing the tone and articulation by recording one’s own audio and video. These activities easily cover the phonological aspect. While dealing with the morphological aspect, language games can be played in various permutations and combinations to discuss synonyms, antonyms, idioms, homophones, homographs, and processes of word formation like affixation, acronymy, conversion, compounding, clipping, etc.

Syntax or scientific study of sentence structures is the heart of Legal English. Undergraduate students need not relearn basic grammar. The target group actually needs remedial grammar that showcases the gradations of sentence construction in the context of law. Revisiting tenses, voice, and first three parts of speech are a must for learners

of Legal English. A unique way of discussing the overuse of passive voice in the legal register is by doing the task ‘order order’ – in this task, the instructor makes the students scrutinise the overt use of passive voice and asks them to reorder the sentence that is easier to grasp and less ambiguous. Another unique way to discuss nouns, pronouns, and verbs in the class is by engrossing oneself into the task ‘from partial to participatory’ – here, the students are compelled to unlearn the wrong use of reflexive and possessive pronouns and relearn the neutral pronouns with allied nouns and verbs. Finally, the most unique way of discussing the tense is by improvising on the activity called ‘relaxing the tensed’ – here students have the liberty to do away with obsolete tense forms and, concentrate their attention on only functional tenses that are most frequently used in litigation and adjudication. The instructor can deliberate upon the demarcation between two tense forms with the help of flashcards, audio-visual aids, and cues from works of literature that effortlessly synchronise legal language with literary musings.

Conclusion

Table 1 undeniably provides evidence of the disparity between the learning experiences of students in college A and college B. The study proves that there is a dire need to curate learner-centric activities to teach Legal English and the instructor must administer out-box strategies with an intention to contrive digital content readiness. Flexibility to upgrade the syllabus of Legal English with the changing demands is more beneficial compared to the irrevocable syllabus and rigid approach adopted by few institutes. However, it must be noted that registering students’ inclination and learning style does not require a registration form; it requires a keen observation on part of the teacher for which s/he needs to be a guide on the side and not a sage on the stage. With this mindset, outcome-based education can be nurtured in the field of English for Specific Purposes.

Limitations and Future Studies

In the present changing and challenging times, language is a constant that unites people through gratuitous expressions like the politeness maxims. The need to connect with people in distress by means of compassionate conversations indeed holds the entire human race together. Professionals are leaving no stone unturned to settle the greatest of the disputes through peaceful negotiation and mediation. Given the significance of using legally precise language in all professions, there is a lot of scope to study the pragmatic aspect of legal English irrespective of the vocation one follows. The present study, though limited to analyzing innovative pedagogical practices only in the context of teaching Legal English as a discipline to undergraduates, opens avenues to conduct research in a similar fashion for other branches of ESP. Another limitation of this study is that it neither explicates the ways of introducing the branch to high school students nor expounds on the possibility of continuing with the discipline at the post-graduate level to delve deeper into the nuances of arbitrariness of legal language. Hence, it can be deciphered that the current research is just the tip of the iceberg and the Indian context provides a fertile ground to develop and expand the genre of applied ELT. With regard to teaching English for Law per se, the researcher firmly believes that it can be delivered not merely as a course content but as a sensitisation programme that can be integrated into the already existing course outline of the English subject; further, it can be spread across the 4th stage i.e. the secondary level (class 9-12) with varying levels of difficulty as per the new curricular structure proposed in NEP 2020.

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Blended Teaching and Learning in Teacher Education Sector in India: Present and Future Prospects

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ABSTRACT

The resource crunch nature of the social sector in India is prevalent since ages due to multiple factors. Education has been under resource crunch condition since independence. Therefore, educationists and economists have unanimously raised the issue of increasing GDP share to the education sector. From Kothari Commission (1964–66) to National Education Policy 2020, it has been recommended that GDP contribution to education be raised to 6 per cent, but still, it is a long-sighted dream. On the other hand, the issue of quantity in the education sector in general and, higher and teacher education in particular have been highlighted for decades through several policy decisions, especially in terms of the availability of teachers/faculty in the institutions. FICCI (2018), AICTE (2019), The Hindu Survey (2016), India Development Report 2012 and several other policy documents including Demand and Supply Study of NCTE 2011 have raised the concerns of lack of teachers in the entire higher education sector to the level of 40 per cent (approximately). Besides, the professionals prepared in the institutions of higher learning especially in Engineering, Medical, Teacher Education, Management, etc., are always questioned in terms of their professional capabilities and justification of the degree they have acquired. Such a scenario in the Indian education sector has also contributed to the increasing unemployment of the educated youth.

In such a state of affairs of education in India, blended teaching and learning environment can be considered as an effective tool/model of educational practice in the institutions of higher learning in general and teacher education in particular. The practice of a blended approach can result in cost-effectiveness in the education sector, enhanced quality and effective teaching-learning environment in classroom transaction, reaching the unreached stakeholders in state-funded and resource-crunched institutions and moreover the flexibility and freedom of learning by the learners. The present paper will make an attempt to study the contemporary practice of the use of technology in educational delivery and the available resources, and highlight the new policy on the blended mode of teaching and learning in education by the UGC (2021). It further attempts to locate the policy of blended teaching-learning in teacher education in the light of National Education Policy 2020.

Keywords: blended learning, blended teaching, teacher education, NEP 2020

Introduction

Open Educational Resources, in the recent decade, have given a new life to resource-crunched and dysfunctional institutions across the globe in general and India in particular. State support for the social sector has been decreasing across the globe while increasing participation from the private sector, especially in education sector and in developing countries. The decreasing financial support to education in general and higher education in particular, is a universal phenomenon across different levels of education in India. Liberalisation, Privatisation and Globalisation of the Indian economy during the 1990s influenced every sector, including education. It further led to the internationalisation of education in India as well. Subsequently, technological intervention in terms of ICT integration for teaching-learning purposes and use of Open Education Resources increased at a phenomenal rate, especially in the professional institutions and more specifically during COVID-19 pandemic in India.

Teacher education plays a pivotal role in the arena of the education sector. It involves creation of a pool of trained teachers from the institutions of higher education; therefore teacher education is largely a part of professional higher education. On the other hand, the trained teacher deals with the schools and children therefore, it is also an integral part of school education. Neglected and delayed attention towards teacher education by governments has been widespread since decades (JVC Report 2013). Academic and Institutional support systems along with the issue of

faculty crunch have been a wider concern in the teacher education sector. Open Educational Resources (OER) and Online learning which are based on Information and Communication Technologies have arrived to the rescue of the education sector to a greater extent. Therefore, it is pertinent to highlight the role of OER in teacher education with reference to quality and learning outcomes in a contemporary institutional environment.

Online teaching-learning and OER are the most popular sources of knowledge for promoting teaching-learning higher education and research culture at one hand and supplementing to resource crunched institutions on the other hand. Teacher education in India has been suffering from commercialisation, quality concerns and lack of financial support from the government resulting in degrading overall quality of education (Pritam, 2020) and leading to lower learning outcomes. There is very little literature available in the form of government documents, initiatives of apex bodies and internationalisation of education through OER in India. Learning outcomes at school level is a much-discussed issue these days, but far as there have not been any concrete criteria or policy decision available in India as teacher education is concerned, (ETMA, 2020). National Education Policy 2020 has given much emphasis on OER and its role for increasing learning outcomes in India. Making OER available for the stakeholders will result in greater benefit to the financially starved and resource-crunched education sector in general and teacher education in particular. Proper utilisation of the OER/MOOCs platform will help the students to learn in a more effective manner as compared to conventional teaching-learning. Although government has been making efforts to take these schemes/resources, mostly urban stakeholders are adequately able to utilise these online and E-resources. The spread of such resources among the rural/semi urban/marginalised stakeholders needs adequate attention by the institutions and must be supported by the government funds. It will further lead to increased learning outcomes which can directly be attributed to minimising the gap between financial investment to/of the institutions and expected returns in terms of learning outcomes.

Besides, OER, e-resources and online teaching-learning will also help in minimising total dependency on the teaching faculty, library resources where maximum investments from maintenance costs are done. As far as teaching faculty are concerned, the paper certainly helps to probe in increasing professional development skills, getting refreshed knowledge and updated disciplinary expertise with minimum cost, affordable time and convenience without disturbing the institution and its stakeholders. Any sort of enhancement in disciplinary knowledge will certainly lead to self-development of teaching faculty on the one hand, and increasing learning outcomes, the greatest challenge of contemporary education in India, of the students at large on the other hand.

Blended Teaching-Learning: The UGC Directives

Blending of different pedagogical activities is never new in the practice of classroom teaching-learning. The resource-starved institutions have always cooked up classroom strategies for effective learning outcomes especially in Indian schools. Teacher education institutions are no exception in terms of resource starvation more specifically in government institutions. But teacher's creativity remained absent till recently and before the emergence of mass level information technology revolution in Indian social science classrooms including teacher-training classrooms. Technological intervention in the classroom as a separate pedagogical activity has now been merged with blending of the existing classroom teaching practice along with technology, e-resource and open learning platforms resulting in more effective and application-based learning outcomes.

The recent directive on blended teaching-learning given by the University Grants Commission has well-drafted strategies and ramification for the teacher education institutions as well. The blending of face-to-face classroom teaching along with information technology resources in teacher education may benefit students and teachers in multiple ways. The author has tried to present the critical perspective on blended learning in teacher education.

UGC Directives on Blended Learning	Critical Remarks with Reference to Teacher Education
Blended Learning Structure (with existing practice)	
Blended face-to-face class	Teacher educators often mix the teaching methods during classroom transaction as per the needs of students' understanding

Blended online class	Blending online classes may be optional depending upon classroom diversity and availability of technology during classroom transaction
The flipped classroom	Flipping the classroom and use of blended approach to the extent of 30-40 online classes is feasible with urban and high profile professional higher education stakeholders with lots of side effects
The rotation model	This model may work for the fixed station based professional programmes but the case of teacher education is different; stations (practice teaching schools and teacher education institutions) cannot be made mobile
The self-blend model	Self-blending needs a level of maturity and professional attitude among students whereas, teacher education programmes are usually last career options/reserve degree option making it more vulnerable to misjudgements, exploitations and malpractices,
The blended MOOC	It has often been observed that students or teacher educators are not friendly to MOOCs platforms due to several reasons such as knowledge about equipments, devices, language barriers and study materials that are not fully developed and/or easily available to students.
Flexible-mode courses	A teacher educator during the classroom transaction often has flexibility as per the choice and need of the students and teachers but directives to use a flexible mode to suit the majority of the group of students from semi-urban and rural backgrounds may not result in flexibility but rather will lead to malpractice

Role of Learner in Blended Teaching-Learning Environment

Increase student interest	Blended mode may increase interest of the students, but keeping it as a forced policy may lead to negativity and exploitation by students as well as teachers.
Keep students focussed for longer duration	Conventional classroom practices with face-to-face mode are unable to keep students focused, there is no assurance for focused and attentiveness among students of teacher education. There is already evidence available (largely due to lack of dedicated practice teaching schools near to the private teacher education institutions) regarding the flipping nature of the students between practice schools, their institutions, and other teacher education institutions (across the year, students are mobile between these practice teaching schools and their institutions as per the curricular requirement).
Provide students autonomy	Autonomy may appear to be attractive for the students and teachers but needs proper management, especially among teacher education institutions. A well-known fact is that 90% teacher education institutions are involved in wrongful acts, such as degree selling ¹ rather than educating.
Instill a disposition of self-advocacy	Self-advocacy is usually meant for the high achievers (both students and teachers), it is not given rather realised by the students which may not be feasible in the case of teacher education. Students who get admission in B.Ed/M.Ed programmes come with a minimum of 45–50% (As per the NCTE Norms and Standards 2014, 2009)
Promote student ownership	Ownership over learning is seen among achievers, blended mode may promote malpractice and focus more on getting degree rather than gaining knowledge and wisdom.

¹ Justive Verma Commission Report 2013 has categorically spelled out that majority of the teacher education institutions are indulging in degree selling activities rather than imparting quality education, here he referred mostly about the commercialisation of teacher education institutions in the private sector.

Allow instant diagnostic information and student feedback	Instant diagnosis is feasible when facility of the blended mode is available and teaching faculty is available and ready to deliver, the non-attending mode of the teacher education institutions makes it almost impossible in India.
Enable students to learn at their own pace	Indian classrooms are falling short of about 40% teaching faculty (AISHE, 2020–21) and private institutions have more than 80% actual shortage ² , students in teacher education mostly learnt on their own.
Prepare students for the future	It may prepare students of professional higher education for the future but may not equally work for the students of teacher education institutions largely in the hand of the sub-standard private sector.

A Case of Teacher Education Institutions

The inclusion of ICT and related technology in teacher education can be traced back to one-and-a-half decade in India. NCTE collaborated with Intel Corporation in 2006–07 to professionally and technically equip teacher-educators and students of the institutions. Use of computer, Internet, multimedia, etc. have been practiced through curriculum and respective syllabus. Still, the outcomes of such ICT and related facilities are far from the teacher-education institutional reality. The ICT resources have been available in several teacher education institutions but blending them with pedagogical practices in terms of usability in classroom transaction could not be materialised so far, except for a few centrally funded institutions. About 91 per cent of the private teacher education institutions located in Delhi NCR have ICT facilities but due to unavailability of respective resource persons dealing with such technology, lack of adequate knowledge and practice by the teacher educators and also due to lack of supportive equipments needed for smooth running of the ICT resources for knowledge transaction led to non-utilisation of these technological infrastructure (Pritam, 2020).

Since its inception, the Department of Education, along with several off campuses of a central university located in Hyderabad, have an ICT lab, a Language Lab and a Computer Lab but are suffering from improper utilisation either by the faculty or by the students. If this is the with a centrally funded university, the situation can be extremely severe in the private institutions in India. Blended teaching and learning can be considered as a second generation of the use of ICT by clubbing it with the classroom pedagogical practices. Teacher education institutions are already suffering from the issue of non-attending students and teacher and inclusion of the blended mode directed by the UGC can be fatal and may contribute to additional malpractices. An inclusion of the application based education of the technology in classroom transaction, evaluation of the students on the basis of knowledge of blending technology with classroom learning, teacher eligibility test based on the application of technology and demonstration classes based on the use of blended method for teacher recruitment can be some of the future reforms in teacher education that are likely to the adaptation of a blended approach to teaching and learning.

Conclusion

Blended teaching and learning is the new educational order and also a need of the contemporary educational world largely influenced by the revolution of information and communication technologies. The politico-economy of the social sector in general and professional and teacher education in particular have forced a decrease in government expenditure and increasing private participation in recent decades. Information technologies, online teaching-learning, Internet, e-resources and blending of all these practices with the classroom experiences have created a new ray of hope of reform in education as well as in teacher education sector. The existing norms of computer labs, language labs, ICT Labs and online and web-based resources in teacher education institutions alone are not sufficient either for the faculty or for the students to gain sufficient knowledge and attain professional expertise. Majority of the teacher education institutions are located in private sector and lack facilities, resources, have issues of non-attending, commercialisation and quality degradation (Pritam, 2020) in education. Related concerns have

² 80% shortage here means not in actual terms, but due to institutionalised absenteeism as a popular commercial practice by private institutions. In order to save money from salary cost, they merely enroll teachers in the official records but they are not attending the institutions.

also paved the way for the blending of technology with classroom practices. Blended teaching-learning practices are not only an effective supplement to existing teaching-learning practices but also cost-effective. They provide alternatives to students to learn in more efficient ways.

The recent directives of the UGC on blended teaching and learning appear gloomy to professional education sector, largely located in urban areas (metropolitan and capital cities) where students belonging to high income category with a greater exposure to technology have access to such an education. On the other hand, majority of students in teacher education programmes are either girls or boys from low income and non-techno savvy groups. They find it difficult to acquaint themselves with learning in a blended environment. Besides, the location of the colleges, faculty in these colleges, the facilities available, the devices and equipments and expertise in techno-savvy educational environment are unfavorable to the practice of blended teaching and learning in teacher education. Therefore, UGC directives may work efficiently in other professional educational programmes but they may not be feasible to practice in teacher education institutions where 96 per cent of the institutions are in the hand of low quality for-profit private sectors. However, going forward, along with the UGC directives, an ICT-based regional or university level financial support from the respective governments, to create technological capacity and instructional infrastructure may be of great help in order to practice blended teaching-learning in teacher education institutions in India. Adequate training, professional development avenues, adequate funding for the devices and equipments for the students and research and development activities, etc. supported by the teacher education institutions are also instrumental in enhancing quality of teacher education through blended teaching and learning.

The educational attainment and learning outcomes at various levels of education including school education (ASER, 2020) and teacher education have been at stake and questionable for a long time. Majority of the colleges of the state-funded universities are unable to reinstate the already given directives to higher education institutions, such as computer lab, ICT facilities, Internet facilities, adequate power backup system, etc. and are struggling hard to equip their institutions since ages. In such state of affairs, blended teaching and learning in teacher education institutions without government support can have far-reaching negative effects. Besides, there are high probabilities of negativity of the blended teaching-learning to the rural, semi-urban, marginalised and technologically less savvy students and to the institutions to cope up with the present model of 60:40 ratio of face to face classroom teaching and blended teaching-learning, especially in the teacher education institutions in a country like India. Instead of a “directive based centralized approach to new pedagogical practices forced uniformly, in an extremely diverse country like India, across the types of institutions and locations in the country, a need and feasibility based practice of blending teaching-learning in education in general and teacher education in particular can result into positive teaching-learning environment in India.”

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Unembellished Digital Education: A Paradigm Shift for Education in India

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ABSTRACT

The forging of the National Education Policy catalyses the need for student's education for their lives outside the confines of an educational institution, and not merely for evaluation. The Indian education sector needs investment in digital infrastructure, development of online teaching platforms and tools, virtual labs and digital repositories, teacher training to become high-quality online content creators for the designing and implementation of online assessments. During the pandemic, India's education system went through a phase of realisation and learning, seeking a prompt solution to the crisis created due to the closure of schools. The introduction of alternative paths for traditional education will provide long-term benefits in the literacy condition of the country. A digital system will familiarise students with technology which will be integrated more into our lives as it develops.

A digital transformation will provide students with access to endless learning resources available on the Internet. As we move towards a new normal of online learning, the policy plans to create a dedicated unit to develop the digital infrastructure, content and supervision for educational institutions. This study aims to gain insights into the new changes adopted by NEP towards digital education and its impacts on beneficiaries. This research aims to explore a few aspects of NEP-2020 that will have a transformational effect on digital education in India. This paper will bridge the gap by investigating the hurdles that stakeholders will face and highlight how new technologies are used in education and their implications.

Keywords: NEP-2020, virtual education, digital infrastructure

Introduction

India is predicted to be the third largest economy in the world by 2030–2031, with an estimated GDP of 10 trillion dollars, a growth be driven by knowledge resources. To boost the Indian education sector's growth, the current government has introduced a new National Education Policy-2020. India, being a growing liberal country for education reforms, currently has about 15,51,000 schools employing 94,16,895 teachers, teaching 24,78,53,668 students. NEP-2020 recommends many transformational ideas for school education, like reforming pedagogy, development of life skills including 21st-century skills, multiple levelled low-stake board exams, transformations in evaluation, assessment, and performance tracking mainstreaming vocational education.

Literature Review

NEP-2020, to be a 21st-century policy, must integrate technology into its curriculum and pedagogy. The policy is making various suggestions for such integration in multiple parts of the system. It recognises the importance of technology to aid teachers and influence student experience in learning.

Open-Source Technology

The education ministry has decided to update its curriculum for the 21st century. One of the primary aims is to bridge language barriers between teachers, students and making education more accessible to students even in remote parts of the country. The government plans to train and aid teachers to curb the language barrier through resources like DIKSHA. The government will establish a one-on-one peer mentoring programme to maximise effectiveness and fun activities for the students. The government also plans to develop "Enjoyable and inspirational books" for students at all levels using technology-assisted high-quality translation in local and Indian languages.

National Committees and Digital Infrastructure

An autonomous body, the National Educational Technology Forum (NETF), will be created to provide a platform for the free exchange of ideas on technology to enhance learning, assessment, planning, administration. NEP-2020 plans to use Artificial Intelligence (AI) and similar technologies to decrease teacher workload and handle student records. It has tasked NETF (National Education Technology Forum) to identify such emerging technologies that could be implemented to increase the learning outcomes. Schools will invest in improving digital infrastructure, online resources and tools and training teachers to use such online tools effectively. While the policy acknowledges the invaluable role of technology in facilitating teaching and learning, it is essential to develop a coherent path of action for fostering technological proficiencies. NEP-2020 successfully engages with technology and its future advancements while providing sufficient safeguards for data privacy and protection.

Teaching Students Newer Technologies and Techniques

Coding has also been introduced in the curriculum to have a solid foundation for applying logic and utilising available technology. It focusses more on the critical thinking aspect than the donkey work associated with it. This integration and dependence on delivering content online will be ineffective in the country, specifically rural regions, where Internet penetration and the required knowledge to access such technologies are limited. The hardware to access such content will also be affected by the students' economic condition and hinder education. The government must develop a coherent policy for fostering such technologies and providing access to the disadvantaged while promoting digital education about its risk.

As India moves forward on the digital front, there will be various benefits like online education. Virtual labs consisting of virtual trips and AR/VR experiments have also been discussed, involving the students and requiring more attention from the teachers. As the new age evolves, these methods can make learning more fun and interactive for the students, and the teachers themselves can also learn a lot from using these techniques. An administrative body NEAT (National Educational Alliance for Technology), has been set up to incorporate innovation for better learning results. NEAT aims to perfect the means to utilise artificial intelligence to customise learning experiences contingent upon student's necessity. It even proposes to expand public collusion interests with Educational Technology organisations for upgraded learning outcomes. Nonetheless, probably the most significant test is to build up a vigorously advanced framework in remote regions.

e-learning Platforms

The National Education Policy 2020 perceives the significance of utilising the upsides of Technology, additionally keeping in view the Economic and Demographic Variation that exists in the Nation. The arrangement of NETF will help advance the broad utilisation of technology in schooling. The strategy prescribes to connect the digital divide, and to make instructive projects accessible every minute of every day in various dialects to consider the understudy populace's fluctuating requirements. An uncommon spotlight on the substance in all Indian dialects will be accentuated and required; computerised content should arrive at the educators and understudies in their medium of guidance. Further, the current e-Learning stages, such as DIKSHA, will likewise be utilised to make virtual labs to ensure that all students have equivalent admittance to quality reasonable and involved examination-based learning encounters. There is a need of giving good admittance to the Socio-Economically Disadvantaged Groups through appropriate gadgets like tablets with pre-stacked content.

Table 1. Initiatives towards Virtual Access to Education in NEP-2020 and NPE-1986

Initiatives	National Education Policy 2020	National Policy on Education 1986
<i>E-content</i>	<i>Development of e-content in 8 languages</i>	<i>E-content available only in English and Hindi</i>
<i>Information Broadcasting</i>	<i>Development of public digital platforms like Diksha and Swayam</i>	<i>Development of introducing audio-visual units</i>

<i>Creative content</i>	<i>Development of virtual lab</i>	<i>Introduction of TV programmes for educational purposes</i>
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The National Education Policy 2020 is a massive step in shaping the future of teaching. For ‘Indian educators,’ the lucky break has arrived to take advantage of the chance and become producers of their destiny. Table 1 shows that the new National Education Policy focusses on creative e-content creation and broadcasting. NEP-2020 will focus on developing e-content in eight regional languages while only available in English and Hindi. The policy also aims to develop multilingual information broadcasting platforms that provide content for stakeholders. NEP-2020 has adapted itself to the modern world by developing virtual labs.

Methodology

The methodology consists of qualitative policy analysis and highlighting the changes brought by National Education Policy (NEP-2020) and comparing them with National Policy on Education (NPE-1986) with respect to virtual education. An extensive resource of written material was used, including books, magazine articles, academic journals. The study is primarily based upon secondary data sources. The implications of the policy are analysed using the predictive analysis technique. Secondary data sources have been used to verify our analysis.

Analysis

NEP has ambitious goals of achieving a 100 per cent Gross Enrollment Ratio (GER) by 2030. However, in 2018–19, the overall GER for the senior secondary level was 58.56 per cent. Therefore, it is imperative to improve the current digital infrastructure in government schools. According to India, T. O. (2020, August 17), NEP will enhance quality education in public schools relative to private schools and now judge both of them on a common minimum criterion.

As per the government survey conducted for the period from July 2017 to June 2018 and published in November 2019, in rural India, only 4.4 per cent of households have computers as against 23.4 per cent of urban households, and nearly 14.9 per cent of rural households have Internet facilities as against 42.0 per cent of urban households. As per the same survey, in rural areas, among persons aged five years and above, 9.9 per cent were able to operate a computer against 32.4 per cent in urban areas, and 13.0 per cent of rural users could use the Internet against the 37.1 per cent Internet users in urban areas.

Discussions

Due to the current “pandemic circumstances,” in which virtual learning has replaced in-person learning experiences, stakeholders have been forced to re-imagine traditional learning and teaching practices. Additionally, the web must be made accessible to all so that every understudy can use this opportunity. Some challenges need to be addressed in the Indian context. According to research, Internet penetration is higher in urban regions, but it is now rising in rural areas. Access to the Internet was nearly always through mobile phones. Every student must have exclusive access to digital gear, such as smartphones, computers, or tablets. Today, most students from low-income families have limited or no access to exclusive digital devices, the Internet, or even electricity.

E-learning is gainful for students just as it is for instructors, particularly in this COVID-19 pandemic circumstance. However, it is anything but a maintainable option in contrast to classroom learning. The ‘human element’ of education cannot be disregarded, and technology should only be utilised as an additional tool to enhance the learning experience.

Conclusion

NEP-2020 aims to make the schooling framework all-encompassing, adaptable, multidisciplinary, attuned to the requirements of the 21st century and the 2030 Sustainable Advancement Goals. The purpose of strategy is ideal from numerous points of view, yet it is the execution where in lies the way to progress. The policy has exciting proposals for education, but its execution will call for a change in mindsets to broaden perspectives and train many teachers,

all within impossible timelines. The latter half of a student's school life (IX to XII) is mainly devoted to securing promising results.

Virtual learning is a developing and invigorating approach to find out about nearly everything. The present web-based learning opportunities offer everything from one-hour live workshops to online degrees. There is something for everybody, and all one needs to do is discover it. In any case, virtual learning is not the same as learning in an offline setting, and it is essential to consider objectives, needs and interests before focusing on something. One likewise needs to consider the time accessible, solace level with utilising innovation and the available hardware. As we all are acquainted with PCs, and its access turns out to be progressively typical, web-based learning will keep on opening entryways and offering learning openings for the intrigued individuals.

Limitations and Future Studies

Future research is needed to validate the feasibility of enhancement in digital education. The availability of multilingual e-content and providing access to the specially challenged students on digital platforms are often overlooked factors. There are numerous opportunities and challenges for the Government and Private sector to ensure equal and adequate access to Digital Learning Platforms. There is a need to set up an administrative cycle to check profiteering from schooling as unaccounted donations. Consequently, the State needs to address the striking inconsistencies in access to digital apparatuses to universalise training.

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Exploring the Parameters of Syllabus through Teachers' Perception

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ABSTRACT

The definition of syllabus has confused various thinkers and theorists for a long time. There are basically two main schools of thought providing the definition. In the first place, syllabus is considered as a part of the curriculum which deals with the course material and its sequencing only; on the other hand, syllabus is defined in a broad manner encapsulating areas like method, evaluation, time and objectives. The present study attempts to analyse teachers' perception regarding their understanding of the different parameters of syllabus design after performing an Exploratory Factor Analysis (EFA). A questionnaire comprising 21 statements on the different parameters of syllabus, was administered to the teachers teaching secondary grade with a view to understand the teachers' perception about the different aspects of syllabus. The EFA results reflect that teachers perceive that syllabus consists of four parameters. The study helps in understanding how teachers perceive the different aspects of syllabus.

Keywords: syllabus, parameters, exploratory factor analysis, perception

Introduction

The concept of 'syllabus' has been important in second-language programmes throughout the history of English Language Teaching (ELT). The term 'syllabus' has been defined differently by various theorists and experts. While defining 'syllabus', Nunan (1988) compares the narrow and broader views in respect of the concept of 'syllabus'. He states that the narrow view draws a clear distinction between syllabus design and methodology and considers selection and grading of content as the only components of syllabus while keeping methodology aside. The advocates of broader view question this strict separation (Nunan, 1988). The researchers in the first school of thought consider 'syllabus' as a document which consists of basic specifications with selection, definition and grading of content (Yalden, 1984; Brown, 1995; Allen, 1984; Stern, 1984; Brumfit, 1984). Yalden (1984, pp. 13) refers to 'syllabus' as a public document, a record, a contract, an instrument which represents negotiation among all the parties involved. Allen (1984) also separates 'what will be taught' from 'how they will be taught'. The advocates of the broad approach are Candlin (1984), Breen (1984), and Dubin & Olshtain (1992) who feel that methodology and evaluation can be considered parts of syllabus design. Candlin (1984) states that in the broad syllabus "we may find some account of preferred methods by which this content is to be presented to learners and interacted with by them. We may also discover how the learning of this content is to be evaluated in terms of the levels of knowing required of the learners" (p.31). Breen (1984) while defining syllabus hints at objectives while saying "Any syllabus is most typically a plan of what is to be achieved through our teaching and our students' learning" (p. 47). Dubin & Olshtain (1992) and Datzman (2018) also subscribe to the broader view of the syllabus design wherein they define the five major parameters of syllabus design as objectives, content, methodology, calendar and evaluation. It gives a wholesome and clear understanding of what syllabus should refer to in the modern context where communicative approach of teaching makes it difficult to keep the content separate from the methodology. The confusion regarding the scope of syllabus makes it important to understand how the teachers teaching the students in the classrooms perceive the concept of syllabus and whether they are able to identify the different parameters of syllabus as defined by Dubin and Olshtain (1992). To fulfill this requirement, the present study tries to understand the teachers' understanding towards syllabus and its parameters through a questionnaire which has been designed around the five parameters of syllabus as discussed above. Exploratory Factor Analysis (EFA) has been performed in order to identify the latent factors in the data. The data reflects that the teachers perceive the parameters distinctly; however, they combine the parameters of objectives and content.

Methodology

In order to analyse teachers’ understanding of the term ‘syllabus’, the study has followed ex-post facto research design using cross-sectional survey method. Data has been collected using purposive sampling under non-probability sampling technique. The target population for data collection was teachers teaching secondary grade students in the schools situated in Ajmer, Jaipur, Rewari, Delhi & NCR in India. A questionnaire consisting of 21 statements on the five parameters of syllabus design as defined by Dubin & Olshtain (1992) has been used as instrument for collecting data. The questionnaire was originally developed in order to understand the teachers’ perception towards the efficacy of the CBSE secondary grade syllabus. The statements were ranked on a five-point-Likert scale where 1 meant ‘strongly disagree’ and 5 meant ‘strongly agree’. Reliability of the questionnaire was assumed through Cronbach’s Alpha analysis and the α value was found to be .779 which is above the accepted range of Cronbach’s α i.e. 0.7 (Taber, 2018). Before running the Exploratory Factor Analysis (EFA), determinant of R-matrix which is important for detecting multicollinearity has been calculated and the value has been found to be 0.897 which is greater than 0.00001 which makes the data fit for performing EFA. Similarly, Kaiser-Meyer-Olkin (KMO) and Bartlett’s Test of sphericity have been conducted for determining the strength of relationship among the variables. KMO value is 0.81 (Table 1) which is well above the accepted value i.e. higher than .5 (Field, 2013). These tests prove the data fit for conducting EFA.

Table 1. KMO and Bartlett’s Test of Sphericity

KMO and Bartlett’s Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.814
Bartlett’s Test of Sphericity	Approx. Chi--Square	2742.303
	df	210
	Sig.	0.000

Findings and Analysis

The EFA (Table 2) has been conducted to identify and determine the number of dimensions/ parameters of syllabus design. Principal Component Analysis (PCA) has been used for extracting the variables from the data set to convert several correlated variables into several linearly uncorrelated variables named principal components (Mahmoudi et al., 2021). Orthogonal VARIMAX rotation has been used for classification of the items as per their respective factors. The EFA establishes that the teachers perceive the parameters of syllabus as four instead of five as presented in the introduction. Hence, the latent variable which combined the items under the categories of course objectives and course content has been renamed as ‘objectives and content’. Therefore, total four parameters of syllabus have been identified in the present study as per secondary grade teachers’ perception.

Table 2. Factor Loadings of Parameters of Syllabus as per Teachers’ Perception using EFA

Statements	Variables			
	Objectives & Content	Evaluation	Methodology	Calendar
The existing syllabus enables the learners to communicate effectively and appropriately in real-life situations.	0.79			
The existing syllabus has suitable content to develop creativity among students.	0.76			

The existing syllabus gives them enough exposure to understand and use grammatically correct English language in a day-to-day life.	0.74
The existing syllabus develops interest and understanding of literature.	0.70
The existing syllabus helps in developing all the four language skills i.e., listening, speaking, reading and writing.	0.70
The existing syllabus enables the learners to use English effectively for study purposes across the syllabus.	0.68
The existing syllabus makes it easy for the students to revise sentence and grammar structures already learnt.	0.62
The content given in the textbooks is adequate for understanding meaning, interpretation and reading beyond the text.	0.61
The existing syllabus has adequate content to develop understanding and skills to adept to different cultures.	0.60
The existing system of evaluation tests the proficiency of using English language for oral communication purposes.	0.85
The existing system of evaluation tests creativity among students.	0.81
The existing syllabus tests critical thinking among the students.	0.79
The existing system of evaluation examines not only the memory skills of the students but the application and expression parts as well.	0.77
The existing syllabus tests application of the knowledge gained in the subject among the students.	0.73
The existing system of evaluation allows the teachers to test the students' performance in a holistic manner.	0.42
The existing syllabus includes the learning tools such as email, blogs, writing and posting on Wikispace and using kahootz, etc. for developing the writing skills.	0.83
The textbooks in the existing syllabus have enough visual support such as images, maps, graphs help students understand the topics in an interesting way.	0.80
The existing syllabus provides access to digital and online platforms for better understanding of the contents of the course	0.73

The existing syllabus has enough multimedia support to make an understanding of the topics/chapters easier for the students.	0.39
The existing syllabus gives adequate time to cover the topics as per the periods allotted by the CBSE.	0.86
The allotted time is enough to carry out all the activities to develop students' language skills	0.85

Discussion

The EFA results of the data reflect that the teachers teaching English to secondary grade students perceive a clear difference among the parameters of syllabus as per its broad definition. The questionnaire had been designed taking into account the parameters of syllabus as defined by Dubin and Olshtain (1992) encompassing the parameters of objectives, content, method, evaluation and calendar as five main components of a syllabus. However, the EFA results in the present study show that though the teachers perceive almost all the parameters of syllabus design separately but they have a similar understanding about the parameters of objectives and content. It further shows that the teachers have given equal weightage and importance to these two parameters in the questionnaire and they have understood the language used for the statements under these parameters as belonging to one parameter rather than two. It reflects that the similar language of the statements under these parameters drove the teachers into understanding them as one parameter.

Conclusion

The present study has tried to analyse teachers' understanding about the different parameters of syllabus. The EFA results have established that there is not much difference between the theory and the practice as the data has established that teachers perceive the parameters of syllabus differently and are able to distinguish the difference among the different parameters. It shows that teachers have developed an understanding of the components which assign distinct and unique characteristics to the parameters of the syllabus. However, in respect of teachers' understanding of the difference between the parameters of objectives and content, the results show that the teachers have combined both these parameters under one group which can be named as 'objectives and content'. Hence, the study substantiates the broad definition of syllabus and its parameters as discussed and propagated by different theorists as discussed in the introduction part of this study.

Limitations and Future Studies

The study is limited to Ajmer, Jaipur, Rewari, Delhi & NCR regions and does not claim to generalise the results to the larger population of teachers in the country. The study will be beneficial for the syllabus designers while trying to understand the implications of the concept of 'syllabus' from the perspective of the teachers. The study will also help researchers in conducting further studies in the field of syllabus and curriculum development as they will be able to see through teachers' lenses into the different aspects of syllabus.

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Science Teaching in Schools and Scientific Temper

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ABSTRACT

The term ‘Scientific temper’ was first used in the Indian context by the first Prime Minister of India, Shri Jawahar Lal Nehru in his book *The Discovery of India*. He believed that science is the driving force that will take humankind to new heights. Scientific temper is an attitude that helps a person in making scientifically informed and rational decisions in life. The lack of resources and training of teachers in terms of perspectives in science education and content knowledge leads them to present textbook concepts either unscientifically or as ‘half truths’. Any individual including science teachers needs substantial exposure to different kinds of reliable resources of knowledge to check their understanding continuously. Teachers, just like other common people, fall into the trap of daily obscurantism and accept the easiest explanations which are presented to them by immediate sources of information. Lesson plans designed using the attributes of science can be a useful way to inculcate scientific temper among children. This paper highlights the gap between how science is presently taught in schools and how it should actually be taught.

Keywords: school science education, scientific temper, inquiry based learning

Introduction

Article 51A of the Indian constitution mentions the 8th fundamental duty as “To develop scientific temper, humanism, spirit of inquiry and reform”. But even after 70 years of independence we see a lot of superstitious practices in our society. Believing fake news and blindly following unscientific information is the modern form of superstition. Hence, it is important to inculcate scientific temper in school children and science educators should take this responsibility. This study tries to understand scientific temper with connection respect to science education. The study looks into teachers’ beliefs and views about scientific temper, science teaching and a few other themes. The other aspects include how attributes of scientific temper can be inculcated among children. Teachers come from different socio-economic backgrounds and go through different kinds of training and hence they have different worldviews. A teacher’s identity takes shape on the basis of her belief, perceptions, experience, values, and judgments. As teachers have a moral influence on the students, their beliefs need to be examined (Bukor, 2011). The practice of teaching or nature and quality of pedagogical reconstruction of knowledge in the classroom is founded on the beliefs that a teacher holds.

Literature Review

On 19th July 1981, Nehru Centre, Bombay published a document named “A statement on Scientific Temper” and tried to push a nationwide debate about scientific temper and also tried to define it. The statement suggests that the method of science is at the core of scientific temper. Meroney in “The meaning and method of Science” (1925) describes the “Characteristics of scientific method”. He puts “Accuracy” as an objective of scientific method at the first place in the list followed by “Recording of observation, classification, working hypotheses, experimentation, observation, comparison, generalisation and prediction.” The position paper on Teaching of Science (National Curriculum Framework, 2005) talks about the method of science as “it involves several interconnected steps: observation, looking for regularities and patterns, making hypotheses, devising qualitative or mathematical models, deducing their consequences; verification or falsification of theories through observations and controlled experiments, and thus arriving at the principles, theories and laws governing the physical world. There is no strict

order in these various steps.” So if we talk about scientific temper in terms of education and specifically science education, we have to inculcate the habit of thinking in scientific manner in students during their education.

Methodology

This study was done with four science teachers in a residential school with 95 per cent tribal community students. Most of the data is qualitative in nature. This data was collected through interviews and implementing lesson plans in classes 6, 7 and 8. In the initial phase, teachers were interviewed separately through an open-ended question approach.

Table 1. Analysis of Teachers’ Responses

Theme/Question	Teachers’ Responses	Analysis
Theory of Evolution	3 teachers :- It should be taught in schools but in a different way. 1 teacher said it should remain as it is.	The teachers have doubts about the theory of evolution and their views lean towards creationist explanation.
Whether the Internet existed during the Mahabharata period	2 teachers :- It can be true. 1 teacher:- It is a religious matter, people should be allowed to believe whatever they want to. 1 teacher disagreed.	We can see that teachers are not aware about the history of science and technology.
Views about Astrology	3 teachers:- There is some connection between the life of an individual and planetary movement. 1 teacher:- Disagreed	Teachers have shaped their worldview according to the mass mentality. Science does not recognise any such connection.
Nature of Science	All the teachers indicated that they had basic understanding about the nature of science as a subject.	From above responses and this response we can see that there is inconsistency in teachers’ belief and practice.
Source of knowledge for teachers	All teachers take help from YouTube videos to understand concepts.	Authenticity of information on this platform is questionable.
Views about Scientific temper	3 teachers: Never heard about this term. 1 teacher was able to reach close to a few aspects of the method of science.	Teachers were unaware of the aims of science education.

Incorporating Attributes of Method of Science in Lesson Plans

Three lesson plans, one for each class 6, 7 and 8 were designed specially keeping the attributes (observation, classification, hypotheses, experimentation, comparison, generalisation and prediction) of the method of science in mind.

Table 2. Analysis of Students' Responses

Aspect/Activity	Student Participation/ Responses	Analysis
Observation	2 out of three lesson plans started from observations after a brief discussion of the topic. Tables were created for children to collect data from the observation field.	Observations and recording are the primary steps in the method of science. It gives children hands-on experience and does away with some of their alternate conceptions/ misconceptions.
Classification of data	The children were given some questions after data collection, such as, "What can you say after looking at the chart? What kind of questions would you want to ask the other groups from their charts?"	Children learned to present data in tabular form, interpret it and were generating the capacity to ask questions. Recording of data without biases and with concentration is very important.
Hypothesis	While discussing the food chain, the children said that "if one animal becomes extinct, it may lead to the extinction of other animals as well."	This statement itself is a hypothesis. When asked about the explanation behind their hypothesis, they were able to tell the possible process by which other animals could go extinct.
Asking Questions	Building the environment for asking questions and giving children space to speak what they think about different questions is very important.	Questioning children on their stand about something repeatedly, makes them think more to justify their stand, through which they understand where they lack in knowledge.

Discussion

The analysis can be discussed in two categories, first one regarding teachers and second related to the classroom teachings during the study.

Regarding Teachers

Teachers are also part of a context and the explanations and logics prevalent in their context affect the teacher's understanding as well. Hence, the scientific temperament of teachers also depends on what kind of context they come from. As seen in the analysis, teachers tend to accept whatever is the dominant narrative in the society, but science teachers should stand out from the general public. Teachers should be provided with concrete resources for their professional development. The analysis of teacher interviews suggests that teachers are aware about the basics of the nature of science and have satisfactory content knowledge. Still teachers need training about pedagogical approaches in science as the didactic method is dominating the classrooms. Teachers also need to be aware about the current discourses/discussions in science and how it can be connected to classroom teaching. Teachers need to engage students in identifying what is scientific/ unscientific and how one should respond when any information is received.

Lesson Plans Using Attributes of Method of Science

Scientific temper is an attitude to live life. If children are exposed to the methods of collecting information, organising, asking questions, challenging current beliefs and coming up with new testable predictions and continuously keep refining beliefs, then spark of scientific temper can be ignited at early stages. The process of coming across evidence which makes one question self is an opening to become a critical enquirer. These days we come across huge amounts

of information from innumerable sources and it becomes very difficult to identify authentic information as different sources report different facts (only which suits their opinion) on one particular event and try to influence us. Hence, the role of science education has to be in terms of making children capable to separate facts from opinions. Facts should be the basis of consuming information and not opinions. If one puts opinions in front and then analyses information then the explanation will obviously be biased.

Conclusions

It is evident that teachers need more training and they need to be made part of discussions held regarding scientific temper. Another important thing is to create platforms from where teachers can get relevant and fresh research results so that they can continue learning. Relying on social media platforms like YouTube is dangerous. Hence, building suitable platforms and making appropriate resources available for teachers to enhance their knowledge and help them grow professionally is required. Furthermore, scientific temper is one of the significant aims of education, and the seed of curiosity can be planted in children's minds at the initial stage of education. It can be done if the children are made to go through the process of doing science in bits and pieces. Science should not become mere rote learning of facts for children but it should be taught as a process of collecting knowledge.

Limitations and Future Studies

The study was done with very few teachers and in a very limited time. A large-scale study can give us detailed conclusions about teachers' perspective on these issues. The term 'scientific temper' has been mentioned in almost every important educational document but little effort has been made to define and implement it. It needs to be specified what characteristics a person should possess to be qualified as scientifically tempered. Future studies can look into the possibilities of inculcation of scientific temper through science curricula and clear definition of scientific temper for education.

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English for Medical Purposes and Its Status in India

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ABSTRACT

English is the language of science and technology; medical sciences are not an exception. This paper focuses on the status of English in medical education in India. New knowledge and research findings have to be shared for the well-being of patients in medical fields through research papers, conducting workshops and conferences. Medical professionals need to interact with people from other states making it mandatory for them to be proficient in English and it applies to students of traditional medicine as well. Unlike other countries, we don't have specific English courses for medical students in India, medical and dental students do not have an English course at all in their curriculum. The English for General Purposes (EGP) what they learn in their secondary school courses would not be useful for their professional growth. Hence needs analysis has to be conducted before deciding the curriculum for the students of medical sciences in India. English language skill requirements need to be incorporated in medical education in India, which should have medical discourses including presentation skills and writing skills, so that they can grow professionally as well. This paper throws light on the position of English in Indian medical education and its importance in medical field.

Keywords: medical sciences, status of english, english for medical purposes

English - The Global Language

No one can deny the fact that English has become a global language. English has become the primary means of international communication in various fields such as business, science, education and media (Alqurashi, 2016). As a result number of people studying English has also increased drastically (Karimnia, 2018). To be specific, English is serving as the main language of scientific community. Those with good communicative skills in English are able to update their knowledge in their chosen field of study since many professional texts are written in English (Pritchard et al., 2004). More than 52 per cent of the most visited websites display in English, therefore more than half the website content is available in English, as it provides more access to information (Ets global, 2020). We need to mention that the Supreme Court of India has declared that access to Internet is a fundamental right and even government cannot deprive it (India today, 2020).

English is the language of business as we can notice that many international companies like airbus, Nokia, Renault has made English as their corporate language, it is compulsory for their employees to use English (The English language centre, 2013). So English not just improves knowledge augments career growth, provides access to infotainment, it also saves lives. Surprising yes, in this situation of pandemic, vital information regarding research conducted on microbes, their nature, growth, control and drug interactions are of utmost importance.

Literature Review

Communication during therapeutic sessions is important for patient centred care in hospitals (Kasabah et al, 2017). Patient anxiety is decreased with proper communication skills (Lanning et al., 2008). Good communication of dentist encourages patients to express their emotional needs more during interview sessions (Aithilingam et al, 2021). Emotional Intelligence (EQ) is also important along with Intelligence Quotient (IQ) in medical field in this 21st century (Quieng et al., 2015). Communication skills of medical professionals are much needed for history taking, arriving at a diagnosis and treatment planning (Hashim et al., 2013).

Role of English in the Medical Field

For health care workers be it a physician, nurse, or some specialist, it is important to know what type of pain the patient is experiencing and the symptoms, based on which he/she can give diagnosis and plan treatment accordingly (Ruden, 2017). It is very crucial to have fluency in English in English speaking countries and in countries like India, which have people from multicultural and multilingual backgrounds. In such environments, English is a connecting language. Most of the conferences and publications regarding medical information are done in English. It is mandatory for a health care professional to be proficient in English vocabulary atleast in their field; therefore it becomes increasingly important for medical professionals to be proficient in the use of medical terminologies, basic communication with fellow health care workers, referring appropriately to specialists with notes.

There arises a question, whether lack of understanding can cause differences in treatments and the studies presented, explains that lack of English knowledge either in patient side or in health care worker side may cause poor understanding of the condition of the disease and may lead to inappropriate treatments in English speaking countries, that is misunderstanding due to language comprehension may lead to improper treatments. For instance, in a case of a 56-year-old Brazilian construction worker whose first language is not English, he was received in emergency department, he had many days of food intolerance, vomiting, gastric bleeding and related symptoms, the doctors were not able to find out the cause of the present ailment, but at last with an interpreter an undergraduate student was able to find out that the patient was taking one type of painkiller which he had not mentioned during the history taking session without understanding the importance of the drug, which was the reason for his present ailment. If left untreated it could have been perilous to life. At last the patient received proper treatment (Green et al., 2017). In this case the primary disease in the patient was kidney related, and the patient did not understand the importance of the normal painkiller he was taking which was causing him pain and he had to be rushed to emergency. Since there were differences in understanding (due to language), the patient did not give complete information which led to a situation of medical emergency.

English - Gateway to Cure

In a multilingual country like India, going to another state for medical treatment is not uncommon. Many patients are moving to other states or countries for better and/or more advanced health care for requirements. There is always a need for health care professionals who have dual language capability to ask, elicit, the symptoms, signs of the present ailment and clinical conditions, plan treatment options accordingly, to be able to explain it in simple language which the patient may understand. Since it is not possible to learn all the regional languages but English has become the connecting language of the country.

During the pandemic all the possible solutions and treatments for diseases are being researched. Even traditional medicines like Siddha, Ayurveda are being prioritised for containing and preventing microbial diseases. Herbs, fungi, biological substances are used for curing diseases in Traditional Chinese Medicine (TCM), which cannot be directly translated into English. Lack of right words and lack of exploration to find apt words for traditional medicines, show many obstacles. If these communicative obstacles are removed these medicinal cures could be useful to the whole world (Jurov, 2008). Having said that not only practitioners of western medicine even the practitioners of traditional medicine need to be proficient enough to communicate effectively with patients, that is oral communication and with written communication like publishing research papers, presenting in conferences and so on. Such situations describe a strong need for communication skills to be included in the curriculum of medical schools in India.

Status of English in Medical Education in India

Apart from nursing and other health care studies, medical and dental students in our country do not have English in their curriculum, to improve their English communication skills. Even the curriculum prescribed for nursing needs to be changed to suit the needs of the students and future challenges they are going to face. In India, in many nursing colleges English is studied as a theoretical subject and students tend to obtain marks just to pass the subject. Though the communication skill is poor, it is a necessity to interact with patients, relatives and document medical

cases (*The Times of India*, 2015, January 18). English for General purposes (EGP) is not suitable for health care professionals. Their job-oriented training and curriculum alone can alleviate this problem (Karimnia, 2018).

EMP - The Appropriate Solution

English for Medical purposes (EMP) is a field of ESP. Incorporating EMP courses in medical education can equip medical professionals with the much-needed communicative skills. As clearly stated by Litwack (1979), ESP curriculum is specific, so while developing the curriculum, we need to analyse the needs of learners', selection of appropriate material of study, relevant situations or discourses to be taken in consideration, context specific tasks or activities, testing them and re-designing them. All these steps must be followed (Teachers of English to Speakers of Other Languages, 1979). No extensive needs analysis has been conducted in India for EMP courses, as well the study material designed specifically for EMP is very scarce. These gaps need to be filled to bring about professional development. EMP curriculum should have its own medical discourse, since health care practitioners have a distinct set of documents such as charts, case sheets to fill by questioning patients or relatives and vice versa, they have to get information from already filled documents. This medical discourse should also include presentation skills and writing skills to prepare them for conferences and writing for medical journals. These discourses can be explained as a set of socialisation practices, each institution and profession will have a different discourse system. The EMP learners are the would-be participants of the discourse community. In order to participate they need to be proficient enough in language skills. Genre-based approaches also could be incorporated in EMP. Medical students and other health care students must be given these EMP courses in their curriculum in India.

Conclusion

Medical students are not given any specific training in English language in their under-graduation in India as English is not in their curriculum at all. Till their secondary school education they learn English for general purposes (EGP), which is not going to help them in their professional career and practice. Since English is in an unassailable position in countries like India, the need to incorporate EMP in the curriculum cannot be overlooked. Research in the field is very scarce, needs analysis, discourse analysis and course designing needs to be worked upon for EMP, which is the need of the hour. These steps can train better health care professionals to benefit the growing technology needs in a challenging modern world.

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Transforming Teacher Education Institutions as Learning Organisations: A Strategic Approach to Innovative Teaching-Learning Practices

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ABSTRACT

A learning organisation is an organisation that encourages and facilitates the learning of all its members to continuously transform itself and to achieve excellence. Transforming teacher education institutions (TEIs) as learning organisations will be a strategic approach to innovative-teaching learning practices and it will cater to the educational needs of 21st-century institutions. The present study was intended to find out different perspectives of pre-service teachers and teacher educators towards transforming teacher education institutions as learning organisations. The study had explored the possibilities of innovative teaching-learning practices in the purview of a learning organisation. The study had also examined the factors which influenced TEIs for becoming learning organisations. The present study was descriptive survey research and a mixed-method procedure was followed for data collection and analysis. The study was confined to pre-service teachers and teacher educators of RIE (Regional Institute of Education), Bhubaneswar. There were 53 pre-service teachers and 09 teacher educators of RIE, Bhubaneswar who were the participants of the study. A questionnaire was used as a tool for the collection of data from the participants. The major findings of this study showed that most of the participants agreed that transforming teacher education institutions as learning organisations will lead to innovative teaching-learning practices and we can use it as a strategic point of view. The majority of the participants revealed that if we will effectively work on transforming TEIs as learning organisations then we have to shift the current teaching-learning practices and a lot of opportunities will be automatically created through the transformation. The study also found some of the factors which influenced TEIs to become learning organisations such as current needs in teaching-learning practices (due to COVID-19), recent advancement in pedagogical practices, changing characteristics of learners, suggestions of NEP 2020, etc., based on findings.

Keywords: learning organisations, TEIs, innovative practices, learning and teaching

Introduction

A learning organisation is an organisation that supports the learning of all the members of that organisation and work on continuously transform itself (Pedlar et al., 1991). It is a collective effort of people working together to enhance the learning experiences of everyone and their capabilities to create results they truly care about (Yadav & Agarwal, 2016). The notion of a learning organisation is significant for both institutional development as well as human resources development. “Learning organisation is all about collectivism and shared values or principles about learning” (Watkins & Marsick, 1993, Jones, 1995). The idea of a learning organisation is more common in the business world but the concept can be of immense use in the field of teacher education. To be an innovative teacher education institution, starts from being a learning organisation. It means instantaneous transformation at all levels of human resources (individual, team, and institutional) development. If an institution cannot transform itself, in the long run, it will be impossible for the survival of that institution in a competitive world (Yosyingyong, 2009; Decharin, 2004). Learning is the key to success for any institution and transforming TEIs as learning organisations will be a strategic approach to innovative teaching-learning practices. In the wider context of ‘learning organisation’, the learning process is closely linked to knowledge sharing vision. Considering information sharing a strategic approach to teaching-learning, there is a need for an increasing development at the personal, collective and intellectual capital of members in TEIs. The learning organisation atmosphere in TEIs will help to achieve more learning outcomes and will open up a new dimension for innovative teaching-learning practices.

Rationale of the Study

The concept of learning organisation seems more feasible for business organisations than for educational institutes. This is evident the dearth of literature present to establish the significance of learning organisations to teacher education institutions. The most significant work of Ortenblad (2013) where he cited several studies to examine the relationship between higher education institutions and the learning organisation and found it to be positive. Evans (1998) has defined a learning organisation as an organisation that itself learns from the learning of its workforce. Culture of learning organisation will add more to the learning climate and will be a strategic approach to innovative teaching-learning practices and do wonders to the teaching-learning process and also help to achieve more learning outcomes. Senge (1990) had identified five dimensions of a learning organisation, namely “personal mastery, mental models, building shared vision, team learning and system thinking” to transform an institution into a learning organisation. Similarly, Ortenblad and Koris (2014) developed a typology of a learning organisation and identified its four aspects as: “Learning at work, Organizational learning, Climate for learning and Learning Structure”. He discussed the significance of the learning organisation concept to higher education institutions. The basic justification for learning organisations is that in conditions of quick change, only those institutions that are flexible, adaptive, creative and productive will sustain. For this to happen, it is reasoned, TEIs need to discern how to tap people’s commitment and capability to learn at all levels and transform themselves as learning organisations. Thus the purpose of this paper was to explore the innovative teaching-learning practices at TEIs in the purview of a learning organisation.

Objectives of the Study

1. To study the perspectives of pre-service teachers and teacher educators towards transforming teacher education institutions as learning organisations
2. To explore the possibilities of innovative teaching-learning practices in the purview of a learning organisation
3. To examine the factors which influenced TEIs for becoming learning organisations.

Research Questions

1. What are the perspectives of pre-service teachers and teacher educators towards transforming teacher education institutions as learning organisations?
2. What are the educational processes of TEIs for becoming learning organisations?
3. What are the possibilities in innovative teaching-learning practices in the purview of a learning organisation?
4. What are the factors which influence TEIs for becoming learning organisations?

Methodology

The study was a descriptive survey research and a mixed-method procedure was followed for data collection and analysis. The present study was confined to pre-service teachers and teacher educators of RIE, Bhubaneswar. There were 53 pre-service teachers and 09 teacher educators of RIE, Bhubaneswar who participated in the study. A self-developed questionnaire and rating scale (5-point Likert scale) as a tool were used for the collection of data from the participants. In the questionnaire, there were both open-ended and closed-ended questions were included.

Results

Pre-service teacher’s perspectives towards transforming TEIs as learning organisations

The study found that pre-service teachers were aware of the importance of transforming TEIs as learning organisations. They believed that when institutions will become learning organisations then the culture of the institutions will be supportive of learning and through this process, we can enhance the learning experiences of every individual.

Perspectives on Learning and Information Sharing

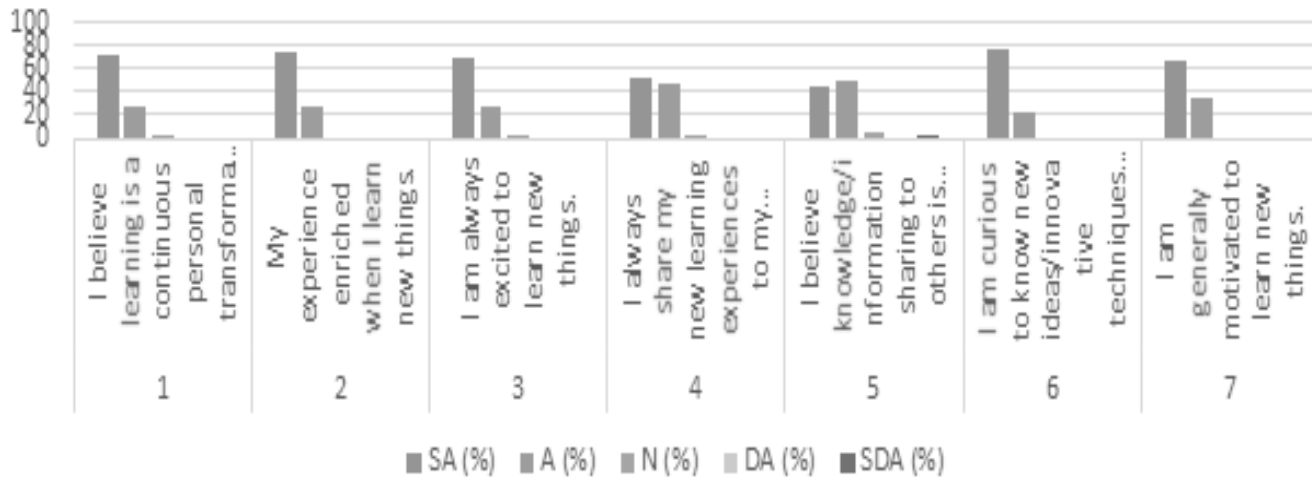


Figure 1. Pre-service teacher’s perspectives on learning and information sharing

Figure 1 deals with the pre-service teacher’s perspectives on learning and information sharing. The study found that most of the participants (71.7 per cent SA & 26.4 per cent A) were agreed that learning is a continuous personal transformation. They believed (73.6 per cent SA & 26.4 per cent A) that their experience is enriched when they learn new things. Most of the participants (69.8 per cent SA & 28.3 per cent A) were agreed that they are always ready to learn new things. Participants (50.9 per cent SA & 47.2 per cent A) also revealed that they always share their new learning experiences with their colleagues. Participants (43.4 per cent SA & 49.1 per cent A) believed that knowledge/information sharing with others is their ethical responsibility. Most of the participants (77.4 per cent SA & 22.6 per cent A) said that they are curious to know about new ideas/innovative techniques for their teaching profession. Most of the participants (66 per cent SA & 34 per cent A) believed that they are generally motivated to learn new things.

Opinion on Learning Culture in their Institute

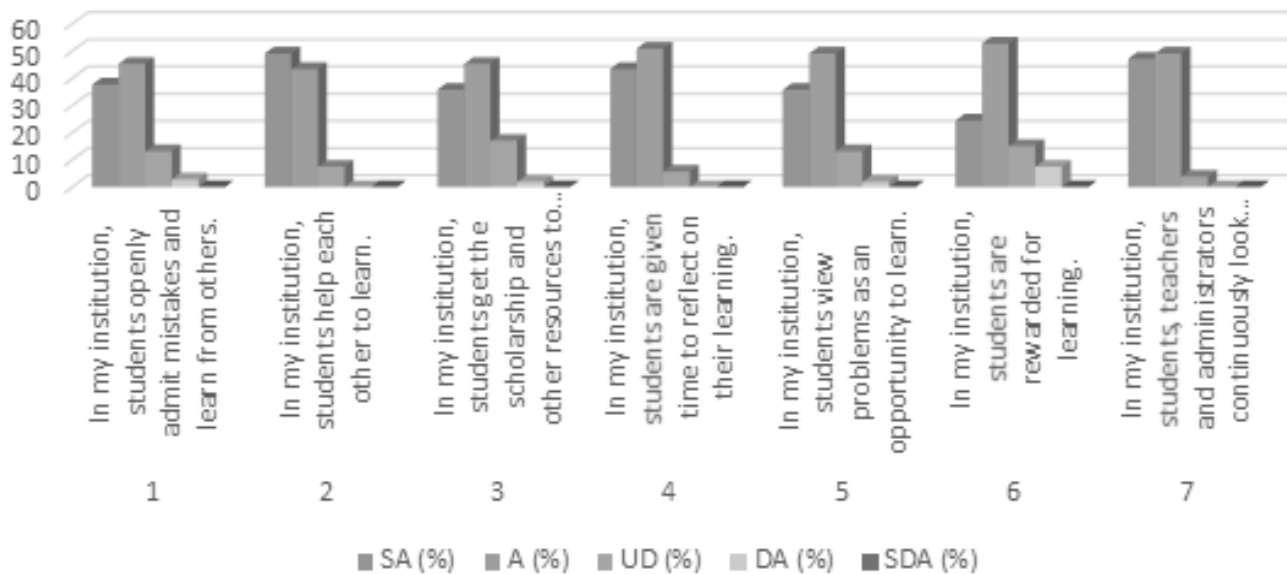


Figure 2. Pre-service teachers opinion on learning culture in their institute

Figure 2 deals with the pre-service teacher's opinion on learning culture in their institute. The study found that most of the pre-service teachers (37.7 per cent SA & 45.3 per cent A) revealed that in their institution, students openly admit mistakes and learn from others. Most of the participants (49.1 per cent SA & 43.4 per cent A) said that in their institution, students help each other to learn. Participants (35.8 per cent SA & 45.3 per cent A) were also agreed that in their institution, students get the scholarship and other resources to support their learning. Most of the participants (43.4 per cent SA & 50.9 per cent A) said that in their institution, students are given time to reflect on their learning. Participants (35.8 per cent SA & 49.1 per cent A) said that in their institution, students view problems as an opportunity to learn. Participants (24.5 per cent SA & 52.8 per cent A) were agreed that in their institution, students are rewarded for learning. Most of the participants (47.2 per cent SA & 49.1 per cent A) said that in their institution, students, teachers and administrators continuously look for opportunities to learn.

Figure 3 deals with the pre-service teachers' perspectives on innovative practices in the purview of a learning organisation. The study found that most of the participants (47.2 per cent SA & 47.2 per cent A) were agreed that in their institute students and teachers share their learning experience with others. Participants (58.5 per cent SA & 37.7 per cent A) revealed that in their institution, students are encouraged to ask questions and pose problems. Most of the participants (56.6 per cent SA & 35.8 per cent A) were in the favour of the statement that their institution organises regular learning experiences through different seminars/conferences/workshops/open discussion forums for their students/staff. Participants (30.2 per cent SA & 54.7 per cent A) also revealed that in their institution, students always give open and honest feedback to each other. Most of the participants (34 per cent SA & 52.8 per cent A) were agreed that their institution works together with the local community to meet mutual needs. Almost all the participants (39.6 per cent SA & 58.5 per cent A) were agreed that their institute has a culture of mutual trust and commitment to work.

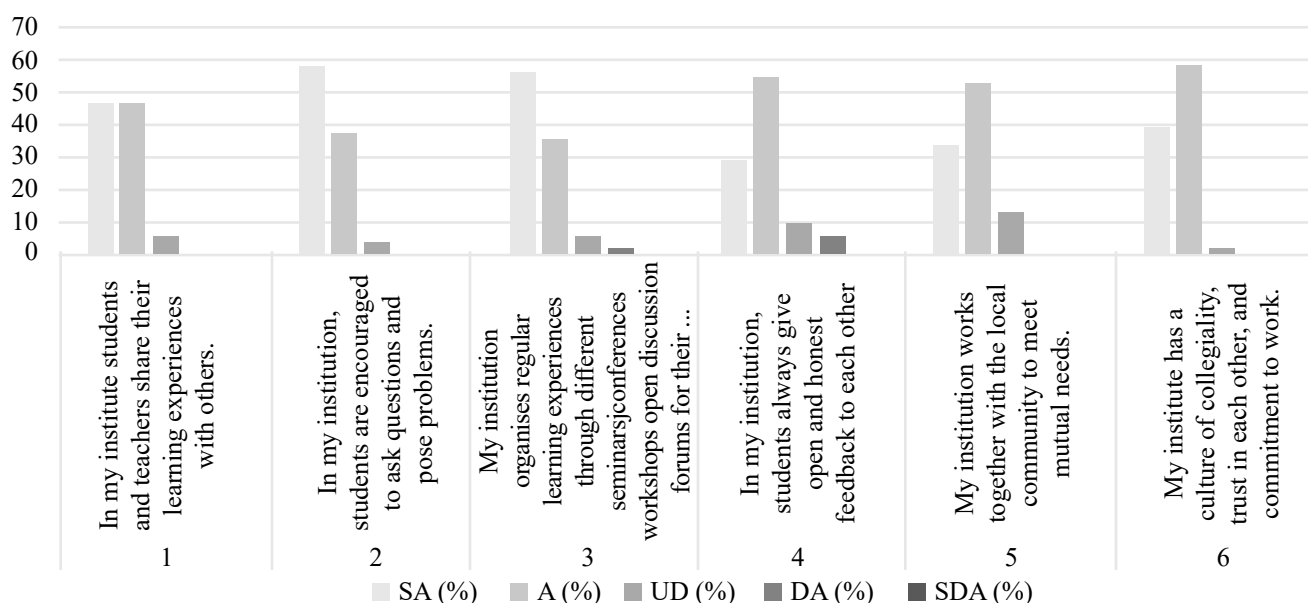


Figure 3. Pre-service teachers perspectives on innovative practices in the purview of learning organisation

Teacher Educators perspectives towards transforming TEIs as learning organisations

From the study, it has been found that teacher educators were sensitive towards transforming teacher education institutions as learning organisations. They believed that after becoming learning organisations we can optimise learning experiences for every member of the institutions. As per the opinion of teacher educators, a learning organisation is a system of collaboration among different groups of people like students, teachers, administrators and community members. It provides learning opportunities to the members of the organisation by giving them exposure to various learning situations/resources and bringing professional development into actual practice. Teacher educators also shared their initiatives on transforming TEIs as learning organisations, such as working on the different dimensions of learning organisations like personal mastery, team learning, information sharing as well

as providing freedom to the learners on learning tasks, utilising different approaches/strategies on teaching-learning practices, using various learning resources etc. while dealing with learners and transferring the spirit behind learning organisation to students and other staffs.

Existing innovative teaching learning practices in the institute

The study had found some of the existing innovative teaching-learning practices in the institute from the opinion of participants. Participants shared that in their institute, the major focus of teaching-learning practices is on providing diverse learning experiences to the learners. Pre-service teachers shared their opinion on innovative teaching-learning practices in their institute, such as teaching is fully learner-centric and students have the freedom to ask questions and reflect upon teaching-learning practices. Teachers of the institute are sensitive towards providing adequate learning experiences to the learners, and are using various techniques and learning resources to deal with learners in the classroom. Teachers and students are also working towards creating a conducive environment for teaching-learning practices in their institute.

Possibilities on innovative teaching-learning practices in the purview of a learning organisation

The present study had also found some of the opinions from the participants on the possibilities of innovative teaching-learning practices in the purview of a learning organisation. The participants suggested if we will create learning without a burden, assessment without a burden in educational setup then we can achieve the practices enshrined by learning organisation theory. Participants believed that through the collective effort of different stakeholders, we can transform our teacher education institutions as learning organisations. We need to use variation in teaching-learning practices, to make educational processes fully learner-centric. educational processes not. We have to create a culture in our institution, where everybody is committed to sharing learning experiences with other members of the institution. Teachers have to treat their learners as co-partners in teaching-learning practices, they need to encourage learners to come up with unique learning experiences and share in the class with other members. The teacher can better engage learners in different activities and provide opportunities for further exploration in different subject areas.

Major Findings

The study found that participants were aware of the importance of transforming TEIs as learning organisations. They believed that after becoming learning organisations, they can optimise learning experiences for every member of the institution. Participants also shared their initiatives on transforming TEIs as learning organisations, such as working on the different dimensions of learning organisations like personal mastery, team learning, information sharing etc. Participants shared that in their institution, the major focus of teaching-learning practices is on providing diverse learning experiences to the learners. Teachers of the institute are sensitive towards providing adequate learning experiences to the learners, and are using various techniques and learning resources to deal with learners in the classroom. Participants believed that through the collective effort of different stakeholders, we can transform our teacher education institutions as learning organisations. The present study found different factors at the personal as well as the institutional level, which influence TEIs for becoming learning organisations. Some of these factors are: continuous professional development, self-empowerment of staff and students, autonomy of the students and teachers, student and teachers awareness on learning, real-world need and demand, learning opportunities and participation, skills attitudes and motivations, institutional academic culture, creativity and innovation, the cordial relationship among students and staffs, involvement of the community in learning, teacher-taught relationship, 21st century learning skills, innovation in teaching-learning practices, democratic/facilitative leadership, common vision and mission, people's relationships for learning etc.

Discussion

The study was intended to explore different perspectives of pre-service teachers and teacher educators towards transforming teacher education institutions as learning organisations. This study found that pre-service teachers and

teacher educators were aware of the impact of transforming teacher education institutions as learning organisations. They had shared their opinion on learning and information sharing, and on those opinions, the study found that participants were sensitive towards the learning process and transferring those learning experiences to other members of the institutions. The study found some existing innovative practices in the opinion of the participants such as learner-centric teaching-learning practices, utilisation of different learning resources by the teachers as well as various approaches and strategies adopted by teachers to deal with learners in the classroom. This study also explored possibilities for innovative practices in the purview of learning organisation such as flexibility in the instructional process, encouragement of staff and students for their personal mastery, information sharing, team learning, systems thinking etc. This study found that through the collective consensus of every member of the institutions, we can transform TEIs as learning organisations. The study also found some of the factors which influenced TEIs for becoming learning organisations, such as facilitative leadership, empowerment of staff and students, creativity and motivation, 21st century learning skills, innovation in teaching-learning practices etc. The present study concluded in a note that transforming teacher education institutions as learning organisations will be a strategic approach to innovative teaching-learning practices.

Conclusion

The findings of the study have several educational implications on transforming academic institutions into learning organisations. The transformations to learning organisations can make the TEIs flexible, adaptive and productive to perform exceptionally in this competitive world. Transforming as learning organisations will certainly be a strategic approach to innovative teaching-learning practices for TEIs. The present study will provide a base for transforming teacher education institutions into learning organisations. The study will help and guide the policy planners to make relevant policies for the development of the educational system in the entire country and to transform the universities/institutes into learning organisations. From the present study, the pre-service teachers, teacher educators and other stakeholders related to teacher education institutions will realise the importance of transforming teacher education institutions into learning organisations and impart a strategic approach to innovative teaching-learning practices. The present study has also provided information and ideas regarding why there is a need to transform an institution or organisation into a learning organisation. This study has significant value in terms of its impact on the field of teacher education research and in transforming academic institutions into learning organisations.

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Preparing for Digital Education: A Review of the Educational Policy Response to COVID-19

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ABSTRACT

The COVID-19 Pandemic has disrupted the educational system across the world, as millions of students and educators have dislocated from their university spaces to their homes. Lockdown and social distancing measures have highlighted the issues in the education system in India. To address the educational disruption caused by the pandemic, different policies and plans were prepared by the University Grants Commission, Ministry of Education, Government of India. In the process, the state and educational administrators have turned their attention towards technology-mediated teaching and remote access classroom setup. In the backdrop of this context, the present research critically examines the educational plans and policies that were developed to provide quality education to all during the crisis. In particular, it applies document analysis as a research method, to investigate the drivers and barriers in the implementation of these policies. The research review reveals in response to the pandemic and technological advancements, the sector anticipates massive scalability of blended learning. Yet, there are some barriers, such as access to digital infrastructure, online learning competencies and pedagogies that would lead to socio-economic disparities in educational outcomes. Therefore, it is important for the students, educators, and practitioners to understand the essence of these plans and policies and address the crisis of unprecedented disruption. It is also deemed helpful for the educational stakeholders to build up a long-term resilient education system for quality education, as emphasised by SDG4 in the post-covid world.

Keywords: COVID-19, educational policies, blended learning, quality education

Introduction

The COVID-19 pandemic is expected to have huge economic consequences worldwide, and it is having a prolific impact on the education system as well. According to UNESCO, more than 1.6 billion students around the world have been impacted, which is approximately 91 per cent of the total number of enrolled students. On March 13, 2020, colleges in India began closing because of the COVID-19 outbreak. As a response to the crisis, the Ministry of Human Resource Development, Government of India, issued a brief notice on 20th March 2021 to promote digital learning in order to ensure fair continuity of learning at all levels in the education paradigm. Since teaching and learning was transferred to online from face-to-face, challenges like digital infrastructure, administrative support, internet penetration, learning resources, and tools and online licenses are being faced by educators and learners. COVID-19 has exposed logistical and pedagogical challenges of students' access to digital infrastructure and thus has exasperated the disparities and inequities in the system. To respond to the current disruption in education, several attempts have been made to ensure that the learners continue to learn by providing active online delivery of lectures, e-assessment, online collaboration, and e-evaluation. Over time, the University Grants Commission and the Ministry of Education have implemented various plans and policies. However, it is as yet unknown whether these policies were successful as guiding practices during the pandemic. There hasn't been a critical review of the plans and policies developed to respond to India's educational disarray during the pandemic in a long time. With this context in mind, this research critically examines the educational plans and policies that were developed to provide quality education to all during the crisis.

Literature Review

COVID-19 is recognised as a watershed, disruptive moment distinguished by unprecedented situations worldwide (Purcell, W. M., & Lumbreras, J., 2021). It has forced education system into the grand experiment in emergency

transition from traditional in-person education to online education is changing the existing educational practices (Lall, S. and Singh, N., 2020). In the process, the educational administrators have turned their eyes towards technology mediated teaching and learning. Technology-enabled learning (TEL) provides students with opportunities to interact with peers and teachers beyond the bricks-and-mortar structure, thereby, improving the teaching-learning pedagogical practices and learning outcomes (Kirkwood, et al., 2016). Blended Learning, a variant of technology-enabled learning is defined as a “fusion of face-to-face and technology-mediated learning” (Garrison & Vaughan, 2008). Policies do not succeed or fail on their own; rather, how they are implemented determines their success or failure. According to Neupane (2020), mapping available resources for education spending is critical in order to identify both resource and demand/supply gaps. As a result, attempting to turn the COVID-19 challenge into an opportunity for online education runs the risk of further lagging many children, particularly those from low-income families (UNESCO 2020).

Methodology

This is a policy review that looks at the goals and practicality of the GoI’s plans and policies during the COVID-19 pandemic. First, the authors used the document analysis method to go over all important policy documents produced during the pandemic. These documents were obtained from the web sites of University Grants Commission and Ministry of Education, Government of India. The purpose of this study is to produce empirical knowledge based on these documents which can help the educational stakeholders to build up a long term resilient system for quality education, as emphasised by SDG4 in post-covid world. The authors highlighted the texts with specific preliminary questions in mind; the method the researchers used during exploration is more similar to O’ Leary’s “interview technique” (2017). Later, the authors reread the documents and notices and organised them into categories such as drivers, gaps, and barriers. In order for the document analysis results to be credible and valid, the researchers attempted to be as objective as possible while analysing these documents.

The study was guided by the following research questions:

1. What were/are the driving forces behind India’s educational policies in COVID-19?
2. What are the gaps and barriers that those educational policies contain?
3. What components of educational policies must be addressed in order to build a long-term resilient education system in a developing country like India during any crisis contexts?

Analysis

COVID-19: Stay Safe Digital Learning Initiatives of Ministry of Human Resource Development (MHRD), 2020

This document provides major list of online learning platforms to promote online learning. Online education is regarded as the best opportunity to mitigate the effects of the COVID-19 crisis on the education industry. Indeed, it has been elevated to the position of TINA—there is no alternative to it. Many states and educational institutions have already embraced this mode of teaching and learning. The educational administrations, acting as “benevolent patriarchs,” have made this critical decision without consulting major stakeholders in the educational system, such as teachers, students, and parents. Despite the fact that these were action plans, it appears that the implementation steps on how to carry out the tasks listed were unclear. Questions about whether professors are willing, have the appropriate abilities, and are comfortable delivering lessons online are dismissed as irrelevant. Most crucially, the choice to launch massive pen online courses overlooks a critical factor: students’ access to digital infrastructure, which includes a combination of a computer, tablet, or smartphone, as well as internet connectivity. As a result, before putting these activities into practice, various variables related to access to the internet, technological assistance, student’s social, economic, cultural backgrounds, their respective age, and level of acceptance via such mode of learning must be taken into consideration.

Let COVID-19 not stop you from Learning- ICT Initiatives of MHRD and UGC, 2020

This document provides the list of all the online learning platforms that students can use to continue their education amid the crisis. The pandemic has shifted the centuries-old chalk–talk teaching approach to a technology-driven

one. Over the last few years, the Ministry has created a plethora of online resources that are accessible via a variety of platforms. The Ministry of Human Resources Development and its affiliated institutions are promoting online education through television and radio. While students and teachers can access these resources via laptops, desktop computers, and mobile phones and are available to learners in rural areas. However, due to the large access gap and inequities in digital infrastructure, socioeconomically disadvantaged students would be excluded from learning possibilities. Most importantly, such exclusion may worsen the massive and systemic socio-economic inequities in educational opportunities and learning outcomes.

The National Education Policy, 2020

The National Education Policy (NEP), which was released on July 29, 2020, is the third education policy since independence by the government of India. The NEP has given a boost to the process of technology adoption with all the power and zeal necessary to overcome the current disruptive situation. NEP places a special emphasis on Academic Bank of Credit (ABC) and National Digital Library (NDL) as we move towards a new normal of online learning. This policy aims to build National Educational Technology forum (NETF) that will promote different technologies for online learning and standardise the pedagogy and the overall content. This policy has also recommended the extension of SWAYAM and DIKSHA platforms accessible to socio-economically disadvantaged students. Further, development of augmented reality, virtual reality, game-based learning are some of the tangible initiatives. It also further lays emphasis on television and community radio in regional languages that will cater to the needs of those students who do not have access to smartphones or internet. However, it does not address the gender gap in digital literacy, problems faced by the specially-abled students and mental health consequences arising out of online classes. Going forward, it is important to address the issues related to online learning in India and create a system that supports equity and expansion.

Blended Learning, 2021

Following the COVID pandemic, the University Grants Commission (UGC) recommended blended learning in its concept note on ‘Blended Mode of Teaching and Learning,’ under which up to 40 per cent of a course will be taught online and the remaining 60 per cent through traditional, offline methods in all higher education institutions (University Grants Commission, Ministry of Education, government of India, 2021). Some of the digital educational resources available for the educators and students are SWAYAM MOOCs, Consortium for Educational Communication’s undergraduate e-courses, NPTEL courses and INFLIBNET’s e-PGPathshala. Adopting technology-enabled blended learning in higher education could help the institutes to focus on continuous evaluation and usage of alternative methods of assessment. However, this understanding of assessment and learning is complicated. Recently, lack of Internet, lack of bandwidth, training of teachers has been a matter of debate. In developing countries like India, with specified challenges to meet the need to current circumstances the “one-size-fits-all” method may not be successful to adopt. Also, the conception and implementation of any new/alternative idea, such as blended learning, necessitates a great deal more thought and effort, as well as knowledge of the student group being served, their strengths and limitations, their backgrounds, and the teachers’ competence/domain expertise.

Discussions

The advent of technology-enabled learning, combined with rapid improvements in Internet connectivity, has begun to usher huge changes in higher education. The pandemic’s disruption of academic activities has accelerated this embrace of technology. Based on the study of the above educational policies, it is imperative that these must be discursive and bidirectional, allowing sufficient input from local educational stakeholders. There should be measures in place to advance current learners (who have little or no access to digital resources) from one level to the next. There should also be a plan in place to assist teachers to work on any digital platforms and further capitalise on new education priorities. Lastly, harnessing lucrative ways to offer greater flexibility and resilience in teaching and learning in post-Covid India is essential.

Conclusion

The execution of these plans and policies is indeed praiseworthy as a response to this crisis situation. The policy documents reviewed by the authors are novel and reflect ground-breaking intentions. In reaction to the pandemic and technology improvements, the research review suggests that the sector anticipates massive scalability of blended learning. However, some obstacles, such as lack of access to digital infrastructure, online learning competencies, and pedagogies, might result in socioeconomic gaps in educational outcomes. It is important for all the stakeholders to understand the essence of these plans and policies and address the crisis of unprecedented disruption. Based on the critical observations of policies, the authors recommend some steps that policymakers might take when developing a policy connected to this sector in relation to any crisis situation. In the meantime, it is also deemed helpful for the educational stakeholders to work on a resilient system for quality education, as emphasised by SDG4 in post-Covid world.

Limitation and Future Studies

This article is solely a document analysis, and it excludes stakeholders' perspectives and experiences with the implementation. As a result, a deeper dive into the interactions of these policies with the stakeholders might provide equally fascinating information.

Acknowledgment

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Pandemic-Driven Educational Research

Teaching, Technology and Pandemic: Experiences of a Teacher

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ABSTRACT

The teaching-learning process has undergone substantial changes since the onset of the pandemic due to a shift in the established mode of knowledge-sharing in educational institutions. In this paper, we present an overview of the changes that have happened in the knowledge dissemination process, with a focus on India, with respect to engineering education. We present results from a targeted survey of the students from different engineering disciplines and their experience of online education. The findings highlight the student's point of view about the online education system. Further, we discuss the impact of using technology which is the backbone of this shift in the learning model. Furthermore, the paper discusses the digital divide, another consequence of the new development of next-generation telecommunication technologies, which is an important consideration in fulfilling this shift in education.

Keywords: online learning, technology, pandemic, teacher education, student learning

Introduction

The changes in the mode of education have led to improvements in the established norms of knowledge-sharing. However, there have been some drastic changes since the COVID-19 pandemic. The education pattern, has been shifted completely to the online mode due to the highly contagious nature of the virus. In the developing countries, these changes have been so sudden that the complete educational ecosystem has been hit at various levels, although, there have also been various advantages. As a teacher, there have been new challenges like the need for technological upgradation and the lack of feedback as available in the classroom mode of teaching which often comes by just the interaction. The experiences of the online mode of education have been a mixed bag with many positives and negatives, at the same time, the educators working hard to resolve teething issues. In the process, it has become clear that in the future, the online mode would be a healthy addition which will add value, but, at the same time it cannot be the only option of imparting education by replacing the traditional classroom teaching. The technological infrastructure also plays an important role in the online mode, where the developing countries are still catching up in terms of the basic telecommunication infrastructure, resulting in difficulties in adopting online mode and providing the educational resources freely and equitably to all. In this work, we present the various challenges the pandemic has brought in terms of learning, specifically, in professional courses like engineering. We present results of the survey which has been conducted on the targeted student population who have been experiencing the online mode of delivery of lectures in the professional courses. We also present the idea of digital divide and the role of telecommunication technology in the online mode of education.

Digital Divide and Online Teaching

The recurring theme of next-generation technologies, the fifth generation (5G) and beyond, is “connecting the unconnected”. The major part of the population in developing countries is not connected digitally due to various reasons like the lack of telecom and power-grid infrastructure. The tele-density metric gives the telecommunication density of a region. The telecom regulatory authority of India (TRAI), as per the report in January, 2020, described the tele-density figure of India to be 87.45 which declined from 88.56 from end of December 2019, with a total of nine states having tele-density lower than the national average. The national capital territory of Delhi had the maximum tele-density of 280.11 and the state of Bihar had the minimum tele-density of 53.07 at the end of January 2020. These values assume significance as we move to a fully online teaching scenario due to the pandemic

and with these figures one can argue that the students had lesser opportunities and availability of the required infrastructure, which can be described as a bare minimum of a mobile device with Internet connectivity, based on their geographical location. To overcome the digital divide, various steps have been taken but the shift towards online mode of teaching has led to boosting of the network infrastructure and adoption of the new technologies with a greater push. One of the themes of 5G and beyond technologies is to provide high data rate to the end users and bridge the digital divide. Adoption of these technologies will aid online teaching. Various platforms are available for online teaching-Google meet, Microsoft Teams, Cisco WebEx, to name a few. There is a lot of innovation and upgradation in their features and accessibility due to their usage in the online education mode.

Advantages of Online Education Mode

The online education system has provided the much-needed flexibility in the education system. Some advantages, according to the author, have been described below:

- The online education system is here to stay and has resulted in development of various massive open online courses (MOOC) courses worldwide. In India, the Swayam portal aims to bridge the digital divide and the national programme on technology enhanced learning (NPTEL) portal for engineering education is helping students and teachers immensely.
- The female enrollment ratio is lowest in the technical institutes including the institutes of national eminence. According to an all India survey on higher education, conducted by the ministry of education, the government of India, 44.5 per cent of the total learners in the online distance learning mode of education are females. With online education, this number is bound to improve as gives online space the females greater access to learning.
- Online mode has led to opening of more learning avenues from the institutes of eminences to a greater population of learning enthusiasts. For instance, for an online undergraduate degree course, Bachelor of Sciences, launched by the Indian Institute of technology (IIT) Madras in 2020, a total of 30,276 applications were received, of which around 20 per cent were working professionals. The data further suggests that of the 8,154 students who graduated, 946 were above the age of 30 years and 3,685 were above the age of 21 years. Thus, it is giving more options to the learners without any age bias.
- The publication of the accepted paper in the conference proceedings required the physical presence of one of the authors with virtual presentations not being allowed. This used to put a strain on the research students in developing countries, in terms of securing the funding to register for the conference and for the international travel. With the online mode, the conference registration charges have dropped drastically and the virtual mode of presentations are being allowed, this has led to better networking, less stress to arrange funding, and has led to equitable access to all the researchers.

Challenges of Online Education Mode

There are a host of challenges of the online education mode which we need to resolve. Some of them based on the author's views are as described below.

- The conduct of the laboratory courses, where the students are expected to experiment on the hardware and learn, specific to the engineering courses, is a challenge. Although, there have been alternate solutions like the conduction of experiments virtually or doing simulation based studies, but these solutions are not always optimum.
- A matter of concern is the tele-density figures, also the availability of the high speed mobile Internet connections with some remote areas not having access to good Internet connectivity, the availability and the reach of broadband services, and even the availability of smartphones.
- The penetration and availability of uninterrupted electric supply, which forms the basic backbone of any online education initiative, in rural and remote areas of the country
- Issues like plagiarism and cheating have been reported in very high numbers in the online mode of education giving unfair advantages to some of the students and forcing some of the students to indulge in academic

dishonesty causing stress.

- Security and privacy issues have been a major concern in the online education system. For instance, there is no dedicated space available in a household for online teaching, which is a hindrance.
- Although MOOC courses have been developed and lead to increasing number of enrollments, there have been some concerns. According to the study, the vast majority of the MOOC learners do not return after the first year, the affluent countries in the world have the growth concentration of the participation in the MOOC courses, and during the six years of study conducted the completion rates of the courses have been low and have not improved.

Survey Results

We conducted a survey across the engineering students, with a sample size of 105, varying across different institutes of eminence in India, and multiple disciplines, further, the responses were anonymous with no data collected. The findings of the survey are presented in this section.

- Fig. 1 presents the response to, “do you consider online teaching as a substitute to regular classroom teaching”. It can be seen that the majority of the students consider it to be an additional resource and not as a substitute. This also contradicts the widespread narrative which has been presented in various forums that the online teaching is the future solution which will completely replace the classroom teaching.

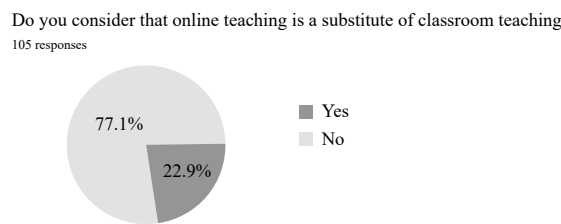


Figure 1. Online teaching as a substitute to regular classroom teaching

- Fig. 2 (a) presents the response to, “your participation in the class discussion as compared to the classroom mode was easier”, and Fig. 2 (b) to “what was your attendance in the online lectures as compared to the regular classroom lectures”. The responses contradict the blanket claims made that it is easy for student participation in the online mode, further, majority of the students claimed to have less attendance in the online teaching mode of education.

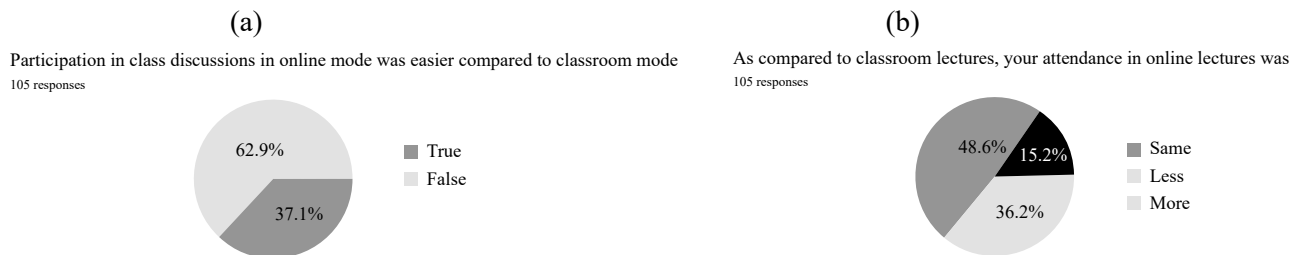


Figure 2. (a) Participation in the class discussion as compared to the classroom mode was easier, (b) Your attendance in online lectures as compared to regular classroom lectures

- Fig. 3 presents the response to, “availability of the recorded lecture sessions even without attending the regular live sessions”. The responses indicate that this contributed as one of the reasons for low attendance. Also, the majority of the respondents noted that this was beneficial for revising the concepts during the exam time.

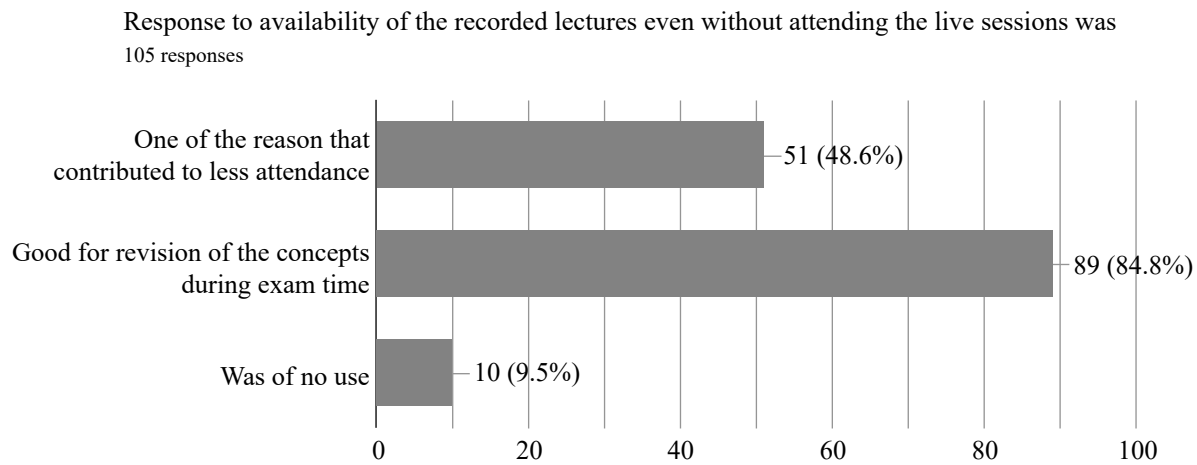


Figure 3. Availability of the recorded lectures even without attending the regular sessions

- Fig. 4 (a) presents the response to, “whether the online teaching added additional burden to the family of the student” and if yes, in what sense, is presented by Fig. 4 (b). A significant number of respondents, i.e., 30.5 per cent said yes and the major reason of that burden was buying of new electronic equipment, and the reasons varied amongst different households.

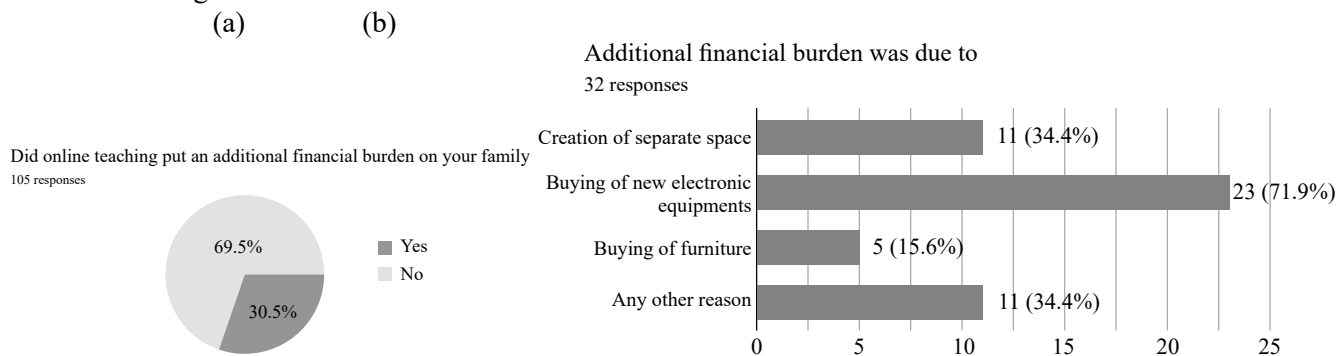


Figure 4. (a) Did online teaching put an additional burden on your family? (b) additional burden

- Fig. 5 (a) and (b) present the response to, “Was Internet connectivity an issue and what type of connection did you use to connect”. For majority of the respondent’s, Internet connectivity was an issue, which is a hindrance to the success of the online education model. The response to how Internet connectivity was established threw interesting mix of responses with broadband being the widely used option followed by the mobile Internet.



Figure 5. (a) Is Internet connectivity an issue? (b) Means used for connecting online

Conclusion

The online mode of education is here to stay and will be a useful addition to the traditional classroom mode. Technology will play an important role in the development and success of the futuristic education models. But for this to be meaningful to the learner's human intervention of the teachers is required. Further, the role of technology needs deeper explorations in aspects such as online testing and proctoring factoring in the issues of academic dishonesty and stress. We presented a brief analysis of the role of technology and teaching in pandemic on the basis of the experiences as an educator and as a telecommunication engineer bringing out the aspects of digital divide and student feedback in the success of online mode of education.

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Psychological Crisis on Higher Education Students due to Remote Learning during COVID-19

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ABSTRACT

In 2019, the whole world got hit due to the pandemic COVID-19 impacting the pillars of the economy of the country and leading to drastic changes in the teaching pedagogy because all the educational institutions were closed due to lockdown and forced to adapt to online teaching. This paper aims to find out the students' perception regarding remote learning and its detrimental impact on their minds in terms of affecting their psychology by adding to their stress level due to various factors like social distancing, lockdown, academic stress where coping is a major challenge, anxiety issues, sleep disorder, frustration, depression, etc. The study encapsulates the impact on the psychological well-being of the students in terms of depression, anxiety etc. during COVID-19 after performing regression and correlation. A sample is collected from higher education students from the plain regions of Uttarakhand, both undergraduate and postgraduate courses in management specialisation. SPSS 21 is used for statistical analysis.

Keywords: COVID-19, higher education, psychological stress, remote learning

Introduction

Since the last year, the whole world has been decelerated due to the very unpredictable Corona virus pandemic. Coronavirus cases were first witnessed in Wuhan, China in December 2019, and later, it got spread to the whole world, wherein it was noticed to spread from person to person via droplet. (AlAteeq et al., 2020)] India began its fight against the corona virus on March 23, 2020, which lasted till May. The pandemic resulted in the loss of livelihood, lives of near and dear ones, and the economy, including the education industry, of the country. Consequently, almost 90 per cent of the student population has got impacted due to this, out of which 32,07,13,810 are Indian students. (*Education: From Disruption to Recovery*, n.d.) It was one of the major disruptive innovations because of this greatest transition from offline to remote/online learning, (Schneider & Council, 2020) so much so that this was regarded as unprecedented and untested (Chandra, 2021) because of its implication on urgency due to unplanned and sudden lockdown. In fact, if the same situation persists for a longer duration, there might come a time when the traditional face-to-face teacher-student interaction will soon be replaced with the e-Learning model, which, a few years ago, was considered as informal education only (Mishra et al., 2020). Some e-Learning tools enable online like Edmodo, LMS, Zoom; Google meet, Microsoft teams, Google classroom, etc. have been used for online learning and a few researchers (Ilmiyah & Setiawan, 2020) have come up with new learning techniques like "student worksheet".

In a few studies (Balaratnasingam & Janca, 2006; Chong et al., 2004) it was found that such catastrophic spread of infectious diseases, caused stress among its citizens and left the population in fear and anxiety which eventually has a major effect on the psychological well-being and behaviour of the people. With the advent of the novel coronavirus in the country, the entire education system was compelled to adopt the new normal of online teaching. Another study (Chandra, 2021) has highlighted psychological problems observed in higher education management in the city of Ahmedabad and Mumbai due to social jetlag/isolation while another study (Mahapatra & Sharma, 2020) pointed out that this has added to their academic distress as well. Other researchers (Wong et al., 2021) have mentioned notable signs of psychological crisis faced by students where depression, anxiety, insomnia and panic, etc. Some theories (Fox et al., 2001) in the past, like "Stressor-strain theory", seconds the thought of how stress elements can lead to psychological and behavioural sufferings. Also, some studies have highlighted some stressors like academics, emotional and financial unsoundness during the normal days (Gupta & Agrawal, 2021).

Literature Review

There have been a lot of studies conducted during the pandemic, which support the current research across different parts of the world. In a study conducted in Spain, it has been found that among the respondent students, due to the lack of interpersonal connection during the social distance, psychological reactions like the depression, anxiety, and stress are more likely to develop and intensify (Odriozola-González et al., 2020) and in China (Cao et al., 2020) as well. A similar kind of study was also conducted in the Indian context with the medical students (George & Joseph, 2018; Nivetha M. et al., 2018). In fact, a study (Chhetri et al., 2021) aimed to examine the linkage between the psychiatric problems, particularly stress, during the pandemic condition, where the PSS score was seen to be influenced by fear of vulnerability, self-management, and refusal to adopt virtual learning. It was ascertained that additional attitudinal elements such as dread and concerns, as well as violations of guidelines, excessive pressure, and technical malfunctions during academic activities, impact the information and persistence needed to manage them. There was also a fear among the student respondents of losing their academic year due to educational delay (Biswas & Biswas, 2021; Dhar et al., 2020) and withdrawn job offers (Satpathy & Ali, 2020) which again added to their depression and anxiety levels.

A study by Cao et al. (2020), highlighted that the growing number of patients and suspected cases and the increasing number of provinces and nations impacted by the outbreak had prompted public concern about becoming infected in this outbreak, which has exacerbated anxiety. To support the same conclusion, Cornine (2020) also stated how students' anxiety levels have risen due to the impact of coronavirus and Bao et al., (2020) in their literature highlighted that the rising number of infected and suspected patients has heightened students' anxiety.

Research Methodology

This study is quantitative and has a cross-section design. Google forms were created and circulated among the students studying in Uttarakhand only as this study is centred around the students of this state. The sample size was 351 undergraduate and postgraduate students questionnaire comprised three sections, first socio-demographic data viz. gender, age, education level, etc., second section comprised a self-administered questionnaire to assess the satisfaction level of the remote learning, lastly, the third section includes questions from DASS-21, to assesses the psychological well-being of the students in terms of depression, anxiety and stress. Each question had four options, namely- Never, Sometimes, Often, Almost Always. Cronbach's alpha was calculated for its reliability. The self-administered questionnaire designed to measure the respondent's perception during remote learning had a Cronbach's alpha value of .732 and psychological stress using the DASS-21 has a reliability value of .840. Out of 351 samples that were collected, 28 per cent were female, and 73 per cent were male respondents.

Table 1. Psychological stress among Respondent Students

		Depression		Anxiety		Stress	
		%	N	%	N	%	N
Never	Normal	21.1	74	48.4	170	24.8	87
Sometimes	Mild	45.6	160	33.9	119	46.7	164
Often	Moderate	22.2	78	11.4	40	17.4	61
Almost Always	Severe	11.1	39	6.3	22	11.1	39
Always	Extremely Severe	0	0	0	0	0	0

Pearson's correlation was calculated for the variables considered in the study, viz., remote learning during Covid and Psychological Stress. During the analysis, it was found remote learning is strongly correlated (.856) with psychological stress as shown in Table 2.

Table 2. Descriptive Statistics and Correlation Analysis

Variables/Items	N	Mean	SD	Remote Learning	Psychological Stress
Remote learning	351	4.312	13.214	1	0.856
Psychological Stress	351			0.913	1

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3. Result of Regression Analysis for the Impact of Neuroticism on Work Performance (N=351)

Variables of Dependent	Variables of Independent	R Square	F	t	Beta
Psychological stress	Remote Learning	0.788	48.587	7.511	0.498

Discussion

According to some research, each pandemic has a natural end, but survivors are left with discomfort and related variables such as poverty, worry, and fear (Mazza et al., n.d.). The study's main aim was to find out the relationship between the two variables, namely remote learning during covid and psychological stress in students. The results and analysis showed significant and direct relationship among the two variables. This study suggests that students have been impacted by the abrupt change brought in by remote learning, which has serious psychological stress implications. According to Table 1, it was observed that 45 per cent, 33 per cent, and 46 per cent of students have mild symptoms of depression, anxiety and stress, respectively. On the other hand, it was also noticed that 11 per cent, 6 per cent, and 11 per cent have severe depression, anxiety, and stress symptoms, respectively. Correlation analysis in Table 2 states a positive correlation between the dependent and the independent variables. The amount of psychological stress students face is due to the abrupt change by switching to remote learning, wherein a lot of students are compelled to be home isolated and sit for a longer duration to attend the classes on their phone, laptop or iPad etc. It was also found during the study that 114 respondent students out of 351 (32.5 per cent) disagree with the fact of being satisfied with the online classes, which is due to various reasons like lack of telecommunication infrastructure in their city, hesitation in participation during the class, the stress of online examination and losing an academic year.

Psychological stress happening due to remote learning was strongly correlated and had a strong regression value too as stated in Table 3.

Conclusion

The analysis and study showcased that stress, depression, and anxiety were moderately prevalent within the student respondent, due to the current situation of lockdown, pandemic, and remote learning. Also, it was seen that there was a slight to moderate fear of getting contaminated or affected by the virus among the students. It was observed that female students aged between 18-25 were more vulnerable and susceptible to such psychological distresses. Students are forced to sit at their home with zero social interaction with classmates etc. and are exposed to an extended duration of online classes. These concerns are increasing frustration among the students due to connectivity issues and other problems like not being technologically proficient since most of the universities and education institutions are employing various cloud and online platforms to deliver the lecture and share the required material. This has therefore acted as an impediment in students learning thus causing workload and assignment stress.

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Digital Learning: A Survival Strategy to Unlock Opportunity

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ABSTRACT

India has a great history of education. It has the oldest Universities like Nalanda and Takshashila. The history and evaluation of digital learning can be traced back to the 19th century. Though it has been in existence since 1999, it became a part of almost everyone's life only during the COVID-19 crisis. Online learning has been a buzzword for the last year. Urban India, directly or indirectly has witnessed its advantages on a greater scale. However, every generation has accepted this challenge and is moving ahead with some or other solution to adapt to this new normal.

This pandemic has drastically affected almost all types of occupations and created much-needed self-time for pursuing studies, engaging in interests and hobbies. Digital teaching-learning has become a saviour, especially to the education sector. e-Learning has its upside where an individual can learn, unlearn and relearn to flutter the wings of aspiration. This study is based on primary as well as secondary data. The study first offers an overview of digital learning from teachers as well as a learner's point of view. The primary data has been collected through a well-designed and structured questionnaire. A sample size of 116 respondents has been studied. The primary study seeks to map the familiarity of and preference to the digital learning platforms. The respondents were asked about the purpose, time spent, their commitment, the effectiveness of and satisfaction towards digital learning. The results were analysed and suitable conclusions were drawn. This research aims at exploring the acceptance and applicability of digital learning as a survival strategy for continual education during the pandemic.

Keywords: e-Learning, digital learning platforms, COVID-19 crises

Introduction

India has a great history of Guru–Shishya tradition. Stories from the Gurukul system from Mahabharata and Ramayana are unforgettable. The ideology of the Gurukul tried to imbibe many life skills with uninterrupted succession of gaining knowledge and Wisdom. These systems were aimed to build personality, sense of discipline, intellect and mindfulness through the lessons from Vedas, Upanishads, Meditation, Mantra chanting and Ayurveda. Old tradition which has existed for centuries and has transformed over the years. In the middle era, Universities like Nalanda & Takshashila were recognised around the world for their education. British education became solidified into India as missionary schools were established during the 1820s. Social reformer and educationist Savitribai Phule with her husband founded one of the first Indian girls' school in 1848. In 1886, Ramabai Ranade with her spouse Justice Mahadev Ranade established the first high school for girls in Pune. With the intervention of British rule in India, open schools were replaced by college systems and printing of books. In the early 1900's India established a dense educational network largely for males. Technology in Education has changed the teaching and learning pedagogy over the last decade. There was a huge difference in the teaching learning pattern from Gen X to millennial. Digital learning has become important educational strategies which may include blended learning, flipped learning etc.

Teacher's Perspective in Digital Era

COVID-19 has led to a series of lockdowns as precautionary measures. This affected the overall functioning of all types of organisations. To cope with this, the education sector has aptly adopted and implemented digital technology. Whether it is pre-school, school or college, use of technological platforms connected teachers and students for teaching and mentoring. This digital move has bridged the gap to complete the curriculum, conduct assessment and evaluate assessments. Majorly Microsoft teams, Google meet, Zoom, Cisco WebEx are used for conducting lectures

and arranging mentoring meetings. Learning management systems such as Moodle, Canvas Instructure, IIT's Bodhi Tree, and Google Classroom are also grabbing attention for smooth monitoring of academics. Many universities have given free access to their libraries. Online training has proved as a saviour during the lockdown period. Due to interactive PowerPoint presentations with animation, GIF files and videos, students are glued to online learning.

Learner's Perspective in Digital Era

The technology accompanying learning is Digital learning. The current generation, better known as millennials have been brought up in an era of Information and Communication Technology (ICT). Millennials are well-versed with technology and can easily navigate through various e-content like informative videos, audios etc. There are specially designed e-Learning softwares that motivate the learners to take up online classes. Massive open online courses (MOOCs) offered by various universities are fulfilling the desire of learners to learn and gain knowledge. They are not replacing the classroom but helping students get deeper insight. This new face of education and learning facilitates students from all age groups. Digital learning has no boundaries, no geographical restrictions and is much cheaper. This dynamic way of teaching and learning has taken the education sector to a higher level. Not only the education field but also working people, entrepreneurs, senior citizens and home makers are benefitted because of digital platforms. Many companies are providing virtual training for development of employees' competencies. The pandemic has created technological dependency not only for science and technologies but also for fine arts. Learners are greatly benefitted by the self-learning courses like Coursera, edX, NPTEL to upgrade the employability skills. Thus, digital teaching and learning has definitely become a saviour to many sectors and fields.

Literature Review

Fatma (2013) highlighted synchronous and asynchronous methods of learning. Effectiveness of virtual classrooms, blended and embedded learning were discussed. This research presented and discussed various tools of e-Learning such as digitising tablets, voice recognition apps and systems, LCD projectors, blogs, wikis etc. and also highlighted the significance of computer-based learning and training for both stakeholders.

Johan Eddy Luan (2013) analysed the relationship between e-Learning and its effectiveness and level of exposure to e-Learning. The study was focused on secondary schools in Malaysia. The researchers carried out a survey in a three-secondary school in Malaysia. The researcher concluded that e-Learning provides more flexibility to select instructors. Another advantage is that learners can proceed with the course according to their grasping speed and pace. Thus, it offers a better learning flexibility with place and time. The problem with e-Learning is that students are missing face-to-face interaction with other students.

Ms. Shikha Dua (2016) presented the upcoming trends in the digital education system. The concept and benefits of K12 sector game-based learning was discussed. The research concluded that today's generation is better known as digital learner's natives. Thus, with well-structured and systematic planning for e-content, students can get maximum advantage. There is a need to focus on planning, developing, and creating a persistent online course for knowledge acquisition. This research also explored the need of Social and Emotional Learning (SEL) concept and new forms of Socio-Digital Participation (SDP) as today's educational needs.

Ming-Hung Lin (2017) emphasised that development in technology and the Internet had led to a switch to adopt digital platforms for learning. The study concluded that digital learning creates a positive impact and better learning motivation. It leads to improved learning outcomes over traditional teaching learning pedagogy. The study advocated that a blend of traditional and online modes should be strategically planned to achieve overall effectiveness for teachers as well as students. Assistance in digital learning increases online interactive learning with teachers. Thus, there is a need for strong infrastructure.

Rui Nunes Cruz (2017) explored various digital learning methodologies such as project-based learning, problem-based learning, digital stories, technology-integrated teaching methods, digital storytelling, educational games etc. These methodologies will be beneficial for collaborative learning, flipped classroom, experiential online development, open educational practice etc. The research presented various tools for teaching-learning such as webinars, web-based and digital video, augmented reality, gamification, simulation etc. For conducting digital

learning, certain support systems are required such as Learning Object repository, Moodle, Learning manager, MOOCs. Digital learning uses the Internet and related technologies to reinforce the better learning experience.

Tick (2018) investigated Z generation digital learning behaviour and habits of the Hungarian students and their computer usage trends. Generation Z comprises digital natives who learn a lot from small and crisp educational videos, short exercises and thus gain more knowledge for their “scattered brains”. The research revealed that Hungarian university students love classroom activities, face-to-face interactive sessions but they also love to pursue online courses.

Methodology

This study is based on primary as well as secondary data. The primary data has been collected through a well-designed and structured questionnaire. A sample size of 116 respondents from age 10 to 70 years has been studied. The primary study seeks to map the familiarity of and preference for the digital learning platforms. The respondents were asked about their purpose, time spent, commitment and satisfaction towards e-Learning. The results were analysed with the help of frequency and percentage calculations and suitable conclusions were drawn.

Analysis

Demographics - Primary data reveals that out of the 116 respondents, 26 per cent of the respondents belong to the age group 10-15 years, 36 per cent belong to the 16-25 age group. 26 per cent respondents are in the age bracket of 26-40 years, 13 per cent belong to the age group 41-55 years and remaining 1 per cent are between the ages 55-70 years. Primary data indicates that out of 116 respondents, 48 per cent respondents are students while 44 per cent respondents are either salaried or self-employed. The remaining 8 per cent are homemakers.

Methods, Platforms and Opportunity

- Digital learning methods – 79 per cent respondents are in favour of synchronous learning while 21 per cent are comfortable with asynchronous learning platforms.
- Access and variety – Digital learning has enabled access to education during COVID-19 crisis. Of the total respondents, 61 per cent respondents agreed that digital learning has provided an access as well as variety to education. Here, by variety, the researchers want to draw attention towards various audio-video aids, learning platforms, skill enhancement apps etc. available online. Lesser number of respondents, 16 per cent disagree with this while 23 per cent remained neutral.
- Digital platform preference – Video conferencing bagged the first rank in preferred digital platform. Video conferencing platforms like Google meet, zoom etc. were used by 47 per cent respondents. Usage of Learning Management System (LMS) is at second rank with 28 per cent users and the remaining respondents using social media and various applications for digital learning.
- Learning opportunity – Digital learning has come to the rescue for a continual education during the lockdown period. 88 per cent respondents stated that digital learning has offered an uninterrupted educational opportunity and helped them to continue their education in these tough times.

Parameters Related to Digital Learning

- Purpose – Primary data indicates the usage of digital platforms for e learning. 80% respondents have enrolled for e learning source for academic or professional purpose while other 20% are using it for life skills enhancement, hobbies, creative courses, etc.
- Familiarity and confidence – Primary data points out that the majority of respondents i.e 63.8% are familiar with and confident of using digital platforms. 8.6% respondents are still struggling with the technicalities of digital platforms while others remain neutral.
- Commitment – The respondents were asked about their commitment and time spent on digital platform. 74 per cent respondents spend up to three hours on digital platforms on daily basis while for 26 per cent respondents the time spent is between 4–8 hrs. 93 per cent respondents are committed while 7 per cent respondents are less passionate and committed about e-Learning.

- Effectiveness - The respondents were asked about the effectiveness of digital learning. 36 per cent respondents agree and feel positive about the effectiveness of digital learning while 32 per cent respondents stated their clear preference for traditional learning over digital learning. 38 per cent respondents are in the indecision stage.
- Satisfaction – Respondents were asked about the satisfaction with respect to digital learning. Only 31 per cent of the respondents were satisfied with digital learning. Though digital learning has replaced traditional learning, respondents are looking at it as a survival strategy and an aid to continue their education. 33 per cent respondents are highly dissatisfied with digital learning while 36 per cent are in the indecisive phase.

Discussions

The COVID-19 pandemic led to lockdown of schools/colleges, offices, classes and other activity centres across the world. As a result, education had to transform dramatically, with the distinctive rise of e-Learning, whereby teaching has been undertaken remotely and on digital platforms. Digital learning has definitely contributed towards the survival of the teaching-learning system during this pandemic in a varied way. It can be academic learning, professional certifications, skill enhancement courses or creative classes, digital learning has been indispensable in all of these during the pandemic. Primary data concludes that people are not only familiar with and confident about digital learning but also feel committed towards it. Majority of respondents are utilising e-Learning sources for academic or professional certifications while a smaller number of respondents are using it for life skills enhancement, hobbies, creative courses etc. Despite proven advantages of digital learning, effectiveness and satisfaction attached to it is on the lower side.

Conclusion

Since the pandemic has disrupted the normal lifestyle of people across the globe, the virtual world has come to the rescue. ICT is acting as a catalyst agent for learning with richer knowledge and content library, better pedagogy tools and techniques, appropriate evaluation and assessments. Online teaching-learning is no more an option but is a survival strategy to unlock the teaching-learning opportunity. Majority of respondents reported that digital learning has offered perpetual education prospects and helped them to continue with their education in tough times.

Limitations and Future Studies

Digital learning is comparatively a new area of research. The scope of current research is limited to the study of parameters related to digital learning. Behavioural aspects studied in this research are subjective and may change with time or changes in the environment. The researchers have come across the low level of satisfaction and effectiveness of digital learning. The probable reason behind this dissatisfaction and low effectiveness and appropriate solutions can be studied as an extension to the current research.

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Students' Perspective of the Sudden Shift from Traditional Classroom to Online Teaching Mode Under COVID-19 Situation: A Case Study

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ABSTRACT

The study aims to understand the perspectives of higher education students regarding the sudden transition from a traditional class to online mode during COVID-19 in India. A survey was conducted among 260 undergraduates and graduate students from civil and chemical engineering branches; based on 15 quantitative and 4 qualitative questions. Students appreciate the flexibility they acquire in terms of timing, necessity and interest to watch the recorded lectures. A peaceful learning environment without distraction/disturbance helps them to focus. But the unfamiliarity of the mode and the relaxed unmonitored situation are considered unfavourable. Improved technical infrastructure and better preparedness from the teacher's side are recommended. This study articulates the students' perspective and expectations from the online mode of teaching/learning, which would help improve the quality of the instruction process. Authors understand that this study addressing the entire instruction framework delivered live in online synchronous mode due to the unprecedented pandemic environment has not been reported previously.

Keywords: traditional classroom teaching, online teaching, higher education, COVID-19 situation, asynchronous learning

Introduction

The novel Corona Virus Disease 2019 (COVID-19) has brought life across the world to a standstill. The virus has spread across more than 216 countries across the planet; it has infected over 14.563 million human beings and over 6, 07, 781 people have died from this highly contagious respiratory disease as per data available in the official website of World Health Organization as on 21st July 2020 (WHO, novel-coronavirus-2019).

India, like all major nations, has fallen prey to this deadly contagion. The government has declared a nation-wide lockdown of all non-essential activities from March 24, 2020 (Gettleman & Schultz, 2020). The sudden enforced transition to online teaching for the students institutionalised in the traditional classroom is something very new in the current country-wide lockdown due to COVID-19. This study aims to understand the perspectives of students regarding this sudden transition to a format of teaching hitherto not used or known well. In this regard, this study specifically focuses on the higher education context, with regards to what students feel about traditional sessions of engineering courses being conducted through online teaching media.

Literature Review

The literature addresses student's satisfaction as a means to assess the quality of online education. Student satisfaction is an important indicator of the quality of learning experiences. Some researchers opine that online education can be at least as effective as traditional classroom instruction. Numerous research studies mention that student satisfaction in online courses or programmes reported both satisfied and dissatisfied (Kim & Bonk, 2006). Many researchers theorise that the role of the instructor is different from that of traditional classroom instructors when they teach online courses (Hill et al., 2004; Kuo et al., 2013).

From the learning outcome point of view, online learning does not differ significantly from traditional face-to-face classroom teaching-learning (Allen & Seaman, 2010). The quality of interaction in online settings may depend to a large extent on the technology tools utilised during learning (Parsad & Lewis, 2008). Lack of confidence in

using technology may decrease student satisfaction during online instruction. This study has investigated factors (interaction, internet self-efficacy, self-regulation) associated with student satisfaction in fully online learning settings. Learner-instructor interaction, learner-content interaction, and internet self-efficacy were considered as significant predictors of student satisfaction in fully online learning settings (Govindarajan & Srivastava, 2020).

Methodology

A mixed method research design is applied in this study. A well-recognised technology and science institute in India, decided to continue the regular Lecture/Tutorial classes primarily through Google Meet from March 20, 2020 as per the regular time-table schedule of Second Semester 2019–20. This sudden transition had not been anticipated by either faculty or students, however the transition has been accepted and continuation of the teaching-learning has been maintained. To take this situation into consideration, a group of faculty members from the institute planned to conduct a survey based research, especially to understand the viewpoints, feelings and experiences of students under this unplanned transition of traditional classroom teaching into online teaching.

Analysis

Responses were registered and analysed at two stages to obtain the general trends and inferences from each question to help us to understand the experiences and challenges faced by students by adopting this transition for continuing their learning aptitude.

Discussion

Descriptive Analysis

Results from the feedback survey of 261 students is presented in Table 1. Number of respondents for each question in terms of the Likert five scale categories of responses (1 through 5) is shown in Table 1 as a percentage of the total number of respondents. Responses corresponding to points 1 & 2 and 4 & 5 are considered as disagreement and agreement respectively. Because of COVID-19, most professors and students suddenly find themselves compelled to use technology as they teach and learn, respectively. They possibly were distracted as well from the class due to this unconventional approach for all their classes all of a sudden. Poor Internet connectivity is another significant hindrance for them.

Earlier research on learning styles has helped in identifying that there are different types of learners (Gentile et al., 1995). During this unprecedented lockdown period, they are able to spend more time on their study material and the corresponding references through online learning. This may be beneficial for slow learners to process information at their own pace and comprehend the content more meaningfully (Salve-Opina, 2014). Student experiences during this sudden switchover to online learning have been quite different. However, this depends a great deal on the pedagogy and instructional design deployed. We are not necessarily comparing traditional and online classroom methods, but our objective is to focus on the sudden change implemented because of COVID-19.

Table 1. Descriptive Analysis of Responses from Student Survey

S. No.	Questions	Disagreement (1+2) (%)	Neutral 3 (%)	Agreement (4+5) (%)
1.	The shift of traditional class to online class helps to focus better (more attentive) in learning.	40.6	21.5	37.9
2.	Interacting with the instructor is harder in online class than that of the traditional class.	23.5	17.7	58.8
3.	Online method helps to motivate better and create interest in self-learning.	30.3	21.7	48.1

4.	Online class platform provides better enjoyment/satisfaction regarding the course/subject compared to the traditional class.	47.5	21.8	30.7
5.	The online class keeps students engaged for longer timespan.	48.8	19.2	31.9
6.	Online class increases the possibility of higher number of student participation.	14.7	17	68.3
7.	Online classroom discourages students to take class notes.	25.3	22.6	52.1
8.	Online classroom discourages students to ask more questions.	36.9	23.1	40
9.	Online classroom is better to cover theoretical concepts.	22.6	24.5	52.9
10.	Online classroom is better to cover problem solving components.	56.7	20.3	23
11.	Online classroom improves learner's self confidence in classroom interaction (due to the physical absence of instructor).	37	25.3	37.7
12.	Online classroom improves learner's self confidence in classroom interaction (due to the physical absence of peers).	33	25.7	41.4
13.	Online classroom lacks the opportunity to meet the instructor outside the class hour.	19.6	19.2	61.2
14.	Online class is more flexible to give opportunity to engage in simultaneous other activities.	13.8	13.4	72.8
15.	The Google Hangout Meet is a user-friendly online teaching platform.	7.7	17	

Thematic Analysis

Thematic analysis (Braun and Clarke, 2006) is adopted as the research method in this study, prompted largely by the fact that the research objective of this current study is to understand a contextual phenomenon in a holistic manner keeping aside the existing theoretical presumptions regarding earlier works on expat kid adjustment process (Clarke & Braun, 2013). An initial literature review helped to serve as the trigger for conducting this research. 65 responses complete in all respect were received after the survey was completed which were used for the thematic analysis. The six-step guideline given by Braun and Clarke (2006) was followed for conducting thematic analysis. The researchers used memos while going through the transcripts to capture any notable aspect of the conversation. After analysing the open codes, five distinct themes i.e. Flexibility of Asynchronous Learning, Benefit of Learning in Harmony, Savior in crisis Avatar, Chaos of unsupervised self-focused learning, Lack of online teaching skills, could be identified which captured the pros and cons experienced by the students while attending their sessions through the online mode.

Conclusions

The novel Corona Virus Disease 2019 (COVID-19) has brought a huge transition into the socio-economic system across the world. The education world is neither exempted from this unprecedented disruption nor is it forced to take

turns into its execution methodologies. This study is conducted with two engineering branches; however, responses may vary across various disciplines, and whether the inclination towards online learning depends on the student's individual capabilities can also be explored in future studies

The descriptive analysis component of the current study concludes with a few take aways, as listed below:

1. Disagreement to the fact that shift of traditional classroom to online classes helps them to be more attentive.
2. Agreement with the fact that online classes are more effective for theoretical courses than problem-solving-based courses.
3. Online method helps learners to self-motivate and create self-learning.
4. Classroom environment with lots of active learning methods in the class is preferred.
5. Agreement to the fact that online classes lead to larger student participation.
6. Online classes discourage students to take class notes.
7. Online classroom discourages students to ask more questions.
8. Online classroom improves learner's self-confidence during interaction possibly due to the physical absence of an instructor, but more so because the fear of public speaking is not present in this situation.
9. Online classroom improves learner's self confidence in classroom interaction.
10. Online classroom improves learner's self confidence in classroom interaction due to the physical absence of peers.

The thematic analysis component of the current study concludes few additional takeaways as listed below:

1. The gross outcome of the analysis shows that the overall experience of the online learning experience has been quite satisfactory on the part of the learners.
2. Thematic analysis shows greater positive sentiment about the peaceful learning environment that they get while attending online lectures compared to traditional lectures.
3. The data shows online learning as the need of the hour and learners were positive about the transition.
4. Analysis shows that due to the remote aspect of the learning, the responsibility of learning rests more on the students.
5. The analysis indicates the lack of preparedness of the faculty to handle the new instruction platform to some extent affects the efficacy of the new system.

Finally, it is important to understand that neither system is perfect. Pros and cons as discussed in thematic analysis exist in both the systems be it traditional classroom teaching or online teaching. However, thematic analysis study reflects the fact that students enjoy learning more in traditional classroom.

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Integrating Web 3.0 Tools for Online Language Teaching and Learning: Prospects and Challenges

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ABSTRACT

The sudden outbreak of COVID-19 has brought forth new challenges to the whole education sector including the language classrooms. With the recent advancement of technology making an inevitable impact in the classroom, the need to bring in innovations is a major concern for all language enthusiasts and ELT teachers. The rapid growth of the web, from Web 1.0 as reading medium only to Web 2.0 as Read/Write medium, is at present surfacing as Web 3.0. Web 3.0 not only allows its users to Read/Write/Execute medium but also permits machines to perform some of the thinking process which so far human beings were relied upon to do. It has a potential to radically change what we assume about traditional teaching and learning and generate innovative tools and technologies for easing web-based language learning. The objective of this paper is to explore the multiple dimensions of adopting Web 3.0 technology in Online Language teaching with issues involved in the complex and changing relationship between technology and language learning. It attempts to study how web 3.0 would encourage students' maximum participation, active collaboration, knowledge personalisation. The study also attempts to envisage how future variations in web technology will actually give rise to modifications in language teaching-learning.

Keywords: Web 3.0, online language learning, dynamic adaptivity, distributive authority

Introduction

The COVID-19 pandemic has produced a huge impact on teaching across the globe, compelling many colleges and universities to adopt online learning abruptly. As a result, online language teaching has also transformed rapidly over the last two years. Due to the advancement in web technology, there is a paradigm shift from the instruction to participation and from teacher centered to self-directed language learning. Much of the web has changed from a "read-only" medium to "read-write" and to "read-write-collaborate", parallel to it the concept of e-Learning has transformed from a meek exchange of education material to exclusively fresh approaches to education, balanced on student's intensive participation and active collaboration. Web 1.0 refers to the document-based web, web 2.0 focuses on users and web 3.0 is associated with data (Cobo Romani and Pardo Kuklinski, 2007). Web 3.0 has revolutionised the whole process of teaching and learning by providing personalised learning, simulations of the real world, intelligent tutoring system, and intuitive access to information. The corresponding web 3.0 tools and apps used via smartphones, tablets, or notebooks are an indispensable part of our students' as well as teachers' lives. Therefore, the incessant progression of web 3.0 tools has unfastened incredible opportunities and challenges in web-based language teaching and learning.

Literature Review

Integrating web tools into classroom require continuous preparation and constant practice. Internet and high-speed communication technologies have a tremendous impact on education technology. In this respect, Naik & Shvalingaiah (2008) describe web 1.0 as a system of intertwined hypertext documents gain access via the Internet with very limited user participation. Thomson (2008) asserts that web 2.0 provides a wonderful platform where people can create, share, and collaborate. Hussian (2012) points out the semantic web as a turning point for the digital native to get benefit from a vast range of educational software for the procurement of meaningful information, collaboration, and data filtering as per their needs for personal learning. Accordingly, consistent with the argument,

key elements of Web 3.0 are that it concentrates on progression of the back end, by exploiting communication and interoperability between and among web sites and electronic devices, thus providing computers themselves the capacity of searching for, organising, and shaping the connections among pieces of information. Thus, as the name suggests web 3.0 is a three-way web avatar as Evans (2012) suggests which will not replace web 2.0 but will make information more accessible by smart web 3.0 browsers. In a study, Chisega-Negrila (2013) highlights one more feature of web 3.0 that it filters out a lot of erroneous data for the need of users in searches over the Internet.

The present paper, therefore, focuses on analysing the basic functioning of web 3.0 tools in online language classroom by incorporating text, audio, photo, and video capabilities into teaching and learning processes. Differences on the selected tools on various parameters like their nature, teacher centric and student centric activities, features, challenges, and prospects have been discussed in a tabular format for better comprehension.

Prospects of Web 3.0

Shift in teaching: Web 3.0 would bring about a shift from teacher-created content for students to students being active collaborators of the content. With the help of various web-based tools teachers would be able to engage learners with various complex assignments to test their learning.

Personalised learning: Web 3.0 has turned out to be a catalyst of change for learners as the process of learning is more personalised. Smart search options customised to the requirements of learners will lead to less stress, burnouts, and frustration. It will note lecture notes, blogs, videos, articles etc.

Personal education administration: With the advent of the semantic Web transfer of degrees, credits have become much easier. E-learning has given a choice to the student to determine their learning needs and accordingly choose university or learning resources.

World Wide Web consortium: This is effective for online content especially for homonyms and synonyms. Smart engines help to recognise and enable more accurate searches.

Ontologies: Meta data will enable the computer to process knowledge akin to human reasoning and inference. Web 3.0 will enable users to crystallise their search entries.

Augmented reality: The AR material which encompasses animation and sound can develop motivation towards vocabulary learning. Through augmented reality and simulations, students gain control over their learning and actively participate in the process of learning.

Personal assistance for learning: Many studies have proved that personal assistance for learning has opened a vast world of possibilities. Alexa, Voice interaction and AI assistance such as Siri, Google assistant are powerful tools to enhance language learning through indirect pronunciation feedback and better opportunities for conversation. The application of automatic conversational system chat boat can also be used as a personal assistant for language learners.

Intelligent tutoring system: ITS shapes teaching according to individual learning needs. Automatic translating system, intelligent virtual class, e-Learning softwares can help in language learning in an efficient way.

Table 1. Web 3.0 Tools for Online Language Learning

Web 3.0 Tools	Nature	Teacher Centric Activities	Learner Centric Activities	Features	Challenges
Blogs	A Frequently updated website	class assignments, daily tasks, class photos, videos, links of interesting articles, stories, games and fun ways of learning language in ESL class	Promotes individual expressions and exchange of idea with peer group	The tutor blog The class blog The learner blog Photoblog	Privacy and security issues Tagging Commenting Absence of guidelines

		Sharing of Syllabus and links of resources	Self- reflection, discussion	Personalised student-centred interactions	
		Vocabulary and Grammar exercises	Project-based learning	Accessibility beyond the limits of traditional classroom	
		Discussion and Comment forum	International class exchange		
Edmodo	Global Educational Network	Sharing resources Enabling discussion Contextualising and Integrating language instructions	Vocabulary, pictures, translations and comprehension quiz Group creation for assignment writing Dictation, recording, speaking exercises	Quiz builder for assessments, Peer reviews, Personalisation, Free admin account activation, award badges to individual students, online discussions and participation of student parent and teachers	The requirement of Internet connection and Environment to access Distraction in teaching and learning process
Wikies	Web page quickly edited by visitors	Collaborative Learning	Problem based language learning	Research Projects, discussion activities, creating collaborative stories, Student e portfolios, reading comments	Technological expertise in managing
		Helpful in digital connection of the reading, writing and vocabulary aspects of the composition classroom	Enhancing of listening and reading skills through wikies		Time in monitoring the student's contributions and organising content on the site
Podcasts	A digital audio file	Provides authentic material to improve student's listening comprehension, Pronunciation, and vocabulary	Listening skills and Pronunciation practice by repeated listening	Podcast transcripts for vocabulary, collocation and spoken grammar. Evaluative summaries for writing skills, Jigsaw listening activities, for speaking activities	Challenges for instructors in terms of production and editing skills. File size and compatibility with other applications

Skype	A Software	Enables Collaborative task in a foreign language classroom	Accommodates different learning styles in the language classroom	Guest speaker. Effective communication tool for experts and professionals	Lack of personal contact Inability to control the action of the students by the teachers
			Overcoming geographic distance for real time language acquisition activity.	Skype live collaboration projects	Discourage introverted learners Manging the interactions and maintaining records or transcripts

Limitations

With the ubiquitous nature of web 3.0 technology and its increased access in the language classroom setting, there is great potential for collaborative learning beyond the four walls of a classroom. In addition, instructional approaches that incorporate the best features of varying technology-facilitated learning approaches are likely to continue to impact English language teaching and learning. The advantages of the use of web 3.0 have been evident in its application, but there are several challenges also. Most challenges are common including economic aspects, support and training, pedagogy and teacher's role and feedback and evaluation. Institutions and professionals are still in the process of tapping the potential of web-based learning and a great part of web 2.0's tools. Hence embarking upon the functional aspects of language learning with web 3.0, several challenges need to be identified, considered, and addressed. Though web 3.0 tools are providing opportunity for language teaching and learning with dynamic adaptivity and distributive authority, however they pose many challenges also such as the choice of teachers on most appropriate ones of these tools for effective teaching and learning. Technology does not ensure complete success in language learning in that sense web 3.0 tools cannot be seen as remedies to the challenges encountered by language teachers in the teaching-learning process. A more collaborative and communicative learning environment is needed to determine the objectives of language lessons and pedagogical needs of teaching situations.

Conclusion

The paper through descriptive study gives an insight into the prospects and challenges of using web 3.0 tools in online language teaching and learning. The evolution of web 3.0 tools is exciting, but concerns have also been evident particularly regarding privacy, availability of web 3.0 tools, economic aspects, support and training, pedagogy and teacher's role and feedback and evaluation. As web 3.0 tools continue to emerge, develop and improve, approaches to using them to support online language teaching and learning will develop as well. With these developments will also come enhanced theoretical frameworks and methodologies to support implementation and research, which will advance online English teaching. With the proper preparation and readiness to embrace these opportunities and address these challenges will undoubtedly make the most of the affordances of Web 3.0 tools for language teaching, learning and continue to make a positive impact on students' learning trajectories.

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Emergency Remote Teaching and Technology Comfort: Mapping Perceptions of English Teachers from Schools in Rural Areas of Rajasthan during COVID-19 Crisis

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ABSTRACT

The present study explores the perceptions of English language teachers in rural areas of Rajasthan, India in terms of their teaching approach, their methodological and technological preparedness, and the kind of teaching materials they have been using and developing since lockdown 1.0 in March 2020 when they had to shift to Emergency Remote Teaching (ERT). The study also investigates the challenges faced by the language teachers for content delivery, assessments, and the students' engagement during classroom interactions. Besides these, the technological challenges related to the accessibility and affordability of hardware and Internet services are also discussed. The data has been collected through surveys from 147 English teachers from various schools in rural areas of Rajasthan, India. The survey results indicate the need for a teacher training program in using technology for online pedagogy, exploring the possibilities of making education accessible in remote areas and new avenues of teaching-learning. The implication of this study also gyrates around a call for restructuring English language teaching in the Indian education ecosystem and curriculum design for the post-COVID-19 era.

Keywords: emergency remote teaching, perceptions of english teachers, rural schools, technology comfort

Introduction

Sudden closure of over 1.5 million schools in India due to COVID-19 forced the administrators to redefine the entire dynamics of imparting and receiving education (Dhawan, 2020; Jaggi, 2021).

The unanticipated shift to Emergency Remote Teaching (ERT) unmasked the inequalities and the crevices that exist in the Indian education system in the form of digital-divide and socio-economic hierarchies (Chattaraj & Vijayaraghavan, 2021; Jaggi, 2021; Outhwaite, 2020) and impacted the schools situated in diverse regions differently (Jaggi, 2021). For language teachers, the challenges are even more as language teaching requires considerable interactions in the pedagogy (Atmojo & Nugroho, 2020). The present study attempts to find out how ERT has impacted language teaching-learning in the schools of rural regions in Rajasthan.

Literature Review

Online education was mostly used to supplement offline teaching before the pandemic (Dogoriti, 2014; Ghasemi & Hashemi, 2011; Lata & Luhach, 2016; Tomlinson & Whittaker, 2013) but the changed dynamics led it to entirely facilitate ERT. The switch to ERT with no prior training and infrastructure made it difficult for teachers and students to cope with it (Afroz, 2021; Hodges, 2020; Stewart, 2021). A case study conducted in Oman (Naqvi, 2020) suggests that though most of the teachers were self-efficient in using technology, teaching writing, and doing assessment and feedback appeared to be very difficult tasks. Another study conducted in Bangladesh (Afroz et al., 2021) shows that it was hard for the teachers to engage the students and the majority from rural areas could not even attend the classes due to insufficient bandwidth. In India, a few studies have been reported for checking the impact of ERT on higher education across different disciplines (Chattaraj & Vijayaraghavan, 2021; Patwardhan et al., 2020; Srivastava et al, 2021). The research gauging the impact of ERT on school education in India is scarcely available. Jaggi (2021) investigates ERT in Indian schools from the perspective of inclusion and diversity. There is a need to do further research to gauge the usage of ERT as a regional perspective of language teachers in India and the present study

attempts to explore that. Most of the studies conducted so far in India and abroad have dealt with ERT in a wider context. Perceptions of language teachers in rural schools in Rajasthan, India have not been specifically reported.

Methodology

Purposive sampling is used to collect data (both qualitative and quantitative). The sample population consists of 147 teachers teaching English in the schools situated in the rural areas of Rajasthan. All these teachers are involved in ERT through various online platforms: MS Teams, Google Meet, Zoom, Skype, WhatsApp, and YouTube, among others.

Research Question

How do English teachers in the rural areas of Rajasthan perceive the following during ERT?

- i. Level of technology comfort during ERT
- ii. Change in the use and development of materials and methods in ELT during ERT
- iii. Students' engagement level during ERT
- iv. Assessment and evaluation changes due to ERT
- v. Effectiveness of ERT
- vi. Infrastructural accessibility (to technology/hardware/software and internet)
- vii. Ease/difficulty in teaching the four language skills

Data Collection and Analysis

The data was collected through survey that included 30 questions: 7 demographic questions; 10 items on Likert scale to gauge the agreement, likelihood, frequency, importance, and efficacy on various aspects related to technology comfort, student attention, materials and methods, assessment and evaluation and effectiveness of ERT in language teaching; 9 multiple choice and multiple response questions to check the best features, online tools, teaching, and learning methods, takeaways, and drawbacks of ERT in language teaching and 4 open-ended questions to analyse the language teachers' perceptions on the kind of classroom activities done, the difficulty and ease in imparting language skills and any additional information the teachers wanted to share. The data collected was analysed using descriptive statistics for Likert scale items and multiple response questions, and thematic analysis for open-ended questions.

Results and Discussion

Language Teachers' Perceptions on Technology Comfort and Other Aspects

The level of technology comfort of language teachers was analysed by collecting the responses on Likert scale items— training sessions attended by the teachers, how proficient and comfortable the teachers felt while using technology and online tools while teaching. The mean values (2.6-2.9) indicate that the teachers required training sessions (often-sometimes) and they had workable proficiency and moderate level of comfortability in the usage of technology. They found the development of teaching and assessment material a bit difficult (M=2.9). Students' attendance and interaction level were not up to the mark (M=3.0) as compared to the face-to-face offline classroom. The teachers were not very sure (M=2.7-2.9) about the ease, reliability, and validity of the assessment tools during ERT. The teachers also expressed a mixed reaction (M=3) while responding to the efficacy of language teaching during ERT. But majority of the teachers did not approve (M=3.89) of the statement that ERT methods of language teaching were better than physical classroom teaching.

In response to the multiple choice/response questions framed to analyse the teachers' perceptions on the favourable features of ERT on online teaching platform 67 per cent of the teachers agreed that online platforms were simple and user friendly along with being interactive and collaborative. Writing skills were considered the most difficult skill to teach by 45 per cent of the teachers followed by speaking (25 per cent), reading (15 per cent) and listening (15 per cent). Thematic analysis brings out the reasons given by the teachers for the perceived difficulty in teaching

writing skills. Language teachers agree that online mode prevented them in giving proper feedback to students on their writing. There is also lesser scope for practicing. For most of the children writing using laptops and phones was not very easy. They lacked any experience or training pertaining to this. Originality of writing is also a concern for the teachers as for writing components like paragraphs, newspaper reporting, congratulatory message, etc., students have the propensity to copy paste which questions the actual learning of the students. In contrast to this, listening skill was voted as the easiest skill to teach by 46 per cent of the teachers followed by speaking (25 per cent), reading (16 per cent) and writing (13 per cent). The teachers asserted that in all modes of teaching whether it is audio, video or lecturing, the component of listening is involved, and students also favour this. They found that interesting audios and videos are a great attention fixer during the times when they cannot watch students for paying attention. Listening was also considered to be the most convenient way of imparting knowledge among the students in the virtual mode.

What are your three major takeaways of the following from Emergency Remote Teaching in the language classroom?

147 responses

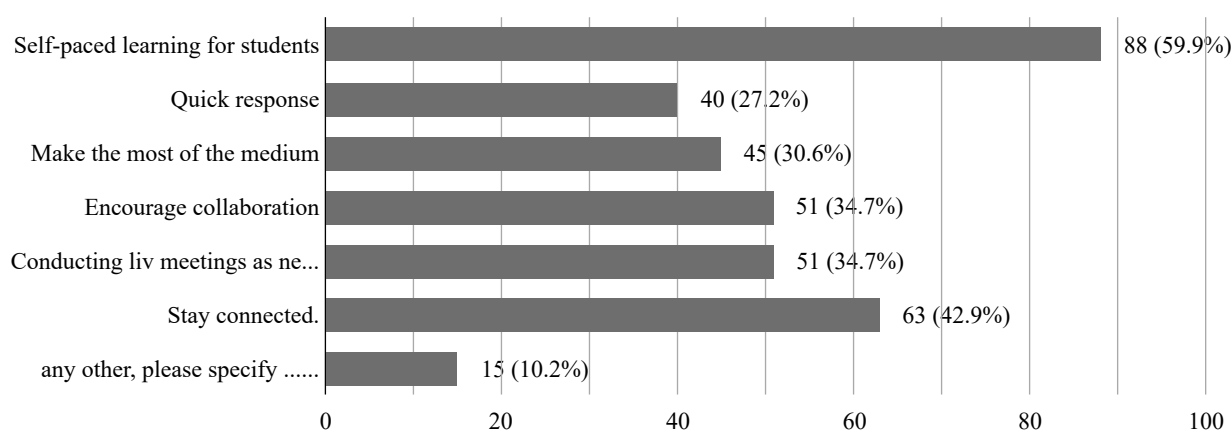


Figure 1. Major takeaways of ERT

In response to the kind of activities conducted in the language classrooms, the teachers responded that GDs, presentations, vocabulary games and quizzes were the most frequently conducted activities though these activities were limited to only those students who had access to Internet and devices. Around 68 per cent of the language teachers in rural areas have reported that either the students did not have access to the infrastructural activities or only a few students have had that.

Despite the inadequate resources, teachers also stated that ERT helped in promoting self-paced learning (88 per cent) and encouraging collaboration (51 per cent) (Figure 1) in the difficult times. The response to the question on the drawbacks of ERT, the teachers gave a mixed reaction. All responses were almost equally chosen by the teachers. These drawbacks were related to limited student feedback, social isolation, lack of self-motivation and time management skills, and complications involved in online assessments.

Conclusion

ERT has been adopted by schools across India to ensure that the pandemic does not prevent imparting of education. But as the name suggests, it was a call of emergency and some disparities and gaps were bound to emerge. The results of this study have clearly indicated that rural schools do not have the required infrastructure and other facilities to support web-based education. The results, thus, also have clearly indicated the need for exploring the possibilities of making education accessible in remote areas and new avenues of teaching-learning. The teachers need to be trained for enabling them to reap the benefits of technology through efficient use in online pedagogy. Language teachers require additional training to get introduced to online tools suitable for different language skills that can result in

multimodal teaching for effective learning outcome and enhanced learners' autonomy and motivation. The study also gyrates around a call for restructuring the English language teaching in the Indian school education ecosystem and curriculum design for the Post COVID-19 in era where student-centric, self-paced, and collaborative learning opportunities through the creation of virtual classroom discourse communities could be explored. Future research can explore the ways in which post-pandemic language curriculum in schools aligns with the goals of creativity, critical thinking and inclusivity outlined in the National Education Policy 2020 in India.

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Virtual Computer Science Education in India: Challenges and Opportunities

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ABSTRACT

In the wake of the COVID-19 pandemic, institutes for higher education worldwide, including in India, were forced to migrate to fully online classes. A country like India, with limited internet connectivity and infrastructure as well as its socio-economic, presents unique challenges. In this article, we discuss how education in India, particularly in the field of Computer Science (CS), is affected, and where the challenges lie for students, faculty, researchers, and administrators. We share our experiences related to the migration of CS classes online in a reputed engineering institute in India with more than 15,000 students over three campuses. We also discuss ways to overcome the challenges posed by the digital divide. The main objective of this article is to generate interesting discussions that could potentially lead to advancements in information and communication technologies geared particularly towards CS education in developing countries.

Keywords: migration to online classes, limited internet connectivity, challenges, opportunities, experiences, virtual, computer science, online education, digital divide

Introduction

There are over 3.8 million undergraduate engineering students in India and about 1.6 million of those are in Computer Science (CS)-related disciplines (All India Survey on Higher Education, 2019). In response to the COVID-19 outbreak in early 2020, many countries, including India, went into a multi-week lockdown. Institutes of higher education with residential campuses vacated the dormitories and sent their students home in the middle of the semester. Teaching and learning shifted to the online mode within a matter of days. Most of these institutes are still holding their upcoming Fall semesters fully online. While many universities across the world are also running online and facing similar issues, a developing country like India presents additional challenges, particularly in CS education, under this “new normal”, which affects these millions of students.

The reason behind these challenges is the extent of the digital divide in the developing countries. The digital divide is defined as the inequality in access to and use of Information and Communication Technologies (ICTs). The first-level digital divide is due to the lack of access to technology (Van Dijk, 2017). Developing countries lack the same level of access to ICTs as developed countries, but even within a country a differential in the availability of technology exists. Cruz-Jesus et al. (2016) report that they noticed a digital divide even in a digitally advanced country like Finland. Lembani et al. (2020) found that urban students had a significantly different educational experience compared to those in rural areas due to poor ICT access. Kumar and Kumara’s work (2018) revealed that while more than two-thirds of the urban students used ICTs for learning, only about one-fifth from the rural areas could do so. These factors are acute in many parts of India with routinely interrupted electric supply and lack of high-speed internet. Rao (2005) notes that there is a disparity in infrastructure among different states in India; within a state, there is a disparity between urban and rural areas; within a geographic group, the education gap creates a digital divide; and at the same education level there is a rich-poor digital divide.

Infrastructural initiatives in recent years have improved the overall availability of ICTs. For instance, the number of Internet users in India has crossed half a billion now (National Digital Communications Policy, 2018), but the next level of digital divide is due to the difference in the digital skills required to use the technology effectively (Scheerder, van Deursen, and van Dijk, 2017). An undergraduate CSIS student does not necessarily have those skills.

Moreover, familiar social and cultural issues, such as gender-based discriminations, continue to reflect in the digital world (Mihelj et al., 2019; Prinsen et al., 2007).

Our observations are from Birla Institute of Technology and Science (BITS) Pilani, but are applicable to most universities across India and perhaps other developing countries as well. As the instruction moved online, we observed many challenges that affected various aspects of teaching and learning: delivering lectures, conducting labs, continuing research, and assessing student learning. However, we also believe there are opportunities to improve the way we approach teaching and learning in these circumstances: better assessment tools, broader adoption of ICT in education, conferences accommodating broader audiences, etc. We present these challenges and potential opportunities in this paper.

Administrative Decisions

Universities had to make some irreversible decisions in a very short time as the lockdown was announced, with the safety and wellbeing of the campus community being the primary concern. The Council of Student Affairs at BITS Pilani conducted a survey across its three campuses. Over 9,000 students responded to questions about teaching strategies, grading, and other student life issues. Based on the survey results, the institute decided to award a Pass/Fail grade to graduating students - instead of a letter grade that would affect their grade point averages - to mitigate any impact of unfinished coursework on their grades and on job placements. In response to another question, almost 75 per cent of continuing students (first, second, and third years) were against using online assessments that would be worth a substantial portion of their final grade. They said they prefer taking a pen-and-paper final exam upon returning to the campuses. Major reasons why students preferred this over an online exam include a concern about lack of transparency, added ease of cheating by other students leading to lack of fairness, and unavailability of reliable Internet.

Some other universities conducted their final exams online but faced severe criticism: students who do not have access to high-speed Internet or computer facilities at home were at a disadvantage compared to those who do. Another challenge with conducting online assessments is ensuring student integrity. Proctoring exams via screen sharing and webcam is not scalable for even moderately large classes, especially with connectivity issues.

The pandemic has affected potential incoming students as well. Admission exams like the IIT-JEE, AIEEE and BITSAT are usually conducted in summer after the higher secondary exams in schools. These in-person exams, which are taken by millions of students across the country every year, had to be postponed in both 2020 and 2021. Lack of access and limited exposure to the technology impact when and where these exams are conducted and who can take those.

Online Lectures

Delivering a live lecture via videoconferencing presented a challenge as the students with low Internet bandwidth switched off their videos, turning the online lecture into a one-way webinar, further inhibiting the lecturer's ability to interact with students and gauge their understanding due to the loss of visual cues. In such cases, the instructors had to rely on the chat-box for interaction, which poses its own issues for students having an English language barrier. To help students who may miss the scheduled lecture due to various reasons, the recordings of the lectures were made available which students could download and watch at any time of their convenience. But this still takes away from the experience of being in a live lecture and interacting with the instructor. Moreover, the availability of lecture videos inadvertently led to a reduction in student attendance and attentiveness. Also, it is not trivial to caption lecture videos, and auto caption tools do not work very well with several languages and accents, which is an important factor for students with certain disabilities.

Online Assessments

The introductory programming course at BITS-Pilani is taken by over 900 students and is run with the help of multiple teaching assistants (TAs). Giving meaningful feedback over the Internet at this scale is challenging. Such large courses will fall short of building on pedagogical components that require in-person interaction (Malmi et al., 2019). While the summative assessment in such courses can be outsourced to testing frameworks like JUnit,

there is a need for scalable, affordable, accessible tools that can provide formative assessments not only on program correctness, but also on algorithm design, quality of code, etc.

Laboratory Sessions

While most CS lab courses, unlike a mechanical or chemical engineering lab that requires heavy machinery or chemical reagents, are easier to offer remotely; yet, they have their own set of challenges. Introductory programming courses require more sophisticated intellectual capabilities compared to other computing topics (Oliver et al., 2004) and students need as much guidance from TAs and instructors as they can get. Laboratory sessions for such courses are typically conducted with the help of multiple TAs who go around helping students to solve the exercise problems assigned for that session. Many students are not able to achieve the learning they would with the help of a TA and feel demotivated to continue learning programming. On the other hand, in the absence of Internet access restrictions (typically enforced in the laboratories through IP whitelisting) and the lack of continuous supervision by the TAs, some students are often tempted to look up and copy code snippets from online resources; this type of plagiarism is harder to detect (Lancaster et al., 2019), and will be even harder to prevent in a virtual setting.

Moreover, certain courses in computer science require specialised infrastructure for lab sessions, which makes it doubly hard to migrate these sessions to an online setting. For example, at BITS Pilani, a course on Parallel Computing was cancelled due to unavailability of a virtual lab infrastructure that supports high-performance computing.

Research Projects

Several research projects were halted as students left the campus. Most projects in CS that do not require dedicated hardware have resumed with researchers adapting a combination of collaborative tools such as Overleaf (for collaborative editing of LaTeX documents), GitHub (for code-sharing and repository building), and Slack (for team communications). However, computer science research projects that require specialised hardware like FPGAs (Field Programmable Gated Arrays) or GPUs with high-end specifications for simulation purposes that are available only in university laboratories are finding innovative ways to involve students who are no longer on campus. One of our colleagues has set up remote workstations for each student researcher on laboratory computers using a desktop-sharing platform TeamViewer and connected the hardware to those machines in the lab. Students log in remotely from home and access the specialised hardware over remote login. Of course, this workaround also suffers from the challenges of digital divide discussed earlier, and, clearly, is not scalable.

Discussions

To mitigate the impact of lockdowns on education, universities moved to online education all over the world. Although the availability of ICT over the last few decades has made it possible to conduct educational and research activities online, the digital divide creates a differential in the experience of students and faculty in disadvantaged situations.

While addressing many of the factors (for example building infrastructure) is in the hands of the governments in the developing countries, there are opportunities to be explored within the frame of available technology in the context of higher education. New platforms smoothen the virtual interaction and make it as close to the in-person experience as possible. Platform designers should specifically focus on scalable methods of proctoring that can handle the variable bandwidths and technological issues. Educators have to find new ways to capture students' attention during live lectures. Faculty needs to encourage the use of holistic discussions to foster online learning and interaction with students for feedback. Countries like India with English language barriers should develop teaching tools and techniques that are not burdened by the use of language especially in the online environment which lacks other cues like body language.

In CS, there is scope for developing tools for helping with assessment, improving engagement, and better conceptual learning. Interactive e-books like Zybooks are effective in teaching introductory computing courses (Allen et al., 2018), but such technologies target developed countries and are cost prohibitive for developing

countries. Moreover, if the technology relies on an uninterrupted Internet connection, it may again suffer from the challenges discussed earlier.

Hillier (2018) proposed a modular offline learning education assessment platform (MOLEAP) that uses the features of a learning management system Moodle and adds tools such as an office suite in the offline mode and combines it with the ability to enable two-way communication and updates when the network is available. Such hybrid solutions can overcome the digital divide to some extent and provide equitable opportunities to students of varied backgrounds.

In summary, the COVID-19 pandemic has forced a paradigm-shift on the education scenario. In this paper, we presented and discussed the challenges associated with this sudden shift to virtual education, specific to India, intensified by a digital divide. Many of these challenges are actually opportunities for the education technology industry to develop tools suitable for CSIS education in developing countries like India. This global problem should be met with a truly global solution – one that promises to bridge the effects of the digital divide.

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Issues and Challenges in Research during Pandemic: With Special Reference to Uttar Pradesh

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ABSTRACT

The COVID-19 pandemic changed the way we live our lives. Remote learning and teaching have changed the research and education system. Social distancing and work from home have created challenges for researchers. The paper examines the issues and challenges faced by research scholars and academicians of Uttar Pradesh.

The researchers adopted a quantitative approach which involved the use of questionnaires and 150 Research scholars and 10 Lecturers participated in the study. A convenient sampling method was used to collect data from five major cities of Uttar Pradesh through Questionnaires using a 5-point Likert scale to 150 research scholars and 10 Lecturers of private universities and government universities. Findings encountered seven significant problems during the COVID-19 pandemic: a lack of e-Learning facilities, a field survey, a financial constraint, a conducive environment, teachers' attitudes, a lack of enthusiasm, and stress and anxiety.

Keywords: pandemic, research, higher education, academic research

Introduction

A novel coronavirus emerged in late December 2019 in Wuhan, China, and quickly spread to the rest of the world (Longhurst et al., 2020). The World Health Organisation proclaimed it a pandemic on March 11, 2020 (Franchi, 2020). On September 22, 2020, the number of instances of infection globally surpassed 31 million, with the virus affecting over 215 nations. Many people's everyday lives were disrupted by the virus, which had devastating impacts on many facets of human existence - consequences that most people had never experienced before (Franchi, 2020).

Two of the hardest hit sectors by the virus are research and education (*Education: From disruption to recovery*, 2020) (Mian & Khan, 2020), which have been halted or delayed significantly (Newman & Lattouf, 2020) due to tight laws and the need for social distancing.

As a result of this threat, all research institutions and specialists are developing effective strategies to mitigate the pandemic's harmful effects on education and research. (Oliveira Araújo FJ et al., 2020) This problem is exacerbated in colleges and schools, where it has increased requests for practical and administrative help from schools (Almarzooq et al., 2020) and increased pressure on these institutions to implement suitable instructional techniques for students (Moszkowicz et al., 2020).

With the spread of the illness in India, all colleges halted face-to-face sessions, and research proceeded online. As a result, courses were held online and offline throughout this period, using pre-recorded lectures. Due to the Internet's speed limitations, just the lecturer's and student's voices were generally exchanged in online lectures. Instructors generally record narrations on their PowerPoint slides and submit them to the institute's database for student access in the offline mode. All areas of research were negatively impacted, and progress came to a standstill.

The COVID-19 pandemic is not the first time a pandemic has influenced research and education; the SARS outbreak of 2003 also impacted education, albeit to a lesser level (Lim et al., 2009). The COVID-19 pandemic, on the other hand, will have far-reaching and long-lasting consequences. As a result, research into the difficulties and opportunities posed by the present pandemic can assist us in adapting more effectively to the new conditions and ensuring the continuance of research.

There is no better time than now to examine the impact of the crisis on teaching and training and ensure that students receive a high-quality education despite the current crisis (Liang et al., 2020). Uttar Pradesh is often referred

to as India's "food bowl". COVID's impact on research is examined utilising quantitative sources of information focusing on Uttar Pradesh, India.

Literature Review

Educators and learners' familiarity and exposure to ICT can significantly impact adopting an effective and relevant online pedagogy. Microsoft Teams, Google Classroom, Canvas, and Blackboard have been utilised to date to enable the teacher to construct education, training and skills development programmes (Petrie, 2020).

The home was a place where many kids displayed emotional and psychological distress but could not communicate effectively. There are currently no best techniques to learn at home using the Internet (Petrie, 2020). While utilising or referring to so many platforms and online educational materials, users — both educators and students — suffer from various problems. There are several issues to consider when it comes to e-Learning (Murgatroid, 2020). When it comes to learning, pupils are more likely to succeed towards the end of the year and internal tests (Sintema, 2020).

Students in the United Kingdom were denied access to A-levels due to the lockdown of schools and institutions. It is possible that the exam evaluation will be postponed or cancelled, depending on how long it takes (United Nations, 2020).

Amid the Ebola outbreak, e-Learning tools were essential for schools and universities to instruct students when classrooms and research institutions were closed (Subedi et al., 2020). For online research and learning, there is no one-size-fits-all strategy. We have selected a few specific subjects, each with its own set of prerequisites, to study. Students of varying ages require a variety of learning methods (Doucet et al., 2020). As a result, physically challenged students can also profit from online education (Basilaia & Kvavadze, 2020).

Methodology

The study first understood the issues and challenges faced by researchers during the pandemic. In this study, the researcher used close-ended questions in the questionnaires and interview questions to collect data. 150 research scholars and 10 lecturers participated in the study. A convenient sampling method was used to collect data from five major cities of Uttar Pradesh through Questionnaires using a 5-point Likert scale were administered to all 150 research scholars and 10 Lecturers of private universities and government universities.

This research was descriptive since the researchers explained the teacher's concerns during pandemic online learning and research. The tools in this study included 13 open-ended online surveys conducted via Google form. The tool was extended to the participants using an Internet-backed platform. The survey findings completed by the participants in the researcher's email then provide the results based on the questionnaire results and link it to the theory concerned.

The questionnaire was assessed for validity and reliability.

Analysis

Reliability of the data

Reliability is a measure of internal data coherence (Rackwitz, 2001). It illustrates how objects in the test assess the same idea and hence the interrelationship of the elements. Internal consistency should be verified to assure validity before a test may be used for research or examination purposes. Simply put, this reliability interpretation is the correlation between the test and itself. (Bonett & Wright, 2015). The Cronbach's alpha value was 0.820, suggesting that the data has good reliability.

The age and designation of the respondents. The majority of the respondents were in the age bracket of 21-30 years, followed by 31-40.

The designation of the majority of the respondents was research scholars.

The majority of the respondents (94 per cent) had a computer/laptop and smartphones (99 per cent). 84 per cent had a proper Internet facility at their homes, and only 56 per cent were provided with an e-library facility by their institution. When asked about the university / institution actively participating on an online platform for various activities like webinars, workshops, and conferences, 81 per cent of respondents responded positively.

Of the total respondents, 56 per cent faced difficulties while conducting field surveys or lab experiments, and 90 per cent learned a new skill during the pandemic period. In contrast, 63 per cent felt that their research survey/ lab experiments got hampered due to the pandemic.

The paper's main aim was to identify the significant problems faced by the researchers and educational institutes during COVID-19 pandemics. Factor analysis, a technique used to reduce variables into fewer un-correlated factors or dimensions, was employed to analyse. Exploratory factor analysis findings show that seven significant problems were found during COVID-19; namely-A lack of e-Learning facilities, field survey, a financial constraint, a conducive environment, teachers' attitudes, a lack of enthusiasm and stress and anxiety.

Discussions

The learning process involves digitised content, system-based administration and a mentoring facility (Zhang et al., 2010; Markus and Robey, 1998). The main focus is on the accessibility of e-Learning, issues and perspectives in public institutions while being used and implemented in education and research. COVID-19 has further exacerbated the issues and difficulties faced by researchers in gathering and analysing field data. Also, the financial strain on the researchers and educationalists has augmented by many folds. Good environment and amenities play a significant role in research and teaching, creating a conducive environment for research and education. Finally, the constant strain and anxiety have impacted the teacher's attitude and researcher's enthusiasm towards their jobs.

Conclusion

COVID-19 has had a significant impact on the research and training sectors in India. It has led to several problems, but also several opportunities. In order to meet the current problems, the Indian government and several training stakeholders have examined the opportunities for Open and Distance Learning (ODL) through the use of numerous digital technologies. India is not ready to spread education across the country with digital platforms.

Indian policy must incorporate individuals in every field of life, predominantly rural, marginalised, and minority populations, to ensure the successful delivery of education. Since online training is suitable for children, even if the lockdown is removed, this should remain. A more comprehensive statistical assessment of the influence of COVID-19 on the education system of India can be carried out.

Limitations and Future Studies

The present digital platform choices would harm students who are not as affluent as their peers. On the other hand, universities and the Indian government are working continuously to find a solution to this problem. The first objective should be to employ digital technology to provide an edge to India's millions of young students and researchers. In order to be prepared for COVID-19-like eventualities, educational institutions must enhance their knowledge and information technology infrastructure.

Even if the COVID-19 issue lasts longer, there is a pressing need to maximise the use of online platforms so that students complete their study and degrees and do it promptly.

Educational institutions to improve their research knowledge and skills. Infrastructure in the field of information technology must be prepared to face any challenges that may arise Situations similar to COVID-19

When feasible, review sessions for all online courses should be scheduled, and traditional research methods should be used along with online research tools after the lockdown.

For effective teaching and assessment techniques, faculty members should be taught how to use online learning management systems. All employees should also have access to technological assistance.

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Multiple Intelligences Infused ELT Precept in the Course of COVID-19: A Pedagogical Proffer

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ABSTRACT

Language and life are inseparable conceptions; both are fused by human beings and milieu. At present, the human race witnesses a different lineament of life under COVID-19. Every aspect of life of an individual, specifically, health, lifestyle, economy, education, and beliefs is being modified because of the effect and influence of COVID-19; Second Language Teaching and Learning are no exceptions. The pandemic has acquainted, all individuals with the precautionary measures. Certain expressions and phrases receive space at the subconscious levels too namely, mask, social distance, vaccine, washing hands frequently, breathing techniques, oxygen, herbal concoction, etc. With the influence of these terms, being lay citizens and researchers of L2, the authors of this paper attempt to compare these C-19 precautionary measures with the teaching of English during this pandemic phase. In order to boost the immunity of L2 teaching and learning online, the Multiple Intelligences (MI) theory of Gardner would be of great aid. Multiple Intelligences theory focuses on the significance of the unique intelligences of the learners. Gardner proposed his array of intelligences namely, linguistic, logical- mathematical, visual-spatial, musical, interpersonal, intrapersonal, bodily-kinesthetic, naturalistic, and existential intelligences. Individualised instruction develops academic and mental health of learners. Hence, this paper aims to outline the COVID-19 ELT guidelines, which could serve as an aegis to teach the English language with the succour of MI. This pedagogical proffer will perk the L2 teachers and learners to fabricate an effective web by emblazoning the Individual Differences of learners during this pandemic learning.

Keywords: individual differences, multiple intelligences, pandemic, guidelines

Introduction

Everything in the world is subject to change. Currently, the entire world is witnessing a drastic transformation because of the swift spread of COVID-19. Nothing has been left out in its gigantic makeover, including Second Language teaching and learning. Since the end of the C-19's first wave, most of the population has become well-aware of precautionary measures to protect their life, guard their health, and shelter the education of the learners through the online mode. During this edifying process, many factors should be considered by the stakeholders. This paper aims to find out the mental health of rural L2 teachers and learners during pandemic period. The objective of this qualitative, quantitative cum conceptual endeavour is to suggest an ELT pedagogic proffer by taking into consideration, the Individual Differences (IDs) of learners, Multiple Intelligences (MI) theory and online teaching and learning parameters in a rural area.

Literature Review

The word 'lockdown' enabled the educators to unlock feasible ways to reach the students. As per the "UNESCO-UNICEF-World Bank Survey, MICS and DHS" (June – July 2020) on Education, during the pandemic, it reported that Remote Learning (RL) has been implemented in more than 90 per cent of countries. It has been well documented that the lack of gadgets made nearly 463 million learners to be away from this RL too. The pathetic condition is "three out of four students who cannot be reached live in rural areas." As a result, teachers (L2) clasped their hands with technology. Fitria (2020) expressed the stubborn notion of real learning in the mind in the Indonesian context. Markus Allo (2020) discussed about the appropriateness of online L2 teaching during the pandemic time and highlighted a notion that L2 learners' needs could be an apt input for L2 teachers to design a responsive curriculum.

Hashmi et al. (2021) explored the C-19 challenges in Saudi Arabia, which discovered the notions of teachers to bring about blended-learning in ELT context. Hossain (2021) attempted to accrue Bangladeshi L2 instructors' and learners' understanding and exercise of L2 teaching and learning during C-19.

Review of the pandemic driven ELT researches highlights the reality that globally all are tied with identical issues. A learner-centric pedagogy should celebrate individuality and IDs of the learners. Multiple Intelligences (MI) theory is one among the many gifts presented by Howard Gardner to celebrate the learners' potentials. Most of the ELT researches during this pandemic center on the notions of teachers, students and the online-technological modes and preferences. Using MI in ELT is not novel, but amalgamating it in line with the pandemic makes it a unique effort. Thus, this paper attempts to assess the mental health and notions of rural L2 teachers, learners and provide guidelines, by comparing it to the precautions measures of COVID-19. Hence, this paper adds fresh actualities to the existing ELT pedagogy during this pandemic period.

Uniqueness: Individual Differences (IDs)

Like fingers, each learner is unique. The qualities, characteristics and the manner of learning are unique. There are many ways a learner is different from others. Henceforth it is the responsibility of educators to focus on the strengths of these IDs and accommodate them in the classroom. Most of the times, these earnest appeals remain only in the research papers and books. Linda O'Toole (2008) explains that "Learning to learn is a primary activity for learners and educators and understanding how one learns most effectively is a critical component of this... Yet these aspects are often missing in the educational discourse" (p.71). Especially during C-19 edifying ambience, the IDs aren't catered; as the lime light focuses on technological needs and advancements.

A Pool of Versatility: Multiple Intelligences

In the tapestry of IDs, intelligence is a complicated yet a prime one. Howard Gardner has given pluralistic notions about the potentials of the brain. According to him, intelligence is the "ability to solve problems, or to create products, that are valued within one or more cultural settings" (2001, p. xxviii). He initialed various intelligences like "Linguistic, Logical- mathematical, Musical, Spatial, Bodily-kinesthetic, Interpersonal, Intrapersonal, Naturalist, Existential" (2001, p. xxix). He opined that all human beings hold all the intelligences; it's about fostering them according to the culture. More than psychologists, educators crowned MI. MI explicates the conception that all intelligences are to be applauded and used; none is superior to other. Lazear (1992) described four phases to use MI in teaching. "Awakening, Amplifying, Teaching with and Transferring the Intelligences" (p. 24-25). Thus at this time of crisis MI could be fused with ELT to nourish cognitive and affective factors of the teachers and learners to achieve a holistic learning through online.

Methodology

This study follows qualitative, quantitative methods and conceptual framework. To understand the notions and emotions (mental health) of L2 teachers and rural tertiary-level learners during pandemic, a questionnaire with close and open-ended questions was administered to 30 L2 teachers and 56 L2 learners in Tirupattur, Tamil Nadu, India. Through Google form the questionnaire was circulated. In order to get genuine answers, the researchers didn't demand the personal details of the respondents.

Analysis

Along with C-19, the confined places subjected people to undergo psychological issues like fear, stress, anxiety, loneliness, worry, etc. Longwell (2021) said that "7.4 million have reported feelings of loneliness negatively impacting their wellbeing since lockdown began...pressures of homeschooling have led to a further increase in stress and loneliness". It corroborates with the data of L2 respondents who have responded to this study. The following table details the data.

Table 1. Notions of L2 Teaching and Learning Online

Respondents	Emotions while Dealing with L2		Influence of Emotions		Needs Training in using Technology
	Happy	Sad	Positively	Negatively	
L2 teachers (30)	6	24	20%	80%	70%
L2 learners (56)	9	47	16.07%	83.93%	78.57%

When they were asked about their emotions while teaching English during C-19, out of 30, only 6 teachers said that they felt happy, whereas other responses were: “fed up, despair, uncertain, helpless, demotivating, anxious and felt pressurized.” Among the respondents (teachers), 80 per cent of them felt that their mental health (especially, their fear, anxiety and uncertainty of C-19) influenced their L2 teaching negatively, whereas 20 per cent of the respondents opined that it did not influence their teaching. In the case of the L2 learners, out of 56, only 9 were happy, whereas 83.93 per cent of learners felt “sad, anxious, boredom, laziness, lacked interest” and expressed earnestly that “in the beginning, online classes were good, but as it prolongs they attend it only for the sake of attendance.” Ergo, it is quite alarming about the mental health of the teachers and learners, which should be addressed consciously and immediately for their betterment.

In order to know the reality of online classes and the notions of the teachers, the following question was posed: “What are your impressions about your students regarding L2 learning through online?” Most of the teachers scribed that “students attend the class for namesake and for attendance alone; some are lazy to do the tasks; students lack interest, attention, honesty and sincerity in learning.” They acknowledged the sincerity of few learners. One teacher earnestly said that “Now English has become only a minimal part in their course and that learning and practicing English language is really a nightmare”. Another one opined that “Traditional teaching is in no way equal to online teaching. Online shall be a standby but not the future.” Whereas another teacher stated that “They are not able to learn English language especially, students from rural backgrounds.” The rural L2 learners too confronted certain difficulties while learning L2 through online namely: “couldn’t listen continuously with attention, homework pressure, lack of network, not having proper atmosphere to learn at home and lack of human presence”. By analysing the notions of L2 teachers and learners, the results, though they are bitter realities, one should admit it. Hence, alternative ways to reach them should be designed. At the same time, teachers should understand the rhythm of the pandemic and try to embrace technology to reach the learners. A total of 74.28 per cent of the population stated that they should be given some training/workshop on easy and friendly technological tools to use in online teaching and learning.

Discussions

By analysing the notions of teachers and learners through questionnaire, it is evident that there is a need for a modification in curriculum and pedagogy too. There is a need for a comprehensive notion of L2 pedagogy in line with Kumaravadivelu (2001) who stated that “I use the term pedagogy in a broad sense to include not only issues pertaining to classroom strategies, instructional materials, curricular objectives, and evaluation measures, but also a wide range of historical, political, and sociocultural experiences that directly or indirectly influence L2 education.” (p. 538) At this moment of predicament, it is apt to think and reframe a holistic pedagogy and curriculum, which cater to the IDs and the emotions of teachers and learners, the contemporary sociocultural aspects and the available technological sources. Therefore, the following proffer is an attempt to compare the precautions measures of C-19 with ELT pedagogy. It is a unification of cognitive and affective factors of teachers and learners in line with IDs.

Mask-Mask one’s L2 teaching with technology. Inhale- Inhale the air of optimism, mirth to teach the language so that learners learn well. Exhale-Exhale one’s uncomfortability while dealing with technology; the prejudices regarding online teaching and about learners’ learning capacity. Social distance- Maintain distance from the concept of ‘One size fits all’. Wash hands frequently- Wash away one’s present affective factors frequently especially, the emotions (negative) regarding C-19 and guard one’s mental health. Vaccine-Vaccine one’s L2 teaching and learning with the updated trends and tools. Yoga/Exercise- There are various exercises and yogasanas available to steady one’s mind and health. Similarly, identify the learners’ various L2 needs and as a teacher, could meditate on one’s

teaching styles and learning strategies. Analyse and regulate them to steady a better pedagogy. Herbal Concoction- It is natural yet very effective way to protect oneself. Where the goodness is brought by the variety of spices and herbs. Hence, appreciate and accommodate the various natural intelligences and preferences of the learners by using MI. Certain herbs are allergic to certain learners. Therefore teachers could consider learners' IDs, strengths and be cautious of the dosage of concoction. Could frame a comprehensible and online manageable L2 syllabus. The following is a sample of ideas to develop learners' L2 skills in line with MI, which are suggested at the background of pandemic.

Linguistic & musical intelligences- Compose a pandemic rhyme/song/poem; deliver a speech on C-19

Linguistic & logical intelligences- Problem solving questions; Riddles/Puzzles related to C-19; Re-narrate old stories/tales from 21st century point of view; Analysis about the current situation; Letter to the Editor

Linguistic, intrapersonal & existential intelligences- Opinions and notions about life during this pandemic period; Biography writing; Journal writing

Linguistic, visual & interpersonal intelligences- Online interview and present a video; Group discussion; News Reporting – from one's house/street/friends circle

Linguistic, naturalist, spatial & logical intelligences- Rear a sapling and describe it; Observe and analyse the habitat during lockdown; Spend time with pet/stray dog and narrate your experience; Garden update video

Bodily, linguistic & visual intelligences- Monoact/Monologue/Solo dance; Awareness video

An L2 pedagogy, which uses MI, is beneficial where most of the intelligences work together and all LSRW skills are integrated to accomplish a task. The merit of MI is the relevance of one's culture. Subsequently, along with culture and environment, teachers could probe the utmost possible ways to reach learners' IDs. When pedagogy is centred on learners' intelligences and preferences, then, their attention, interest and authenticity could be generated from them. The essence of this MI infused ELT proffer lies in evaluation, assessment, feedback and reframing it.

Conclusion

The bitter time of C-19 could be utilised better. In order to address learners' uniqueness, teachers could use their MI to study the learners' needs; analyse the present situation and resources; frame a practical and comprehensive pedagogy; could get continuous feedback; through evaluation reform and develop the content. MI is the immunity booster of one's mental health and pedagogy. This MI infused ELT Pedagogy demands Commitment, Creativity, Appraisal and Flexibility from the stakeholders. It is possible through the fusing of MI and technology. Thus, this ELT precept would be an aid to construct a holistic web of learning.

Limitations and Future Studies

This snap research and its outcomes are limited to rural environment. The following suggestions could be carried out for future studies: A longitudinal study about the mental health of L2 teachers could be done; this proposed proffer could be experimented in online; and more IDs studies could be tried with various technologies during this pandemic period.

Acknowledgement

With a grateful heart, I thank the 86 respondents who have expressed their genuine views. I thank my Research Supervisor, Rev. Dr K.A. Maria Arokiaraj, for his constant guidance in undertaking this study.

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Pandemic-Driven Educational Research: Plotagon

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ABSTRACT

The author wishes to facilitate the teaching of appropriate body language, accent and correct pronunciation while communicating. The objective of the study is to train students of technical courses in communication skills in the English Communication Lab. Moreover, the paper aims to make English formal conversation easier and interesting for the students in virtual English labs by using Plotagon app.

After a long survey, the author studied and worked on exploiting the resources available in the Plotagon app so that videos could be created by the teachers in a few minutes even on their android devices with no additional expenditure.

Necessity is the mother of invention. The role of a teacher evolves with its contemporary needs. To save society from perishing, the teacher's role becomes instrumental. Teachers are the future makers of the nation. With the evolution of ages, not only the social, political and economic conditions (Marx's base and superstructure) change but the ideological conditions evolve too. The intelligentsia of every evolution, every change is instrumental in creating a new history. Ultimately, it is the Teacher whose role modifies with the modification in economic, political, social and ideological systems. Because of the pandemic, Online education has brought about revolutionary changes. In March 2020, students' education, in the middle of the semester, suffered a severe blow and the teacher was in great contemplation. There was undue stress on the shoulders of teachers all over the nation. Looking for better apps was a new thing to research and the need of the hour. In this paper, I wish to discuss how to use the Plotagon app in creating multimedia videos that can be used as teaching material.

Keywords: facilitate, Communication lab, Plotagon app, android devices, Gurus, oblivion penance, Marx's base and superstructure, ideological conditions, contemplation

Introduction

The toughest challenge on this earth is to be a teacher in the real sense. Even when God created mankind, the concept of acquiring knowledge was also created. God assigned the duty of imparting knowledge to scholars (then *Gurus*) and the rest is history. He wanted His human to acquire knowledge. Lord Brahma gave brains to humans only so that they can come from the darkness of ignorance to the light of illumination.

गुरु गोविन्द दोऊ खडे, काके लागूं पांया Guru Gobind Dono Khade, Kake Lagun Paye,

बलहिारी गुरू अपने गोविन्द दियो बताया। Balihari Guru Apne, Govind Diyo bataye.

We do find elite scholars even when primitive man had just started civilising. Aryabhata, Plato, Panini and umpteen of them who were jewels to the mankind. Gurus observed penance and lived in oblivion. It was quite challenging to find an appropriate Guru for any father to make his children learned scholars.

With the evolution of ages, not only the social, political and economic conditions (Marx's base and superstructure) change but the ideological conditions evolve too. The intelligentsia of every evolution, every change is instrumental in creating a new history. Ultimately, it is the Teacher whose role modifies with the modification in economic, political, social and ideological system. Every nation looks towards academicians in times of peril. It was no different in March 2020 when all schools, colleges and universities of the nation were unexpectedly shut down due to the Corona pandemic. People were made to sit in their houses and work from home was enforced. The whole education system was reframed and the teacher played the pivotal role. Though it was expected that online education will soon end and physical classes shall resume soon. But hitherto, online education has under gone revolutionary changes and 2022 shall also see a similar scenario repeated. There was undue stress on the shoulders of teachers all over the

nation. Meetings, deliberations, webinars and trainings were held so that every possible step could be taken and the future of the students could be saved. For schools I shall mention it was mainly the higher senior secondary classes (10 and 10+2) suffered badly.

The most challenging for any teacher was to prove that how many online classes have been conducted by him/her in a day. Has the teacher followed the time table? Is the workload assigned to the teacher being sustained? It became traumatic to submit daily reports of the classes taken, the duration, the syllabus covered. The toughest was the teaching of the lab material. The teachers had to face abuses and the stress during the pandemic online classes. It was a new experience in the life of every teacher. Besides, gathering students in virtual classes, maintaining high attendance (about 75 per cent), syllabus completion, giving assignments, quizzes, sessional, online proctoring and numerous other duties were assigned to teachers. Internet connections, data usage, connectivity, screen sharing, visibility, voice audibility, clarity, attendance, white board, slides preparation, video recordings, etc. were additionally painful yet necessary pains that every teacher had to go through. However, in 2021 we have evolved in facing all these challenges. Yet, the senior teachers were not so familiar with these online education apps were badly thwarted. When work from home was implemented, few had laptops, tablets or any gadget to start with the online education. Quoting my own example, April 6, 2020 I had to start with actual online virtual interactive classes and I started with Zoom. We were instructed by the authorities not only to stick to Google classroom where every individual teacher was expected to have a specific classroom for uploading the study material. But it was not one to one interaction. More was expected of us. You don't learn swimming till you jump into the hot water. I started with Zoom. Poor connectivity and the indiscipline of the students were the most panicking things. Disabling the chats, white board sharing, muting the participants propped up additionally. Finally, I was on my way to syllabus completion. But hurdles were there and adaptation became difficult for the teachers as well as the students. Besides free online apps for online teaching also came up with limitations and gave offers to buy them for better teaching methods. Life was a challenge and teaching online a trauma for a couple of months.

“Students, am I audible to you?.....”

But you cannot stop and fool a teacher for long. Looking for better apps was a new thing to research and I successfully discovered Cisco Webex, Google Meet and Microsoft Teams. These apps have many useful features. They were really better in handling and teacher-student-friendly. We also joined training programs and were given trainings also from the institute to learn new strategies. In this paper I wish to discuss how to use Plotagon app in creating multimedia videos which can be used as teaching material. This app is highly useful in developing interest of the students and helpful in English Language Lab.

Literature Review

While conducting my English Language Lab classes for first year BTech students, teaching correct phonetics and sound system which is a major part of the lab syllabus became the biggest challenge. Leaving out the topics as such was also not acceptable. Students coming to first year are very raw and they need a lot of phonetic practice. It was one of the special online training sessions that I learnt about this app, Plotagon. Using this app is really very interesting and effective in making appropriate videos for language lab sessions along with required body language. The pandemic had adversely affected the lab subjects. Despite virtual classes and labs, the actual performance and potential could not be gauged. A specific teaching method was the need of the hour to make the students acquire the required assets. The Phonetics lab was a challenge for the technical students. A questionnaire was prepared covering the issues faced by the students and expectations were mapped. A rubric was also drafted so that the students could be assessed on appropriate pronunciation, word stress and phonology. A lot of verbal practice was provided to the students.

The plan included creating one's own multimedia videos that enhance the perceptive and understanding skills of the students. Students could view them multiple times. Videos were created to enhance the listening skills of the students. Appropriate body language was also taught to the students. Students can further create their own multimedia videos. Thus, Plotagon helps in increasing the creativity level of the students.

Methodology

Plotagon is an award-winning storytelling tool for all ages. With this app, you essentially have an animation studio in the palm of your hand. Just choose a scene; create your own actors; write your story and let Plotagon make it come to life and save your masterpiece and share it with the world!

Analysis

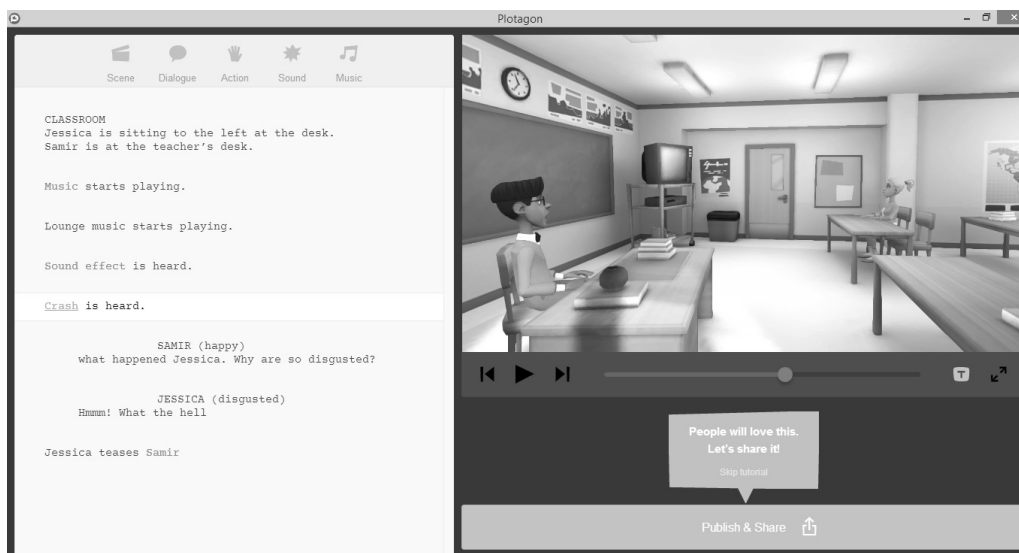
With the change in the teaching-learning process, the entire education system has changed. Online teaching was a distant dream for Indians but the pandemic compelled everyone to revise the teaching platform from physical to virtual. Virtual classroom was not an unfamiliar term but majority loved physical classroom teaching. Talking of the pros and cons, both have many. Students in online teaching are definitely safe at their homes but do they really sit and pay attention to each and every word the teacher utters. Mere attendance is their concern because they know that their online exams don't need effort. Every answer is available at the click of a button. No matter how many assignments are given to them, no matter how many tests and quizzes are being conducted for them but they are fearless. It's just the rare sincere students who really sit and learn and that percentage is low, only 2 per cent. Similarly, a two-hour lab especially for English was a trauma. But certain creative apps like Plotagon made it possible where creative animated videos can be made for the students.

Starting from scratch, I made my own recorded videos on Zoom app based on phonology and stress. Simple videos on my android phone were also tried. But the feedback of the students was not satisfactory. A new innovative idea which could be easily accessible to the students was required. Something catchy and interesting was what the first year students looked for.

Discussion

Plotagon is an app which is supported by every PC, android phone and Apple OS devices. It can be downloaded as an app on any android phone. After you download and make your login ID, you are all set to move on. A small shortcut icon is also created on your desktop or home screen after the downloading process is done. After you open the app, on the left hand side of the screen you get five shaded icons named by Scene, Dialogue, Action, Sound and Music respectively.

In the scene icon any of the given locations can be used along with the position. In the dialogue icon one can write as many dialogues to the chosen characters. Action takes the physical action and how the speakers act upon each other. A variety of music can also be added to the video. Specific sounds as per the need of the scene are also available.



One can choose any of the two locations. For the classroom setting, characters of Jessica, Lizzie, Samir and Scott are available. While selecting the character the mood of the talk or the discussion can be decided. There are more than 20 moods available which can be selected. Moods are one of the most appealing features of Plotagon as they are not available in any other app. Even self-made videos lacked them.

Moreover, any role can be specified to any speaker. Location can be given to the speakers, whether on the teacher's desk or near the television. With the change of theme to watercooler we get a new scene. Appropriate to the scene a music clip can also be added.

Students Feedback

A questionnaire was shared with the students in which various attributes pertaining to pronunciation, phonemes and stress were judged. Besides the difference in learning from Zoom recordings and that from Plotagon videos were mapped. Students learning from Plotagon videos performed far better than those who learnt from Zoom videos.

Conclusion

It is always the teacher who holds the benchmark of change. Colourful, effective animate videos became the need of the hour to attract the attention of the students. Still bringing the students together in the virtual class and making them learn is a bit challenging. But with new innovative strategies and availability of numerous software for non-technical faculty makes it interesting and worth learning. I would like to mention here that last year in June 2020 when I found my students were not able to make much of online teaching, I discussed with each one of them personally what they were really looking for. To my surprise, they wanted to learn but not from the normal lecture method. They wanted that there should be proper slide sharing with colourful animation. For the lab they wanted it to be not less than a movie shot. So the expectations of not only the teachers but our students are on a rise with the change in the education process. Thus I found this app very useful and interesting in making videos for my students.

Limitations and Future Studies

A lot is required to work on the kind of location provided in the app. Since the free version has only two settings available but the paid version has several other locations which can be used for different reasons. More characters can be purchased. One of the limitations is to create subject specific videos. The software does not have variety of features that can help in creating videos for technical subjects.

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It was in June 2020 that our university conducted a one-week online training programme on preparing e-content for the students. It was during this training programme that I learnt about this app. I thank the college authorities who took pains in training the faculty.

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<https://plotagon.en.softonic.com/download> This is the link to download the app.

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Developing Soft Skills in Engineering Students with COVID-19 Pandemic: Challenges and Limitations of Digital Classes

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ABSTRACT

Developing soft skills of engineering students has always been sought after in all academic institutions, for their best placements and to sustain in big organisations with best professional skills it is always a bench-mark set by all engineering institutes. The inclusion of rigorous training sessions and teaching made this quite an achievable target but COVID-19 pandemic brought a situation where day-to-day life was challenged and the world had faced crises which were not seen in 100 years. On one hand, it was difficult to understand and predict how things will develop and suddenly we no longer had control over our lives. In such a situation, to continue higher education, promote students, conduct practical classes and justify evaluation was a big challenge for engineering colleges and institutes as all these learning centres were closed. An immediate and effective response to this crisis was digital or online learning. This paper aims to enlist ways of developing soft skills of engineering graduates above and beyond all the COVID-19 challenges and limitations of online classes with the intentions of making engineering graduates industry-ready and viable to work in reputed firms.

Keywords: soft skills, challenges, limitations, digital classes, COVID-19, engineering students

Introduction

Every student entering the portals of an Engineering College comes with dreams and hopes for a bright future. They come with many hopes and aspirations. Some students take up job assignments, others plan to pursue their higher studies either in India or abroad. A few may plan to take up entrepreneurship. Whatever be the future course of action a student pursues after his education, he needs to have a basic soft skill set. Soft skill is all about how people learn and think. These are basically behaviour, personality, attitude, preferences, personal integrity, communication style, leadership and/or management aptitude and style.

Whatever be the future course of action a student pursues after his education, they need to have basic soft skills set. When everything was going up to the industry requirement and demands of the employers, suddenly WHO declared worldwide pandemic. This not only made day-to-day life difficult, but also had set lot of challenges for educational institutions (school, colleges, and universities). The conventional mode of teaching was face-to-face learning in classrooms where students had lot of scope of holistic development like interaction, team-building, good connectivity, etc but all this came to a standstill because of COVID-19. In 2020, education sector dealt with this problem by shifting the platform from offline to online and changing the teaching methodology. When there was a big question of effective teaching of core subjects in Online mode another big question arose about teaching soft skills to engineering graduates with effective results and making engineering students still an industry ready. This study will focus on challenges of teaching soft skills in online mode, strategies used in online soft skills training and sustainable pedagogy for online soft skills training.

Literature Review

Coman et al. (2020) have explored the ways in which Romanian universities managed to provide knowledge during COVID pandemic with sudden and multiple changes. It was found that if teachers and students adapt and familiarise themselves with online environment, the educational process will improve.

Thomas. N. Martin (2019) has reviewed various classroom approaches for developing soft skills development through continuous, realistic, experiential active classroom teaching and learning approach.

Valeny Suryaningth (2021) has explored various ways of having students soft skills along online learning during pandemic. By using optimum media and learning methods like LMS, SLP, WhatsApp through collaborative learning students hone their skills. It is suggested that honing skills is a continual process but if considered several factors can influence online collaborative learning, resulting in soft-skills enhancement.

Discussion

Challenges faced in soft skills training of engineering graduates on virtual platform: With the start of the lockdown there was no training for the teachers and trainers to switch to online mode and no written guidelines. Despite this fact, with the zeal to learn new and more, teachers adapted to the online platform and accepted this new normal. When core subject teachers were dealing with problems like connectivity, online interactions, practical classes in virtual labs, soft skills trainers had different challenges which are as follows:

Online teaching: The first challenge faced by soft skills trainers was transition from offline mode to online mode especially for a subject which requires more of face-to-face teaching and training as it is more about body language, team building, Group Discussions (GDs) etc but rather on virtual platform training on topics like GD, presentation, Body language was quite a difficult task.

Technical issues: When the entire world was struggling with house arrest stress due to lockdown; teachers had another stress of dealing with technical issues like- Internet-related problems, learning virtual platform handling, non-verbal cues not reaching to students and other way round even students were not comfortable in equipping themselves with cameras. Rather when this struggle was going on another question came was of Methodology which was supposed to be used in making the course of soft skills interesting for students.

A student hailing from rural background: Soft skills teaching becomes very important for students who are coming from non-English backgrounds but it is even more important for students hailing from rural background. In offline mode or classroom teaching, still communication skills teaching was an achievable task but in COVID19 the entire system went online and students were supposed to learn from their houses, it was very difficult for students from rural backgrounds to continue learning as there were technical issues, low connectivity, and above all many villages lack Internet facilities.

A more fatal second wave of COVID-19: when the entire world was coping up with the pandemic, year 2021 brought an even more fatal second wave of corona virus where entire families were getting infected from grandparents to parents to children. This scenario stressed out students in higher education. They suffered from the stress of losing either their parent/s, or near and dear ones, friends which ultimately impacted their academic performance.

Socio-economic and other challenges: On the one hand, teachers were facing their own challenges while on the other hand, graduates and postgraduates had their own set of challenges emerging due to family sufferings like social cut-off, financial stress because of either earning member's death due to corona or else losing jobs, which generated psychological stress also.

Strategies to Combat the Challenges of Soft Skills Development

Tactics for soft skills development: Soft skills training is a process of developing skills which can give students a smooth start to their career and can make them adapt to any given situation. Soft skills teaching in the pandemic condition should be governed with the situation and environment as well as learning goals, set by the students and teachers. In this new normal certain skills are highly sought after in the post-COVID world like Problem solving skills, leadership skills, and communication skills. Not just hard skills but also soft skills require change in methodology and adaption to new way of working. Students have to learn problem-solving skills to approach at problems rationally and find new opportunities, to develop teams which can plan and manage work better through their leadership skills, to develop good collaboration and communication clearly the most important skill is communication skills.

Techniques used in teaching soft skills: Observations and other researches have proved that on different virtual platforms there are a lot of possibilities of conducting group activities which were possible in classroom set up. In a physical classroom setting, an instructor could manage distraction by gently reminding absent-minded groups via verbal or non-verbal means but on virtual platform this is possible by using breakout room in which students are divided and allotted rooms. Pandemic has brought the situation where online learning was the only way to continue education. Media and method both made this possible by providing varied options like LMS, WhatsApp, Google Classroom, Zoom, etc. Universities not only faced challenges of affordability but also quality management, pedagogy change, accessibility. Students are induced their soft skill by doing tasks like group Discussions in breakout rooms, Power Point presentations by screens sharing and oral presentation in specific time limit, case study discussion for developing effective problem solving skills, critical thinking skills.

Conclusion

The Coronavirus pandemic has shaken up the education sector globally. The biggest challenge may be the ongoing pedagogical challenge of how to teach soft skills in a manner that is contextually relevant and realistic. Soft skills are crucial for the enhancement of employment performance and career prospects. This paper includes the challenges, limitations, problems faced by the students as well as teachers along with the strategies which can be used for students' soft skills inducement and sustainable pedagogy to get through this tough time of pandemic. This study has discovered new ways of providing group discussion session, how to generate enthusiasm for learning and student's interaction during online learning. This paper provides ways to strengthen students' engagement, enhancing students' soft skill along online learning during COVID-19 pandemic. The possibility of taking classes anywhere and at anytime on virtual platform strengthens its importance as soft skills development is also a continuous process thereby developing new skills in the process leading to life-long learning. At last it can be concluded under vowel technique that:

1. This paper adds new ideas to the earlier research works done.
2. It explores possibilities of virtual soft skills teaching which were not available in conventional learning mode.
3. It identifies challenges that have come up due to the pandemic.
4. It gives an overview of the importance of soft skills in post-COVID era.
5. It helps in understanding changing times of the pandemic.

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The Role of Online University Teaching and Learning during COVID-19 Pandemic

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ABSTRACT

Amidst the worldwide prevalence of the COVID-19 pandemic since March 2020, there has been an abrupt transition to online teaching and learning. Among students of various age groups, students pursuing university education have been one of the most drastically affected by this sudden change. Responding to this critical predicament adapting completely and rapidly to online education that ensures effective learning, has been the need of the hour. It is imperative to also investigate the ways in which Information and Communication Technologies affect the learners, teachers and supporting staff members during the lockdown of COVID-19. This paper proposes to evaluate the challenges faced by instructors across universities in India. Through this exploratory research, an attempt will be made to understand through an exhaustive literature review, the measures that have been deployed to overcome the challenges that hamper effective learning among university students and online pedagogies. The paper concludes with insights to focus on students' experiences of learning online. As a part of this prescriptive research, it also aims to propose effective best practices of teaching and learning as well as pedagogical innovations that can improve distance education.

Keywords: online university teaching, COVID-19, pedagogy, learning, ICT, higher education

Introduction

Since December 2019, novel Corona Virus, SARS COV 2, or COVID-19, which was found in a wet market of the city of Wuhan in China (Huang, et al., 2020) spread world-wide. Since it quickly gets transmitted among human beings (Li, et al., 2020) WHO advocated social distancing as an effective measure to contain the spread of the pandemic (WHO, 2020). Social distancing had been imposed as a global mandate in varying degrees as a stern measures.to contain the virus. The activity of learning also had to adapt to this new normal of online education. Online education is defined by Fry as learning that involves the use of the Internet and relevant devices to prepare learning materials for a smooth administering of a course or a programme. (Fry, 2001)

Objectives of the Research

This paper discusses the transition due to the crisis of abrupt changes during the outbreak of COVID-19 pandemic among institutions of higher education, students and faculty members to online learning. The chief objectives of this research are

- To bring to the forefront the existing challenges and available opportunities that the lockdown, restrictive measures have brought to online university education.
- To gauge the challenges faced by teachers across universities, particularly in India.
- To comprehend with the help of an exhaustive corpus of literature review, the actions that have been organised to encounter the challenges that hinder effective learning among university students and online pedagogies.

Methodology

The papers selected for the literature review of this exploratory and prescriptive research focus on online learning and teaching in the landscape of higher education published between January 2002 and June 2021. This will offer a recent study of first-hand empirical research. The papers have been selected from the database of Science Direct and other articles from databases of Online journals, books, eBooks, websites that elaborate on the practices of online teaching and learning.

Literature Review

The pandemic has thrown scores of people of the academic fraternity into a state of sheer unpreparedness. As a result, a multitude of literature on various public platforms related to this predicament have been populated to discuss solutions for the same. Though the shift to online teaching was unforeseen and hurried due to COVID-19, it occurred in the middle of a broader ICT revolution process in educational organisations (Selwyn, 2012). Technological innovation has been a part of higher education for several decades in some countries (Kopp, Gröblinger, & Adams, 2019). Using technology in higher education has been burgeoning, keeping pace with the continual digital advancements.

Analysis

Technology in Higher/University Education in India

The widespread use of technology had already been made available by the Government of India on several domains for the last two decades before the pandemic on platforms like Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM), MOOCs, Annual Refresher Programme in Teaching (ARPIT) and e-PG Pathshala. (Mishra, Gupta, & Shree, 2020). Several educational strategies adopted by countries to encounter the effects of COVID-19 had been reported through a document by UNESCO. Following these as guidelines, UGC attempted to help universities that were in the middle of their terms to complete their teaching modules and conduct examinations online (UGC, 2020). Following the mandates of the Government of India, schools, colleges and universities had to stop students from physically attending classes in order to maintain social distancing guidelines. The eruption of COVID-19 made it imperative to shut down university campuses and migrate to the online domains of teaching, learning, assessment as well as admission and placement processes.

Advantages of Online Learning and Teaching

By applying learning theories, discerning different viewpoints through conversation, altering teachers' opinions and finding new teaching concepts, practitioners used online communities to build meaning of their teaching practices. Baran & Cagiltay (2010). Both synchronous and asynchronous lectures when judiciously used, can go a long way in offering guidance and support to the students. A vast variety of exercises, online activities, videos, audios, podcasts, pictures, diagrams, maps and demonstrations are available online as free access that can be used as educational tools. This can make learning greatly interesting and teaching extremely satisfying depending upon the degree of technological competencies of the participants.

Challenges of Online Learning and Teaching

COVID-19 has given sufficient evidence of how much the education system is prone to external hazards. (Bozkurt & Sharma, 2020). The challenges of the digital shift are not limited to instructional strategies during the period of COVID-19 pandemic but include affective factors as well for both instructors and learners as well (Adedoyin & Soykan, 2020). Another mixed-methods study proposed that "transitioning online in a context of a crisis contorts normal longitudinal perceptions of preparation and readiness" from the view point of the instructors. Rather than evolving innovative methods for online teaching, it is the quality and volume of scholarly publication that is rewarded with career advancement incentives (Cutri, Mena, & Whiting, 2020). This digital migration of instructional strategies came with several logistical drawbacks and attitudinal changes (Ribeiro, 2020).

Discussion and Conclusion

Online education has been received by learners and faculty with varying perceptions. For instance, the sudden difficulty of changing to online teaching is perceived in different ways by faculty members depending on their goals. (Martin, et al., 2020) Several papers discussed above have raised this as a reason accounting for the mixed reactions towards online education. Empathy for learners who are attempting to learn online can benefit faculty who are learning to teach online (Salmon, 2011). Online learning has been regarded as a part of "replacement processes that has been branded as disruptive processes" (Adedoyin & Soykan, 2020). Several studies have discussed the technological and educational interventions that sustain the development of knowledge (Baran & Cagiltay, 2010;

Mumford & Dikilitaş, 2020). However, MOOCs, online certification, free university coursewares can also be integrated well with educational resources.

Limitations and Future Studies

Some areas of study warrant further scholastic attention, focusing exclusively on areas of practical learning like learning design which can be seen in only a few research articles (Best & MacGregor, 2017) for instance. The literature review is largely limited by ease of access and availability. Greater attention needs to be directed to the students' perspective of this online transition. Much of the available research does not primarily focus on this issue. Since the outbreak of the pandemic, much of the available research focusses on conceptual areas of teaching and learning, including cognitive and logistical factors affecting them. Yet, studies that concentrate on empirical research are limited in number and do not focus much on the relevance of the topic of this paper. Further research needs to be carried out in the context of the assessments that can ensure that the expected learning outcomes of every course have been duly achieved. It is hoped that this paper may offer sufficient prompts for further courses of study and research that can be implemented for the benefit of such educational experiences.

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Flow Learning Experience in Online Learning by Integrated Course Design

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ABSTRACT

Learner engagement is critical for the success of the teaching-learning processes. It has become challenging in online learning. With a sudden increase in online learning after COVID-19, many institutions and teachers had to face several challenges and one significant challenge remains to be learner engagement leading to significant learning experiences which are in flow state. Irrespective of the mode of learning, flow learning experiences are achievable by using integrated course design methodology. This work explores the integrated course design experience of a first-degree course offered in an online learning mode. It highlights several features of the course based on the integrated course design methodology that made it engaging and the learning significant. Evidence of engagement are analysed and conclusions are drawn about the elements of the learning experience that were impactful. The study showed that integrated course design is one method that can be used by teachers for creating flow learning experiences in online learning as well.

Keywords: online learning, integrated course design, engagement, effectiveness

Introduction

Isolated learner, technology availability, competence of teachers, inefficiency of group work are some challenges of online education (Gillett-Swan, 2017). Supporting and engaging the isolated learner in online learning is crucial for the success of learning experience. A study conducted in a private higher education institution during early days of COVID-19 reinforced the common challenges of online learning. The study listed, students staying less focused, unsatisfactory platform/medium of learning, non-availability of gadgets, poor internet access, disruptions in the momentum of teaching, students not attending online courses as the six major challenges faced by the educators (Yusuf, 2020). Educators and educational systems had to quickly react to the pandemic and many institutions at all levels of education were faced with the crisis of continuing the teaching-learning process. Crisis situations like COVID-19 pave the way for the educators to step up their pedagogical and technical competency that are pivotal for online learning success. Using innovative pedagogical approaches is one major opportunity that is available during such situations (Dhawan, 2020). While the technological challenges were addressed to some extent with the pandemic extending into 2021, challenges pertaining to learning effectiveness related to pedagogy remained, as indicated in a study (Yuzulia, 2021). Online learning is fast emerging as an alternative to offline learning in classrooms across the globe. There are EdTech companies emerging which have evolved technology for online learning in all the possible modes which includes asynchronous, synchronous, and blended. Greater deployment of technology in the education space is likely to continue but the learning experience and effectiveness will greatly depend on the teaching learning process that is carefully planned with continuous support, sufficient facilities and facilitative environment (Sim et al., 2021).

This work is about a teaching strategy that was implemented at course level in higher education that aimed to provide an online learning experience that was engaging, effective and significant. Metrics were used to measure the engagement, effectiveness and significance of learning in the course after the implementation of the teaching strategy.

Literature Review

Fink's taxonomy of significant learning to redesign courses and assess student learning expands student learning well beyond foundational knowledge (Levine et al., 2008). Fink proposed six levels in the taxonomy (Dee Fink, 2009). Fink also states that significant learning will have flow experiences. Flow experience was proposed by Csikszentmihalyi and the flow tunnel or tube is strongly supported by Vygotsky which emphasises the growth principle, when level of challenge stretches the existing skill (Csikszentmihalyi, 2014; Pavlas et al., 2010). Game-based learning environments such as video games are known to be creating excellent flow experiences which are naturally engaging and gradually increasing level of challenge and skill (Pavlas et al., 2010). Integrated course design consisting of twelve steps and three phases has been proposed by Fink for creating significant learning experiences (Dee Fink, 2009; Fink, 2003). This work adapts the integrated course design methodology proposed by Fink to offer a course online, thereby creating significant learning experiences which consist of flow states as well. Several authors have applied integrated course design proposed by Fink to their courses (Banks & Henderson, 2019; Kusumawardani et al., 2014).

Methodology

A course offered to Bachelor of Engineering degree programme with specialisation in mechanical engineering of the institute as an elective which the author designed and taught for sophomores was considered for the study. The course had been taught for three times now and this was the fourth time it was being offered and first time online. The aspects of the course that had to be changed to suit the integrated design approach were modified or designed first time. The different aspects of the course and the modifications made are listed in Table 1. The course was offered online in the blended mode (asynchronous and instructor led). It had three credits with 45 hours prescribed in the syllabus. The metrics to measure the engagement, effectiveness and significant learning experiences were decided before the delivery of the course and were closely tracked.

Design Aspects

The course was offered at a time when the students were not on campus and COVID-19 cases and deaths were on the rise. Hence it was one of the key situational factors which had its impact on the design, delivery and assessments. There were 18 students registered for this elective course on "Battery System for Electric Vehicles". The implementation of integrated course design using Fink's taxonomy are shown in Table 1. The course had two tests of 50 marks each and the assignment was evaluated twice for 15 marks each. Hence a total of 130 marks was considered for the performance in the course. All the questions in the tests and the assignment were checked for alignment to course outcomes. Over and above the student feedback about the faculty, which is mandated by the institution through the respective departments, an exclusive feedback form was designed to collect additional feedback about the course, teaching learning methods and instructor. This feedback form was made anonymous, hence the learners were free to express their views.

Table 1. Fink's Taxonomical Levels, Procedures for Assessment and Learning Activities

Level	Procedures for Assessment	Learning Activities
1. Understand and remember key concepts, terms, relationships, and the like	Quizzes	Videos
2. Know how to use the content	Tests	Videos, Handouts, Quizzes, Instructor led sessions
3. Be able to relate this subject to other subjects	Assignment	Previous courses

4. Understand the personal and social implications of knowing about this subject	Comments	Posting and commenting on articles in Padlet
5. Care about the subject (and about learning more on the subject)	Design report	Prepare design report
6. Know how to keep on learning about this subject after the course is over	Extending design	Supporting with review comments, sources to refer to, certifications available etc.

Metrics

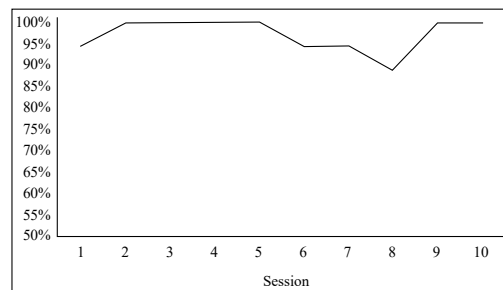
Engagement in the course was tracked using number of students viewing course videos hosted and responding to the embedded formative assessment questions, attending the instructor-led sessions and actively taking part in the online activities, such as Menti quizzes. Engagement is reported session-wise in percentage. Effectiveness of the course offered using this methodology was assessed using the average and standard deviation of the scores in the two tests and one assignment. Course-end feedback survey had questions related to self-reflection and rating of various aspects of the course and instructor. It had both quantitative and qualitative response type questions. Findings using the different metrics are reported in this section under two categories.

Engagement

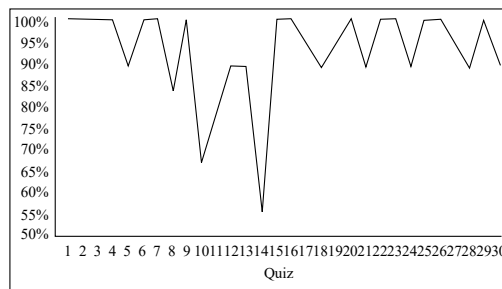
The following figures 1 a, b and c show the engagement expressed in terms of percentage for video lesson (content), live sessions and quizzes.



1a. Engagement percentage with video lesson



1b. Engagement percentage during instructor-led sessions

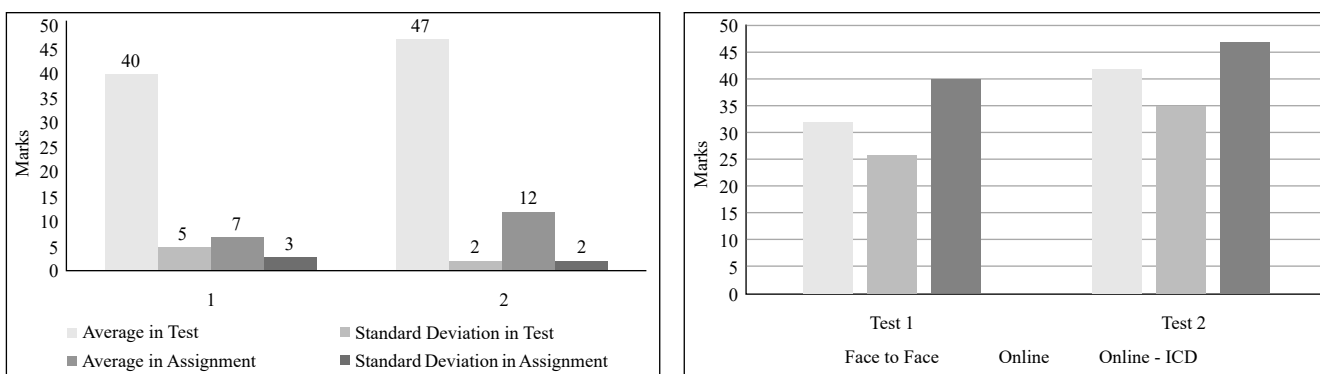


1c. Engagement percentage in the quizzes

Figure 1. Percentage of engagement of learners with content, sessions and quizzes

Effectiveness

The following figures 2 a, b show the performance of the learners in the tests and assessments by comparing the average marks and the standard deviation in the marks.



2a. Average and standard deviation of marks in tests and assignments

2b. Average test scores across three batches of students in the same course

Figure 2. Performance of learners in tests and assignments and comparison with other batches

Discussions

Engagement in content (video lessons with embedded quizzes) ranged from 61 to 100 per cent, but on an average, it was 85 per cent. Engagement in the instructor-led sessions ranged from 89 to 100 per cent, but on an average, it was 97 per cent. Engagement in the assessment quizzes ranged from 56 to 100 per cent, but on an average, it was 93 per cent. The average marks are increasing while the standard deviation is decreasing in the tests as well as assignment. Between the first and second test the average score increased by 3 marks and the standard deviation reduced by 3 marks. The anonymous feedback survey conducted upon completion of the course indicated that learners were overall very satisfied with the course. This was based on the experiences that they got due to careful design using the method proposed by Fink. In particular, Menti quiz and assignment drew special attention. The content, assessments, methods and instructor were highly rated by the learners. This was also reflected in the institutional feedback where the learners gave 96 per cent rating for the course based on the standard instrument used for all courses. The significant experience of the students were observed when 17 out of the 18 submitted complete design reports for their chosen systems/products/parts. It was also observed that 3 out of 18 students have continued their experience from the course and are planning to manufacture an e-bike. The comparison of the average test scores across three batches also indicated a significant improvement when integrated course design (ICD) was applied to online learning.

Conclusion

Fink's work proposing a taxonomy and recommending integrated course design as a method to create significant learning experiences is notable and found applicable for college courses offered online. Learners were engaged, learning was effective and flow experiences were felt by learners in the course. Well-designed course assignments play a vital role in creating significant learning experiences. Engagement in instructor-led sessions can be enhanced by using apps like Mentimeter. Flow learning experiences which are significant is possible in online learning environments through careful course design using methods such as integrated course design

Limitations and Future Studies

The parameters considered for the engagement, effectiveness and significant learning experience were the best possible, given the situational factors of COVID-19. Detailed exploration of the parameters to measure the impact of integrated course design will go a long way in establishing this method. The data gathered and reported based on the metrics, showed significant variations in some cases. The cause(s) for the variations must be studied further to under pin the focus areas for improvements based on the data analysis.

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Education and Industry Linkage

Experiential Learning-Based Service-Learning Pedagogy for Civic Engagement of Pre-service Teachers

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ABSTRACT

The present education around the globe seeks to address the issue of lack of civic engagement among students which can have adverse effects on society. Experiential education in the form of service-learning enables the students to engage in activities that address community needs together with structured opportunities for reflection designed to achieve desired learning outcomes. This study aimed to use a transformative pedagogy that linked the classroom with the real world and theory with practice. It was a deliberate effort to integrate service learning pedagogy into teacher education programmes in order to link academic instruction with community service with an intention of developing in the pre-service teachers, a strong commitment towards civic engagement. This experimental study consisted of a post-test only control group design involving a sample of 64 pre-service teachers pursuing their two-year Bachelors of Education programme. A self-designed civic engagement scale was administered to collect the data. The experimental duration was four months covering one semester. The post-test results indicated significant differences in the civic engagement of pre-service teachers. The pre-service teachers exposed to service-learning Pedagogy had significantly higher civic engagement compared to the group that was not exposed. The study has implications for teachers at all levels of education to adopt service-learning pedagogy to ensure civic engagement, as service to humanity is the ultimate purpose of education.

Keywords: experiential education, service-learning, service-learning pedagogy, civic engagement

Introduction

The main purpose of education is the holistic development of an individual, ensuring the contribution to the betterment of society. Education should develop a society in which people are aware of their rights and duties. The contemporary education around the globe seeks to address the issue of students' lack of civic engagement which can have adverse effects on the society. This issue can be addressed through service-learning a form of experiential education in which the participants' learn by linking academic instruction with service experience by actively involving in a service experience that meets identified community needs with meaningful reflection. Many higher education institutions and discipline-specific associations have embraced service learning as a way to join campuses with their communities to positively respond to community challenges and opportunities for collaboration (Kiarash, 2017). The present experimental study was an attempt to find out the effectiveness of an experiential-learning based service-learning pedagogy on the civic engagement of pre-service teachers in a two-year teacher education programme.

Literature Review

Experiential learning based service-learning can be an effective pedagogical tool for developing students' civic engagement is substantiated by a number of studies. Koopmann (2013) in a study examined the relationship between service-learning and civic engagement in the two-year college. The mean differences of pre-test and post-test suggested that the service-learners had a higher tendency than the non-service-learners to participate in the majority of assessed civic engagement activities. Ebacher (2013) in a study showed that service-learning strengthens student learning and civic engagement and that service-learning courses may be led successfully by instructors with limited time and experience. In their study Bringle and Steinberg (2010) found that service-learning is an effective pedagogical tool to enhance not only students' discipline learning, but also their interpersonal skills,

their interest in volunteerism, their participation in politics, and their civic engagement. However, several studies do not yield statistically significant data to support the correlation between participation in service-learning and civic engagement (Billig & Jesse, 2005; Levesque-Bristol & Fisher, 2010; Brandes & Randall, 2011). However, the application of Service-Learning Pedagogy in teacher education programmes is uncommon. Hence, the study aimed at answering the research question “Whether pre-service teachers who were exposed to Experiential Learning based Service-Learning Pedagogy show greater civic engagement than students who were not exposed?”

Topic

The objective of the study was to find the effectiveness of experiential learning based service-learning pedagogy on civic engagement and its indicators among pre-service teachers in a teacher education programme. It aimed at giving experience of service, reflection and learning to pre-service teachers by involving the partnership of various local agencies designed to achieve desired learning outcomes. The treatment was for the duration of one semester of four months. It began with the orientation session followed by implementation of an action plan involving need analysis, formulation of academic and service goals, selection of community agencies and service-learning activities. Every service activity was implemented in five stages namely, planning, action, reflection, evaluation and celebration. This aimed at sensitising pre-service teachers towards social problems and also developed most needed civic values in them.

Civic engagement is defined as the “Individual or collective actions in which people participate to improve the well-being of communities or society in general” (Cho, A. et al., UNICEF, 2020). In the present study, civic engagement refers to the active participation of pre-service teachers in the public life of a community in an informed, committed, and constructive manner, with a focus on the common good. It included indicators of civic, electoral, political voice, comfort with diversity, willingness to help others, intention for future participation and service learning.

Methodology

The experimental design used in the study was non-equivalent control group post-test only design. The population consisted of all the pre-service teachers pursuing their two years Bachelor’s of Education programme in Mangalore Taluq of Dakshina Kannada District of Karnataka state. Sixty-four pre-service teachers randomly chosen with thirty-two pre-service teachers each in Experimental and Control group formed the sample of the study. The “Civic Engagement questionnaire” consisting of 20 questions was constructed, validated and used for post-test data collection from both the groups of pre-service teachers after four months of experimental treatment on Experiential Learning based Service-Learning Pedagogy. The following Null Hypotheses were formulated and tested using the test of significance “t” test.

H₀1: There is no significant difference in the mean post-test scores on Civic engagement of Experimental and Control group pre service teachers.

H₀2: There is no significant difference in the mean post-test scores on Indicators of Civic engagement of Experimental and Control group pre service teachers.

Analysis

The Hypotheses H₀1 and H₀2 were tested using the ‘t’ test of significance and the results are given in Table 1.

Table 1. Test of Significance Results of Post-test Scores on Civic Engagement & its Indicators of Experimental & Control group Pre-service Teachers

Civic Engagement & its Indicators	Groups	N	Mean	SD	t
<i>Civic Engagement</i>	Experimental	32	57.71	7.48	3.49*
	Control	32	51.94	5.60	

<i>Civic</i>	Experimental	32	82.33	1.14	25.48*
	Control	32	73.50	1.04	
<i>Electoral</i>	Experimental	32	117.5	0.49	36.04*
	Control	32	111.5	0.80	
<i>Political Voice</i>	Experimental	32	59	8.29	2.52*
	Control	32	55.25	0.81	
<i>Service Learning</i>	Experimental	32	112.66	0.58	
	Control	32	104.33	10.69	4.41*

*Probability (p) < 0.05

The results in Table 1 indicate that the ‘t’ values for civic engagement (3.49) and for indicators of civic engagement namely, civic (25.48), electoral (36.04), political voice (2.52) and service-learning (4.41) are significant at 0.05 level of significance. Hence H_01 and H_02 are rejected and alternate hypotheses are accepted. Thus, it is concluded that the “Experience based Service-Learning Pedagogy is significantly effective in enhancing the Civic Engagement and its indicators namely, Civic, Electoral, Political voice and Service-Learning of Pre-service Teachers”.

Further analysis on the responses of the Experimental and Control group pre-service teachers on future participation in civic engagement is depicted in the figure 1.

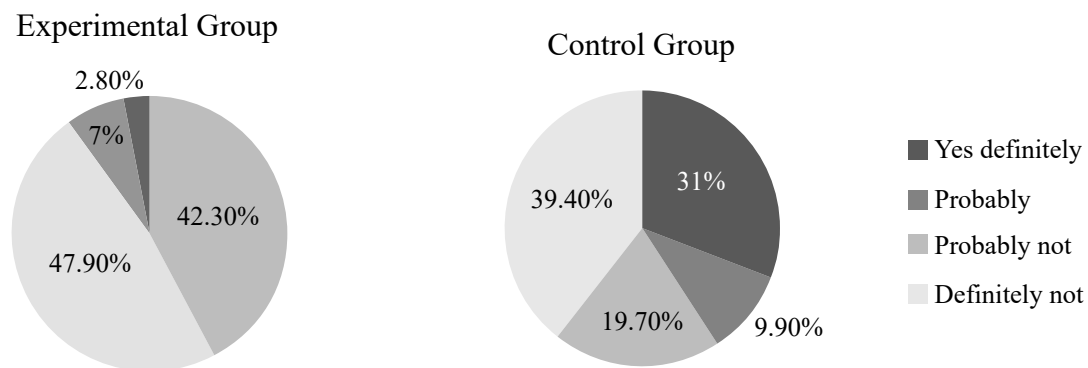


Figure 1. Future participation in civic engagement of pre-service teachers

Figure 1 indicates that 90.2 per cent of pre-service teachers exposed to experiential-based service-learning pedagogy expressed their willingness to volunteer for community engagement compared to that of control group pre service teachers who showed 40.9 per cent willingness to volunteer. It was evident that 31 per cent of pre service teachers who were not exposed to experiential-based service-learning pedagogy said definitely they will not be part of the community engagement in the next six months whereas only 2.8 per cent of the group exposed said the same. Hence, this pedagogy has definitely oriented the pre-service teachers towards positive civic engagement.

Discussions

The results indicated that pre-service teachers exposed to experiential-based service-learning pedagogy compared to those who were not exposed demonstrated more civic engagement in terms of community problem-solving, active membership in a group or association, regular volunteering for a non-electoral organisation, regular voting in both local and national elections and frequently contacted officials as well as signed petitions, both written and electronic, were willing to participate in community life in the future, exhibited comfort with diversity in participating with a group of different gender, ethnicity, sexual orientation, or religion. These results are supported by studies conducted by Koopmans (2013) and Ebacher (2013). Though there are empirical research evidences that

support the results of the study, not many researchers have attempted to apply this pedagogy in higher education, professional education and teacher education programmes. Hence, further research is required in the Indian context to generalise the results of this study.

Conclusion

The pre-service teachers exposed to experiential-based service-learning pedagogy were sensitised towards the community challenges and were able to connect themselves to the real world and realised their obligation to contribute to the community. This attitudinal change in them to contribute to the community was visible in their being ready for future participation in civic engagement activities. This pedagogy when implemented effectively yields tremendous benefits for students, teachers, communities and institutions at all levels of education. This study has implications for teachers at all levels of education to adopt service-learning pedagogy to ensure civic engagement, as service to humanity should be the ultimate purpose of education.

Limitations and Future Studies

The experimental design of the study revealed the cause-effect relationship which limits external generalisations. The quantitative statistical model applied revealed only significant differences between the experimental and control groups. The duration of a semester and hectic schedule of the academic programme restricted the participants to have continuous follow-up work. The lack of continuous support from the partnered organisation delayed implementation of scheduled activities. However, the study has a wide scope of application at all levels of education for different target groups, namely, administrators, teachers, students, parents and community members. Future studies can be focussed on enhancing student's interpersonal skills, interest in volunteerism and community partnership along with discipline learning.

Acknowledgement

I am indebted to the principals and faculty members of B.Ed. colleges of Mangalore University for the support rendered in implementing this research study. I am grateful to the pre-service teachers involved in the study for cooperating to be a part of this study.

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Impact of Flipped Classroom on Student Engagement

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ABSTRACT

Birla Institute of Technology & Science, Pilani conducts Work Integrated Learning Programmes (WILP) as a means of continuing education for employed professionals. The mode of instruction is either face-to-face or online. We conduct lectures via both regular mode (comprising 16 sessions each of two hours) and flipped mode (comprising 11 sessions each of two hours). In the regular mode, the instructor delivers lectures during class hours and students are assigned homework problems and other assignments to do at home. In the flipped mode, students are expected to watch pre-recorded videos, that is digitised content at home, and then come to the classroom with an understanding of basic concepts. In the classroom, the instructor will review important concepts and advanced topics as well as clarify doubts. They will also focus on the application of concepts via problem-solving and experiential learning such as excel modelling, case study discussions and simulation. This is the reverse of the traditional approach of introducing new concepts in the classroom and assigning homework problems and projects to be done by the students at home. Our study has found that flipped classroom model has a positive impact on student engagement as compared to the traditional classroom model.

Keywords: flipped classroom, student engagement, Work Integrated Learning Programmes (WILP)

Introduction

Innovation is the need of the hour. The innovations in teaching-learning have brought in active learning pedagogy as a prominent component of education. Active learning is necessary for students to take part in the learning process and also for not making their learning ephemeral (Canaleta et al. 2014; Niemi et al. 2016). Technology in education is an ever-evolving process and demands the students and the instructors to update themselves of the emerging technologies in education from time to time. With recent developments in active learning pedagogical approaches and technological advances, a major part of the teaching fraternity encouraged the implementation of an innovative educational model called flipped learning (Bergmann and Sams 2012, 2014; Lopes and Soares 2018; Sletten 2017). As a part of this model, students will have the opportunity to watch the pre-recorded videos at their own convenience and come prepared to the class. Therefore, during the class, active participation can happen. The below figure illustrates the key elements of the flipped model as practised in WILP at BITS, Pilani.

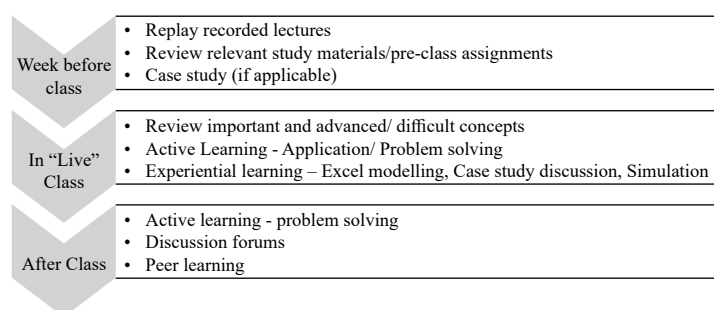


Figure 1. Flipped classroom model at BITS, Pilani

The purpose of this study is to gather responses from students (registered in Second Semester 2020–2021) who are pursuing their BITS, Pilani, WILP-MBA programme to find out their preferences and level of engagement with

regards to the flipped classroom. The findings from this study will help instructors to get to know the benefits of the flipped classroom and help them choose flipped learning for better student engagement.

Literature Review

Flipped learning was pioneered in 2012 by John Bergmann and Aeron Sams. Originally, the term given by them was “flipped classroom” in 2002. What was initially started as an alternative for students who missed classes has since gained recognition (Birgili et. al., 2021). In 2016, a global combination of teaching fraternity, practitioners, technologists, and leaders in flipped learning formed the Flipped Learning Global Initiative (FLGI). This organisation supports the adoption of flipped learning worldwide (FLGI 2018a; McCarthy 2016). The launch of the FLGI has led to the replacement of the popular term “flipped classroom” with “flipped learning”. This approach gained worldwide recognition in various subject areas such as science, medicine and engineering, to mention a few (Bergmann and Sams 2012, 2014; Bergmann 2018; Lin et al. 2019). Higher educational institutions such as Harvard and Stanford in the USA and the MEF University (the first fully flipped university) in Turkey have become pioneers of this global movement (FLGI 2018b; Şahin and Fell-Kurban 2016). These three universities have collaborated in setting 187 standards to facilitate the spread of the flipped learning approach worldwide with the best practices and technologies. In November 2018, these standards were made public at the Flipped Learning 3.0 Global Standards Summit at MEF University (Flipped Learning 3.0 Global Standards Summit, 2018). This summit established an understanding to the teaching community that flipped learning has something more to it than simply uploading the pre-recorded videos (Sams and Bergmann, 2013). In the process of flipped learning, learners go through the course content through pre-recorded videos and come prepared to the class. Learners can thus learn advanced course topics in the live lecture and engage with the instructor and peers by being fully active in the learning environment. Aycicek and Yanpar (2018) found that teachers need to be encouraged to use flipped classroom model to enhance classroom engagement. The most commonly valued reasons for the success of flipped classroom model are: learners appreciating learning by using the videos, the opportunity of self-paced learning, flexibility and mobility brought by pre-recorded videos (Nouri, 2016). Holik (2019) found that the student grades in the flipped classroom were nearly 4 per cent higher than those in the traditional classroom and were consistently higher throughout the semester. Halili and Zainuddin (2016) in his analysis found that flipped classroom brought positive impacts toward students’ learning activities such as achievement, motivation, engagement, and interaction. Tarik and Gulsecen (2019) found that the flipped classroom has a positive impact on the students’ academic achievement, engagement and satisfaction. A meta-analysis of studies comparing the flipped classroom with traditional classroom revealed that student learning is in favour of the flipped classroom (Lag and Saele, 2019). In addition to the aforementioned benefits, there are few drawbacks to this flipped classroom model. One is the duration of the videos. When the videos are too long, the students may not be interested in watching the entire video or opening the video link. Moreover, it defeats the purpose of the “one video-one goal” concept (Brame, 2016). Another challenge is that older learners seem to resist the use of the flipped learning approach (Hewitt, 2017). In addition, if students come to class without having watched the video, instructors cannot proceed with the course as per their plan (Bognar et al., 2018) or students cannot follow the live lectures properly (Heo et al., 2018). While flipped learning is treated as an effective approach for students’ active learning, instructors cannot be sure that students will watch the videos before attending the class.

Methodology

Students pursuing WILP MBA programme were asked to complete an online survey on Flipped Classroom. We obtained approximately 500 responses from about 2200 students surveyed.

Analysis

We used Cronbach’s alpha to measure the reliability or internal consistency of our survey. According to the literature the acceptable range for Cronbach’s alpha is 0.70 to 1.00 (Nunnally, 1978). We computed the Cronbach alpha for our survey to be 0.85, which suggests that our survey has “Good” level of reliability and internal consistency. We have developed bar graphs with respect to the responses gathered by the students. We discuss the key findings from the analysis in the next section. To adhere to the page limit, we are not displaying bar graphs.

Discussions

- We find that 56 per cent of the respondents either strongly agree or agree that the flipped classroom model is more engaging. Only 16 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that flipped classroom model is more engaging than the traditional classroom model.
- We find that 64 per cent of the respondents either strongly disagree or disagree that the flipped classroom model has not improved their learning. Only 14 per cent of the respondents either agree or strongly agree with this notion. These results support the view that flipped classroom model improves the learning of the participants.
- We find that 45 per cent of the respondents either strongly agree or agree that the flipped classroom model provides greater opportunity to communicate with other students. 25 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that flipped classroom model provides greater opportunity to communicate with other students as compared to the traditional classroom model.
- We find that 60 per cent of the respondents either strongly agree or agree that the students are more motivated to learn in a flipped classroom environment. Only 8 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that flipped classroom model motivates the student to learn as compared to the traditional classroom model.
- We find that 76 per cent of the respondents either strongly agree or agree that the flipped classroom model benefits their future education. Only 5 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that flipped classroom model benefits the future education of the students.
- We find that 78 per cent of the respondents either strongly agree or agree that they regularly use the resources provided to the participants of the flipped classroom model. Only 4 per cent of the respondents either disagree or strongly disagree with this notion. These results indicate that students are willing to support the flipped model by leveraging the resources provided to them.
- We find that 66 per cent of the respondents either strongly agree or agree that the flipped classroom model provides more time for experiential learning. We may note that the majority of the WILP courses feature experiential learning components that enable the student to apply their conceptual understanding to solve business problems. Experiential learning includes: Projects/assignments, Case Studies, Simulation/modelling exercises. Only 13 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that flipped classroom model provides more time to engage in experiential learning activities as compared to the traditional classroom model.
- We find that 76 per cent of the respondents either strongly agree or agree that the flipped classroom model makes it easier to understand the course content. Only 8 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that flipped classroom model makes it easier for students to understand the course content as compared to traditional classroom model.
- We find that 57 per cent of the respondents either strongly agree or agree that they learn more in the flipped classroom model. Only 15 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that flipped classroom model enables the students to learn more as compared to the traditional classroom model.
- We find that 73 per cent of the respondents either strongly agree or agree that the in-class activities in a flipped classroom environment facilitate learning. Only 6 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that the in-class activities in a flipped classroom environment facilitate learning.
- We find that 68 per cent of the respondents either strongly agree or agree that more courses should be offered in the flipped classroom model. Only 10 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that students prefer flipped classroom approach to traditional classroom approach.
- We find that 88 per cent of the respondents either strongly agree or agree that the pre-recorded videos are helpful. Only 3 per cent of the respondents either disagree or strongly disagree with this notion. These results highlight the relevance and value of the pre-recorded videos.
- We find that 52 per cent of the respondents either always or most of the time watch the pre-recorded videos before class. Only 4 per cent have stated that they never watch the videos before class. Thus, it appears that a

significant number of students watch the pre-recorded videos before class. These results in conjunction with the results from the prior observation suggest that immaterial of whether or not students watch the videos before class it appears that students find the pre-recorded videos to be helpful.

- We asked the respondents to rate the flipped classroom model on a scale from 1 to 5, where 5 was the highest and 1 was the lowest. The average rating was found to be 3.71 suggesting that the flipped classroom model is rated very highly by students.
- Lastly, we also find that 78 per cent of the respondents preferred that the instructor who recorded the videos should also be the instructor for the live classes. This possibly suggests that the instructor may be better able to align the live classes with the recordings and enable a smoother learning experience for the student.

Conclusion

Overall, the results of the survey suggest that students are finding the flipped classroom model to be more engaging and more beneficial. It suggests that institutions of higher education should actively explore how best to incorporate flipped classroom model into their course delivery model in order to maximise the learning of the students.

Limitations and Future Studies

This study was based on the responses of MBA students who are pursuing BITS Pilani Work Integrated Learning Programme (WILP). Additional studies viz., the relation between attendance and student engagement and comparison of pre-test and post-test results may need to be carried out to generalise the conclusions.

Acknowledgement

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New Technologies and Education

Extended Reality for Enhanced Learning beyond the Classroom: Three Pandemic-Proof Prototypes

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ABSTRACT

Spatial Computing technologies, such as eXtended Reality (XR), are being increasingly explored for training and learning scenarios across industries and educational institutions. The trend of online learning and cyber-physical campuses has become the norm since the year 2020 due to worldwide lockdowns imposed on learners. The current model of remote learning is often limited to text and audio/video conference-based learning. This has significantly affected the multimodal learning necessary to learn formative concepts in courses requiring physical presence. XR solves this problem by blending visual, auditory, reading, writing, and kinaesthetic modes of learning in a shared three-dimensional space using desktops, phones, and virtual/mixed reality headsets. However, the use of XR for teaching and learning is still at a nascent stage. This work presents three different XR prototypes used in a university and industry setting for teaching programming and cyber-physical security.

RobotAR is a Computer Science education tool where a virtual robot can be programmed to move about using augmented reality technology. Learners use Python to program the robot's actuators and receive information from the robot's sensors. The application was used to teach computational thinking, Python programming, and higher-level computer science topics such as object-oriented programming and state machines at a university.

PlantVR and PlantAR are mixed reality applications to visualise the security, safety, and operations of Critical Cyber-Physical Systems such as a city's water treatment plant. They visualise cyberattacks, the resulting process anomalies, and whether or not the anomaly is detected. The learner is connected to an actual, operational water treatment plant. This opens up the physical plant for remote worldwide collaboration and telepresence. The educator can come up with numerous attack/defence scenarios and serious gamified challenges for training and education.

We explore the efficacy, challenges, and opportunities of XR technologies for remote learning in this paper.

Keywords: remote online learning, cyber-physical campus, telepresence, remote collaboration, ER

Introduction

Extended Reality (XR) is increasingly being explored for training and learning scenarios across industries and educational institutions. XR refers to a wide range of technologies that offer immersive experiences. Immersive experiences can range along a continuum from real environments to Augmented Reality to Mixed Reality to Virtual Reality (Papanastasiou, Drigas, Skianis, Lytras, & Papanastasiou, 2019).

Our literature search suggests that XR technologies are used widely from K-12 to higher education to adult learning to teach various disciplines. XR allows for several affordances such as digital-age literacy, creative thinking, communication, collaboration, and problem-solving ability skills and are effective tools to enhance learning and memory, as they provide immersed multimodal environments enriched by multiple sensory features (Arvanitis, *et. al.*, 2009; Zainab & Huda, 2020; Xie, *et. al.*, 2021).

In addition to the developments in technology and reducing cost, the COVID-19 pandemic seems to have accelerated the adoption of XR technologies. The completely online mode of student-centred learning requires us to rethink teaching and learning. While it has been relatively straightforward to adopt lecture-based teaching to online learning, this does not natively allow for various aspects of student-centred learning such as collaborative learning, experiential learning, and active learning (Caitlin & Pausch, 2005).

XR solves this problem by blending visual, auditory, reading, writing, and kinaesthetic modes of learning in a shared three-dimensional space using desktops, phones, and virtual/mixed reality headsets. This work presents three

different XR prototypes used in a university setting for teaching programming and cyber-physical security. In the next sections, you will find case-studies of the three XR technologies, our reflections on the design, development and implementation for teaching and learning.

Case Study 1: Using Augmented Reality (AR) to Teach Python Programming to Undergraduate Students

One of the learning tasks in teaching programming at our university was to get our students to apply their Python programming skills to control and move a physical robot. Over the years, we have been trying to innovate our teaching and learning using simulated robots and AR robots (RobotAR). Advantages of the RobotAR (Kurniawan, 2021) include remote immersive learning, and minimised cost associated with maintenance and storage of physical robots.

The app design uses physical markers to define the boundary of the AR robot playground, the starting position of the AR robot and the virtual objects which the AR robot can interact with. This means that educators can set up various programming challenges that suit their learning objectives (Kurniawan, Leo & Sockalingham, 2021).

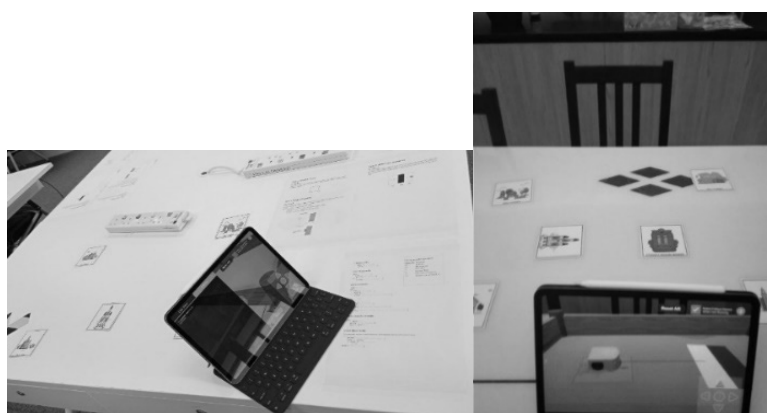


Figure 1. (a) Set-up of the AR Robot and the physical markers during study. (b) View of the virtual robot and a black colour floor object using physical markers which can be used as a programming task for students.

We used AR to teach python programming in 2020 for the first time and thus needed to understand the feedback of students on RobotAR compared with the physical robot. Students were given one programming task to use with the physical robot and another with the RobotAR. At the end of the two tasks, they were surveyed on their intrinsic motivation using the Intrinsic Motivation Instrument (IMI). A total of 19 students participated in the study. They were split into two groups and given two tasks each. The first group performed the first task using the physical robot and the second task using the RobotAR. On the other hand, the second group performed the first task using the RobotAR and the second task using the physical robot. We used Thymio for the physical robot (Riedo, Chevalier, Magnenat & Mondada, 2013). We developed the python library in such a way that students use the same API to control both the physical robot as well as RobotAR.

The results indicated that AR Robot has a similar score if not higher as the physical robot in terms of students' intrinsic motivation (Kurniawan, Lee & Sockalingam, 2021). This was encouraging as it means that one can use AR technology to replace physical robots as a motivational tool for learning programming.

Case Study 2 and 3: PlantVR/AR for Cyber Security Training of Critical Infrastructures

Virtual and Augmented Reality (VR/AR) are increasingly being used in industrial and workplace use cases, whether for training or as a productivity tool. The Secure Water Treatment Testbed (SWaT) is one such physical testbed developed at iTrust, SUTD, Singapore Mathur & Tippenhauer, 2016). It is an operational water treatment plant testbed that allows for cyber security experiments to be conducted. PlantVR extends this same ability of SWaT to the cyber-physical space.

PlantVR can be used to create a virtual and a highly accessible cyber security testing environment. This helps trainees remember and develop muscle memory for the spatial steps needed for a certain routine. The heads-up display in Figure 3 functions as an integrated monitoring panel for critical plant values and anomaly warnings.

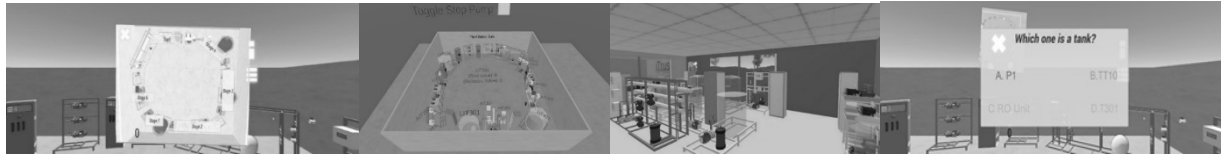


Figure 2. (a) PlantVR overhead view (b) Plant view (c) Heads-up display (d) Quiz

The PlantAR project, like PlantVR, aims to emulate the physical conditions and data collection of the SWaT plant for both onsite and offsite uses (shown in Figure 3).



Figure 3. Various stages of process in PlantAR

Table 1. Analysis

	Case Study 1	Case Study 2	Case Study 3
Educational Context	<ul style="list-style-type: none"> Teaching programming to first-year students Using AR Studying motivation and learning 	Helping operators and policy-makers visualise cybersecurity remotely	AR-enabled onsite cybersecurity in operational plants
Design Tools	Unity, C#, Swift, iOS App	Unity, C# Python	Android, Firebase, Python
Experience	Evaluated in an educational study comparing the RobotAR with the Physical robot	Tested in multiple cyber-exercises and visits worldwide	Evaluated at a Singapore-level cyber exercise and SWaT plant
Outcomes	Students reported that they found RobotAR to be as motivating as a physical robot in terms of usability and motivation. No significant difference in learning. Some students still preferred a real robot and maze over a virtual one.	A physical plant SWaT could be accessed and controlled from anywhere in the world. The plant was open to teleoperation and education.	Operators untrained in cybersecurity could visualise relevant information in their physical space. Boosted productivity and response time to prevent cyber attacks.

Challenges	The study was done within one and a half hour and only measure short-term effect of AR. Need to explore whether AR continues to motivate students in a long-term use for learning programming.	The ergonomics of using a VR headset as of 2021 for prolonged periods (>30 minutes) is still cumbersome. This is improving year after year with better technology.	The handheld nature of AR makes it a restrictive medium for jobs that are hands-on. PlantAR is being explored for Hololens and Mixed Reality for handsfree operation.
Efficacy	Effective replacement for real robots given the constraints of remote learning.	Found effective in multi-disciplinary teams of policymakers, technologists, students, etc.	Easily adaptable for existing plants and hand-held devices

Discussion

Three Extended Reality (AR/VR) tools were used in teaching and training during the pandemic at SUTD and elsewhere. The technology tools offer an indispensable learning/teaching platform and immersive - experiential learning environment during the pandemic conditions. Usage of the ER tools were evaluated in experimental as well as natural learning contexts. We found that AR is useful for immersive application-based learning and motivating. But the long-term impact on learning needs to be studied. A small group is a limitation too. AR anchors the added contextual information in the physical world, thus making the two worlds relatable. The advantage is that the design in Case-1 allows for sustainable use and change of task. On the other hand, VR is useful for absolute immersion and teleoperation, which is a requirement for certain fields of study. Case 2 and 3 are digital platforms can be repurposed for any critical infrastructure to learn about the service, security, safety in a kinesthetic medium without the need for resource investment for the real set up. Overall, cases 1, 2, 3 save cost of building physical testbeds, purchasing robots, organising students in a physical space, and this is worth considering even beyond the development cost. One other aspect that needs further exploration is the types of hardware in ER tool usage.

Conclusion

Since the online learning environment presents several challenges for hands-on, immersive and experiential learning, three ER apps, RobotAR, PlantAR, PlantVR were tested in higher education. Our experience of the ER tools suggests that there is positive potential for these applications and more studies need to be conducted on the long term impact on learning and motivation. We also learnt that the instructors and designers must have a clear vision on how the app is going to be used for teaching and learning. That is how the learning is structured and how the learners are going to be supported. It is not merely the use of XR tools that is going to bring about learning. The underpinning starts with the app design process of being clear about the learning outcomes and designing ER app tasks/assessments to align with the activities and scaffolding. This would allow students to self-appropriate learning, and such decentralised learning has broader socio-economic and geopolitical consequences.

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Outcome-Based Learning: An Overview

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ABSTRACT

The outcome in the course learning is something that the student should be able to achieve at the end of the course. Outcome-Based Education (OBE) is a novel approach in which curriculum design and content achievements are driven by final learning outcomes. The purpose of the OBE is to attain the predetermined learning outcome. In countries where the economy is driven by knowledge, outcome-based education is identified as one of the most important components in higher education.

Continuous Quality Improvement (CQI) is the key to keeping the quality and standards of an OBE model. In other words, in an OBE system, teachers act as facilitators for students so that they can gain the knowledge, skills and qualities that will make them accomplish the expected outcomes.

In characteristics of OBE, Programme outcomes (PO) mainly focussed on the attainment of Knowledge, Skills and Attitudes by students. Programme outcomes are aligned with Course outcomes and fulfilled by the achievement of course outcomes likewise Lesson Learning Outcomes are aligned with course outcome and their achievement satisfies the course learning outcome. OBE based courses produce qualities in the graduates, students are well informed and trained of the skills required out of them.

Factual, conceptual, procedural and metacognitive knowledge, cognitive skills, functional work skills, personal and entrepreneurial skills, Ethics and professionalism are some of the attribute's students attain at the end of the programme. Integrated learning of courses is an important curriculum concept. Using Bloom's taxonomy for appropriate verbs according to difficulty level, is of prime importance while designing an assessment strategy. Formative assessment with feedback mechanisms is crucial in continuous improvement of the student. Formative and summative assessments are an integral part of the learning process.

Keywords: outcome-based education, course learning outcome, continuous quality improvement

Introduction

The purpose of higher education is to make an individual capable of utilising the knowledge in identifying the problems prevailed in various sectors and providing the best solution by employing learned skill and generating new ideas to make society and country to progress.

A programme in education is a combination of subjects or modules in a structured way to attain the learning outcome which precedes to the award of qualification. These qualifications are certificates, diploma, degree, postgraduate or doctorate that are awarded by qualified institutions or competent authority after confirming that the required quality standards and necessary learning hours or credits are completed in a satisfied manner (Harden RM, 1999).

Program learning outcomes are a description of the knowledge, skills, attitudes, competencies, and values a student displays at the completion of the program.

Course learning outcomes are expected to be learned by the completion of the course. These outcomes should be meaningful, observable and measurable. The nature of learning outcomes is mainly cognitive outcomes, behavioural outcomes and affective outcomes.

Teaching and learning and evaluation methods are the tools to achieve these outcomes. Constructive alignment in teaching & learning and assessment strategies is emphasised to achieve these outcomes in appropriate manner.

Analysis of these outcomes is necessary at the end of each cohort to assess the effectiveness of the program. This assessment could provide key information to improve the curriculum by indicating the performance of each

program outcome. Continuous quality improvement is a dynamic process which can be done periodically to ensure the quality of the program while implementing the outcome-based education. (Takahashi H & Kosano H., 2015)

Andres WCO and Cheryl LCR, 2012 reported the implementation of OBE framework in an undergraduate engineering course in Department of Civil Engineering, De La Salle University, Manila, Philippines. The study reported EGA (Expected Graduate Attributes), college & department vision and mission, learning outcome for statics, teaching learning activities and assessments methods. (Andres Winston C. Oreta and Cheryl Lyne C. Roxas, 2012)

Khor PY et al, 2016 developed outcome-based pharmaceutical science curriculum. Researchers carried out a questionnaire using web-based survey. The study achieved an 81 per cent response rate and fulfilled the sole purpose of using triangulation method in getting a broader perspective in curriculum development. (Khor PY, 2015)

Need of Outcome-Based Education

There is a significant gap between academia curriculum and industry requirement. Graduates with diploma and degree often face difficulty when they enter the job market due to lack of necessary critical skills and expertise required in the industry. A significant portion of the syllabus in academia is knowledge-based which is memorised by students without having sufficient exposure on the practical applicability. Gap between industry and academia may lead to problem of unemployment in the country as courses and curriculum in academia are not matching up to the needs of the industry. Outcome-based education produces human resource with critical skills, moral and ethical qualities which are valued by industries. (Rao NJ., 2020)

Outcome-Based Education (OBE)

OBE in higher education is a unique way of learning in which the curriculum is guided by the learning outcomes that the learner should demonstrate at the end of the course. It's a complete transformation of the learner as a result of quality education. Relevant curriculum content, diverse teaching and learning strategies and appropriate evaluation methods are the backbone of this learning system. OBE is a result-oriented, learning-centric system which benefits all the stakeholders. Key performance indicators such as performance in various assessments, employability rate after course completion are among the other important outcomes in OBE. (Wudthayagorn J., 2015)

Table 1. Outcome-Based Education Versus Traditional Education

S. N.	Outcome-Based Education	Traditional Education (Content-Based Education)
1.	Active learning	Passive learning
2.	Formative, summative assessments	Examination and grades-driven
3.	Skill-based, develops skills like reasoning, reflection	Memorisation-based
4.	Integrated subjects, Problem-based learning	Individual subjects
5.	Group/teamwork, teacher as facilitator, self-learning	Textbook/teacher centered learning
6.	Flexible framework	Rigid and fixed framework
7.	Continuous quality improvement	Improvement during curriculum revision

Learning Domains

Educational objectives are divided in to three domains-affective, psychomotor, and cognitive. According to Bloom's Taxonomy, the main goal of assisting and motivating educators is to focus on all three domains thus imparting a holistic form of education.

Cognitive domain has a knowledge component and the development of intellectual skills. It has six levels – knowledge, comprehension, application, analysis, synthesis, and evaluation. Knowledge and comprehension fall lower in the order with cognition and application, analysis, synthesis, evaluation falling under higher order thinking skills.

Physical movement, coordination and the use of the motor skills fall under the psychomotor domain.

It has seven levels-perception, set, guided response, mechanism, complex overt response, adaptation and origination. Perception and set are lower order and guided response, mechanism, complex overt response, adaptation, origination are higher order. Psychomotor skills are practical skills which are learned by practical demonstration and assessed by practical test or examination.

The way we deal with things like feelings, interests, thoughts, appreciation, enthusiasms, motivations fall under affective domain. It has five levels-receiving, responding, valuing, organising and internalising. receiving and responding are lower order and valuing, organising and internalising are higher order.

For knowledge, teaching strategy are mostly based on lectures and tutorials whereas assessments are mostly written examination. However other novel teaching, and assessment methods are also employed such as quizzes. Critical thinking, problem-solving usually involves case study, group work or projects and assessed by presentation, reports and essays.

Communication skills are learned through group work, projects, tutorials or case studies and assessed by presentations. Social skills, ethics, professionalism could be learned by projects, case studies, group work and can be evaluated by reports or presentations.

Lifelong learning, managerial and leadership skills are learned by case studies, group work, projects, discussions and can be evaluated by portfolios, presentations and reports.

Mapping of course-learning outcomes with Bloom's taxonomy or other taxonomy is extremely important. While designing the course and lesson learning outcome, appropriate action verbs should be used matching with difficulty level and outcome. To make these course and lesson learning outcomes more clear, conditions and standards should be added.

Program learning outcome (PLO) should be written in line with industrial and profession needs. Course learning outcomes should be written in such a manner that they match program learning outcome.

Educator should be able to understand the mapping and correlation between CLO & PLO, CLO & LLO (lesson learning outcome) (Khor PY, 2015).

Lesson Plan

It is a document which is made up of written description on how to teach academic content. It facilitates to organise teaching objectives and methods and provides focus for the lesson to be presented. Components of Lesson Plan:

- Goals/ Aims
- Outcomes
- Prerequisites
- Materials
- Description
- Procedure
- Assessment/ Evaluation
- Rubrics

Feedback Mechanism

Providing feedback to students indicating levels of attainment after each assessment method will mitigate the misunderstandings and learning difficulties. Feedback helps students to identify the area of improvement in their performance and bring transparency in the system.

This mechanism helps teachers to detect ineffective teaching techniques and assessment tools which can help them to prepare course critique report including the feedback from students and all the tutors involved, in particular course indicating the performance in each PLO attainment for the particular course and further bring up the lacuna to improve through CQI (Continuous Quality Improvement).

Student Learning Time (SLT)

Students must give quality time for self-improvement. Effective learning time or Student academic load should be allocated in such a way that it reflects quality of student's achievement. In course syllabi credit hour calculation should include the student learning time which includes face-to-face and non-face-to-face. In traditional teaching, credit system is mainly based on educator contact hours and is mostly teacher-centric. However, in OBE, the credit system includes student learning time including face-to-face, non-face-to-face, independent learning time and assessment preparation time.

Blueprints for Assessment

Blueprints for assessment are important in ensuring that the assessment is in-line and appropriate to evaluate predefined outcomes with predetermined difficulty level for each course. Difficulty level in the courses gradually increases as the student advances to higher classes.

While these specifications are usually developed to ensure test validity for the assessment of cognitive domain, they also should be developed to ensure test validity for the assessment of psychomotor and affective domain.

Rubrics for Assessment

It is a scoring tool that assists the evaluator to assess a student's performance based on the sum of attributes rather than a single numerical score.

These rubrics are usually handed out to the students and explained before the assessment so the students will know on which criteria their work will be evaluated. Rubrics can be created in different ways with several levels of complexity (Malaysia Qualification Agency 2011).

Students can also be made to participate in the assessment process through both peer and self-assessment hence understanding the designing and utilising it for assessment is critically important for students. Involvement of the students bring self-confidence and as a result, their learning becomes more focussed and self-directed (Shamsul Mohamad, 2012).

Evaluation

Evaluation methods should relate directly to learning outcomes and evaluation activity should be designed in a way to promote student growth. Feedback should be useful to the student after each evaluation. Multiple evaluation strategies should be provided to master achievement of outcomes/competencies. Students should clearly understand the methods of evaluation for test or activity. Students must understand the rubrics used in evaluation. Assessment strategy should be based on teaching and learning method used and it should cover the learning outcome assessment (Ben-david MF, 1999).

Conclusion

OBE is an educational system which involves the reform of curriculum, assessment in education to pursue the achievement of outcome-based learning and mastery rather than merely accumulating the degree or certificates. In OBE, educators assist students in their professional development and also ensure that students are achieving the intended outcomes in their education. Students differ in their knowledge, skills, motivations and predisposition hence there is great need of a type of education which can cater to the academic need of each student and OBE can cater to such a need.

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Communication is the Universal Solvent: Usability Study on Atreya Bot – An Interactive Bot for Chemical Scientists

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ABSTRACT

Dialogue-based agents are the latest development in human-machine interaction, employed in multi-disciplinary, diverse business products to aid customers. In this research study, we propose an interactive chatbot, “Atreya”, for chemistry students to access information from the ChEMBL database (chemistry repository). This chatbot is deployed on a trendy cloud-based messaging product known as ‘Telegram’. The main objective of the paper is to look at the prospect of creating a dialogue-based agent to help chemistry students and researchers with a variety of information-gathering tasks. Atreya sends a user query to ChEMBL, extracts the drug specifics for a certain disorder, chemical targets linked with that medication, etc. The usability form was filled up, after tasks were performed on the Atreya Bot. The scores were then calculated, and analysis was performed using 2 standard usability metrics – SUS (System Usability Scale) and CUQ (Chatbot Usability Questionnaire). These questionnaires, help us to measure attributes such as usability, attractiveness, efficiency, and stimulation provided by the bot. We found significant positive results for both metrics, which mainly emphasise that the Atreya bot is easy to use as the various functions in this system are well integrated.

Keywords: artificial intelligence markup language, chemistry, ChEMBL, dialogue, telegram, natural language processing

Introduction

Human-machine collaboration is a current trend in information technology research (Gwizdka, 2010; Radlinski & Craswell, 2017; Kaushik et al., 2020a, 2021). Various studies have been conducted to examine the usability of these dialogue-based bots in the present age (Avula et al., 2018; Arguello et al., 2018; Kaushik et al., 2020b; Avula & Arguello, 2020). These studies are restricted to some broad applications such as customer support, whereas still, there is an immense opportunity for chatbots in specialised spheres (Araujo, 2020; Kaushik & Jones, 2021). In the study (Sharma et al., 2021), Sharma et al. proposed the Atreya Bot, which was explicitly created for chemical experts to support them in their multifaceted information search process. It retrieves the following data from ChEMBL (Mendez et al., 2019; Davies et al., 2015): Target-Drugs, Drug-Disease and its approval phase, Gene information from synonyms. These and many more elements (which are discussed in depth in the study (Sharma et al., 2021)) make ChEMBL an exceptional virtual chatbot.

This structure of the study as follows: motivation of the study, technical overview of Atreya, methodology, results and analysis, conclusion with the imminent possibility of the investigation. The set-up of Atreya Bot is explained in (Sharma et al., 2021).

Motivation

In a traditional search system, a query in the search engine delivers the most relevant content according to their ranking algorithm in a single shot. There are several restrictions that can impact the search success of a single query search. The subsequent points are the restrictions of single-query search (Kaushik, 2019; Kaushik et al., 2020a):

1. The searcher or the user must correctly explain the information needed in a single query: To get the most relevant results, the searcher should include all necessary information in a single query. Rationally, this can be a very difficult as well as challenging task.
2. The searcher or the user may not be able to accurately convey their information needs: In most cases, the searcher is unaware of how to define the information required in a single query. In most cases, the searcher tries to come up with a search term that includes words that are relevant to the information sought. However, this may or may not reflect the actual specification of the searcher or users.

Technical Overview

Dialogue flow of an Atreya can be classified into two major intents: informal conversation as well as chemical conversation. In an informal chat, the chatbot is responsible for greeting the user and answering a few basic questions about itself. On the other hand, in Chemical dialogue, Atreya can execute all of the use cases described in this segment as per the user's requirement in the study (Sharma et al., 2021). The user can interact with the Atreya while selecting the process to execute from the choices discussed in the paper (Sharma et al., 2021).

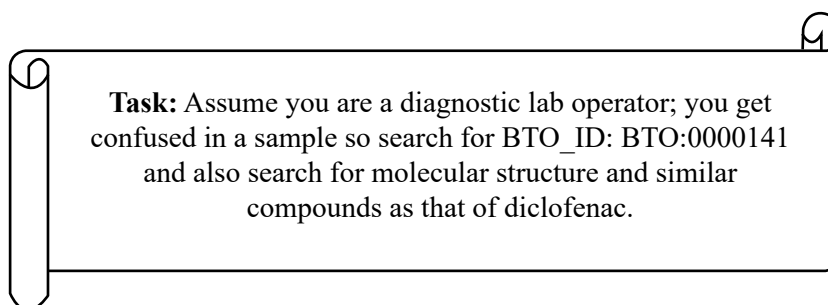


Figure 1. Sample of the backstory for user task

Methodology

The chatbot has been evaluated based on System Usability Scale (SUS) and the Chatbot Usability Questionnaire (CUQ) metric. Ethical guidelines have been followed as per the respective institute while conducting the experiment. Considering Bloom's taxonomy, we have chosen 'Analyse' complex taxonomy for the tasks. Based on this, we have designed 10 tasks, the sample is shown in Figure 1. We have conducted the pilot study on five volunteer subjects to refine the experiment set-up and remove the shortcomings. Subjects signed consent forms before participating in the experiments and all tasks have been arranged in the Latin square method to avoid sequence and learning effect. The subjects have to fill pre-task survey which contains demographic information and a post-task survey (usability metrics) at each task.

The 17 subjects have tested the system by doing two tasks and individually marking each usability metric per task. This is to check the correlation alpha coefficient and to investigate the inconsistency in the data which can help us investigate the subjects who have not participated in the task seriously. Out of 17 participants, 15 subjects (8 Female, 7 Male) followed instructions carefully which are used for analyses. The next section discusses the detailed analyses of the results.

Results and Analysis

SUS Score

The SUS score measures effectiveness, efficiency, and overall ease of use (Brooke, 1995). The mean SUS score for Atreya Bot was 80.67, which is considered Grade 'A'. This implies that the system has an adjective rating 'Excellent' and considered to be enjoyable and maybe recommended to others by the user. Atreya Bot has a high level of usability and performs well better than the average benchmark of 68. The lowest score in the distribution was 52.5 and highest score was 100, therefore, the median was 81.25. Similar evaluation has been performed for

conversational interfaces by (Kaushik & Jones, 2021). A boxplot of Atreya Bot SUS and CUQ scores is displayed in Figure 2.

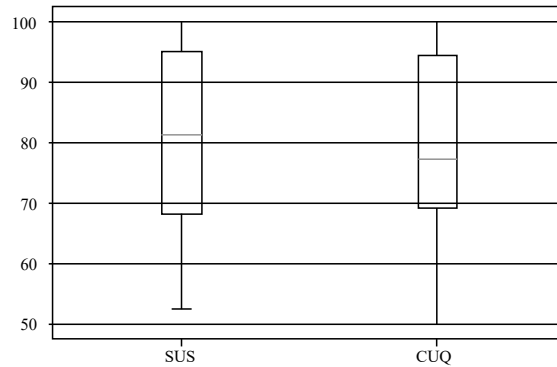


Figure 2. Atreya Bot SUS and CUQ scores

CUQ Score

The chatbot usability questionnaire (CUQ) measures the overall usability and user experience of the chatbot (Holmes et al., 2019). Mean CUQ score was calculated to be 78.14 ± 15.4 , which is greater than the acceptable value of 71.1. This implies that the users found the system to be adoptable and useful. The lowest score was 50.0 and the highest score was 100. Median score was 77.3.

Hypothesis: Users are evaluating the systems on both the metrics similarly.

Table 1. T-test for SUS and CUQ

Questionnaire	Mean	Standard Deviation	p-value (Significance level = 0.10, 0.05, 0.01)	T (Significance level = 0.10, 0.05, 0.01)
SUS	80.67	14.80	0.20334	-1.301463
CUQ	78.39	15.17	0.20334	-1.301463

Table 2. Average Score for Each Parameter for SUS and CUQ

SUS Average		CUQ Average	
Frequent Usage	4.43	Realistic engaging	4.2
Complexity	2.03	Robotic	2.9
Ease of Use	4.5	Welcoming	3.9
Technical Support	2	Unfriendly	1.6
Integration	4.46	Clear Scope	4.3
Inconsistency	1.7	Scope not explained	2.03
Quick Learning	4.43	Easy to Navigate	4.5
Cumbersome	2.13	Confusion	1.9
Confidence in use	4.46	Comprehension	4.3
Previous Knowledge	2.16	Input recognition	2.4
		Appropriate Responses	4.46
		Irrelevant Responses	1.6
		Error handled well	4.03
		Error handled poorly	2.03
		Easy to use	4.7
		Complexity	1.7

Table 1 shows the details of dependent t-test performed on both the mean SUS and CUQ scores. The p-value and t are calculated for significance level of 0.01, 0.05, and 0.10. Table 2 shows the average SUS and CUQ scores for 30 search tasks. The hypothesis failed to reject at 3 confidence level.

Conclusion

The potential of the conversational search interface used by chemical scientists and chemistry students is investigated in this study. The effective ratings in the usability measures indicate that the subjects found the system to be simple to use. Work on the project in the future will include integrating more advanced components into the chat system while considering the user's previous knowledge. Using deep learning models, an interactive system may be further designed and improved to help with complex queries. The Atreya bot's resemblance to other interactive models or systems may then be examined to highlight the benefits and limitations.

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Impact of Online Education in the Development of Life Skills of Students

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ABSTRACT

The pandemic COVID-19 has made tremendous changes in the education system, as all the educational institutions were shut across the world. Thus, education has changed dramatically, e-Learning and online education played a key role in the education system. Intelligent technologies make the new education system more attractive and student-friendly. The purpose of education is the overall development of students. Life skills help to deal effectively with the demands and challenges of life. The purpose of this study is to assess the impact of online education on the development of life skills of students. It collected data from more than 986 students who use the online method only for education during the covid crisis. The findings of this study indicate that a sudden switch to pure online alternative changes their life skills also.

Keywords: life skills, COVID-19, online, education

Introduction

School education period is very important for children and their mental and emotional changes. School and college education changes the mental health and skills of students. Life skills are behaviours that allow individuals to get used to and deal well with the demands and challenges of life. During the education time, students hone several skills, and they achieve life skills. Online classes also change the life skills of students. Students may face different problems in their lives. These skills can be developed during classroom teaching also. Imparting life skill training through inculcating life skill education will help students to overcome such difficulties in life. The present paper focusses on the importance of life skills education and the impact of online education on the development of life skills.

Life skills are defined as the capabilities that enable individuals to take adaptive and positive behaviour that makes them able to deal with the events and challenges of everyday life and to participate in the modern world full of new challenges and handle everything from interactions with others to identifying and processing emotions.

Early developmental years of children, with a stable environment for social interactions, help them develop skills like assertiveness, empathy and communication etc. The offline classes allow plenty of room for developing their life skills, unlike a virtual learning setup.

In online learning students get enough freedom, which helps to develop some skills. Online learning platforms can help these students become more independent learners before they make their way into college.

Lack of motivation and a sense of self-discipline needed to study online are some of the major struggles that children face. A school classroom provides a structure and an environment of effective learning, and it increases the skills of students, in the same manner, online education also increases the skill of students.

Literature Review

The study by Ningsih, Tutuk; Kurniawan, Heru; Rahayu, the COVID-19 pandemic requires students and teachers to do distance learning/online learning to prevent the formation of a new cluster of the spread of the Coronavirus. Without face-to-face learning, the teacher's role as a facilitator will be minimal. This study focuses on developing

learning activity models. This study proposed Project-Based Learning (PjBL). Project-Based Learning (PjBL) focusses on encouraging the student to create interesting learning experiences by thinking creatively and working together to create a real project to solve the problem.

The purpose of the study conducted by Machmudah et. was to determine the effectiveness of parental involvement training on the improvement of children’s life skills in primary school classes. towards increasing children’s life.

A study by Eva Luthfi Fakhru Ahsani, Siti Eni Mulyani aims to describe online distance learning for students’ life skills, especially students in elementary school. The study used a qualitative approach, and the data collection techniques were done through interviews and observations. This study indicated that online distance learning through WhatsApp group applications and Education TV programmes could develop students’ life skills, especially in the covid-19 pandemics time.

Online Education and Life Skills

The Basic Life Skills curriculum for the students is based on evidence-based psychosocial methodology including cognitive behavioural therapy, mindfulness and resilience-building activities. These skills can help students better understand themselves, get along with others, and gain tools to cope with life’s inevitable difficulties. The top life skills are: 1. Stress management 2. Emotional regulation 3. Positive thinking 4. Self-esteem 5. Empathy 6. Listening skills 7. Interpersonal effectiveness 8. Handling disputes 9. Managing relationships 10. Confident communication 11. Goal setting 12. Decision making 13. Problem-solving 14. Critical and creative thinking 15. Executive function skills 16. Resilience

In this study, we focus on how online education affects the life skills of students. In this paper, we study Self Awareness, Empathy, Self-Control, Anger, Stress, Communication skills, Decision-making skills, Problem-solving skills, Creative thinking, Interpersonal skill and other qualities such as Technical skills, Emotional intelligence, Spiritual intelligence. We collect data from different schools and colleges and direct interviews and interviews conducted in online mode. More than 1100 samples are collected and 120 direct interviews and 310 online interviews was conducted.

Figure 1 given below shows the changes in life skills during online education during the covid crisis.

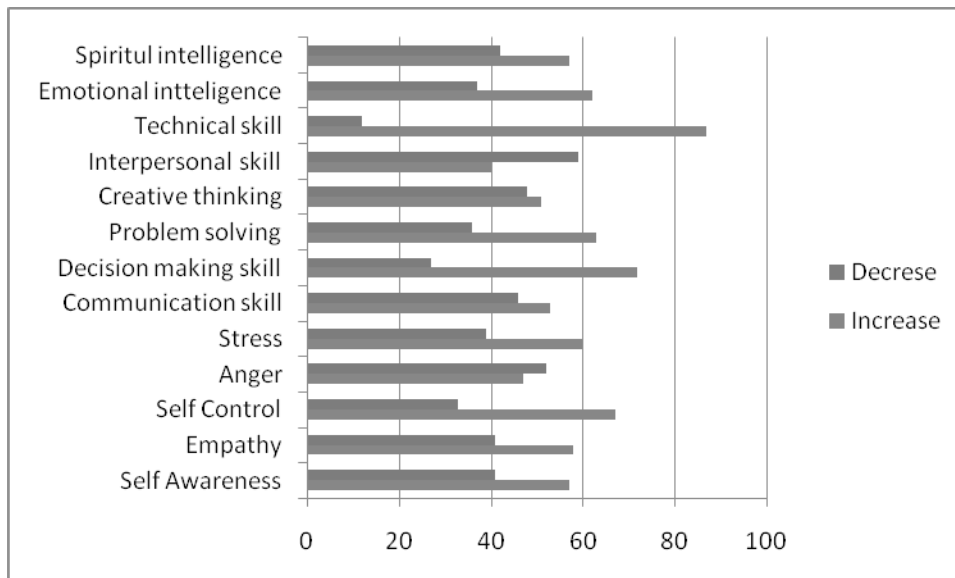


Figure 1. Relative change of skills

The study shows that self-awareness increased for 57 per cent of students and there was a decrease in 41 per cent students. In the case of empathy, 58 per cent of students increased their empathy at the same time for 41 per cent, it got decreased and for 1 per cent there was no change.

The study reveals that in 60 per cent of students there was an increase of stress and a fall in the interpersonal skill of 59 per cent of students. The technical skill of most of the students has increased.

Figure 2. Graphic representation of changes in life skills

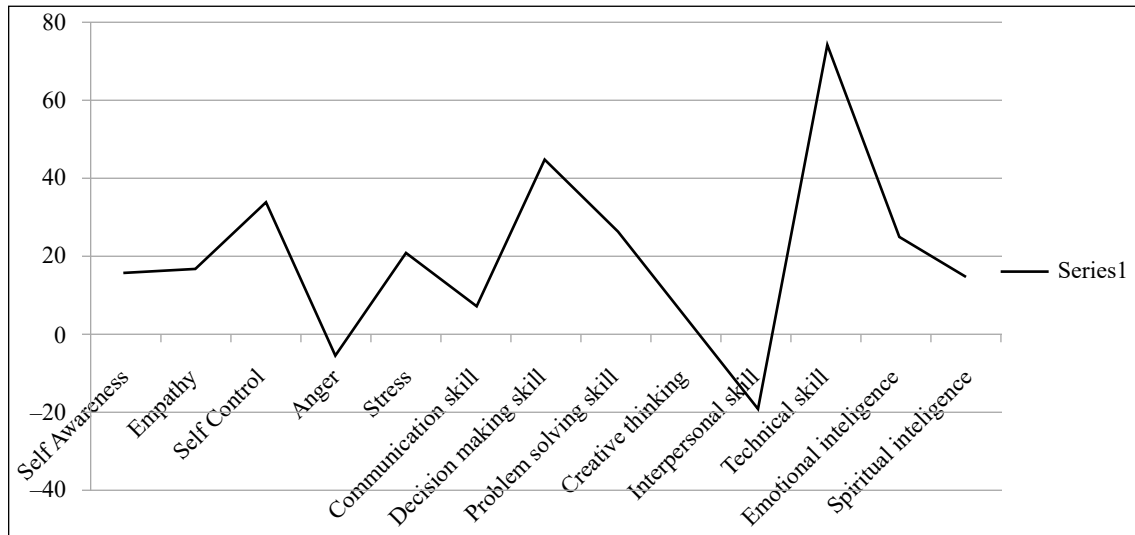


Figure 2. Difference graph

Table 1. Difference Table

Life Skills	Difference
Self Awareness	16
Empathy	17
Self Control	34
Anger	-5
Stress	21
Communication skill	7
Decision-making skill	45
Problem-solving	27
Creative thinking	3
Interpersonal skill	-19
Technical skill	75
Emotional intelligence	25
Spiritual intelligence	15

It shows that anger of the students went down and stress went up. During this covid crisis emotional intelligence of 62 per cent of students improved and spiritual intelligence of 57 per cent per cent increased. In Table 2 the negative values show the decrease in life skills and positive values show the increase in life skills and Figure 2 shows the graphical representation.

An Anova test is a way to find out if survey or experiment results are significant. One-way ANOVA between groups is used when you want to test two groups to see if there’s a difference between them.

Table 2. Single-factor Anova result

SUMMARY						
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>		
57	12	717	59.75	149.65		
41	12	472	39.33	148.42		

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	2501.04	1	2501.04	16.78	0.000477	4.30
Within Groups	3278.91	22	149.04			
Total	5779.96	23				

The Anova test result shows that online education is suitable to increase certain life skills and the offline method is suitable to increase certain other life skills.

Conclusion and Future Studies

Life skills development is an integral part of our education system, but the mode of teaching and situations also affect the life skill of people. The online method makes tremendous changes in the life skill of people. Due to online education, the stress of the students will get increased and interpersonal relationships may get decreased. The study shows that for some of the students, their life skills in certain areas increased and at the same time, some other life skills decreased. A more detailed study is needed in this area to find which types of students get affected by online education and research is also needed to improve the life skills of people in the online mode of teaching.

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COVID-19 Pandemic: New Technologies and Challenges to Online Education

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ABSTRACT

The COVID-19 pandemic attracted the attention of the government since March 2020. The government concrete measures came in the form of lockdown i.e. 24th March, 2020, which led to closure of schools, colleges and universities across the country. The risk and severity of the pandemic caused several deaths necessitating a shift from physical classes to online mode of education in the education sector. Online classes became the norm and there had been a shift from blackboard classes, direct face to face interaction to fruitful discussions via different modes of delivering education such as Zoom, Skype, WhatsApp, Cisco Webex, Google Meet, etc.

However, with the shift, there was a paucity of expertise and skills required for online teaching. As a result, numerous workshops, skill training programmes and institutional support are required to overcome such challenges. To take advantage of online education, there are other requirements in the form of strong broadband connectivity, owning a smartphone and laptop, requisite computer skills and technical knowledge and afford data cost at an affordable rate. Over time, it was found that students couldn't afford a have a smartphone and was forced to rely on recorded sessions and videos. With the online mode of teaching, exams were conducted online which was quite challenging for both teachers and students. Issues over connectivity and bandwidth always tended to prevail. Sometimes, online classes were burdensome with increased screentime. Teachers and students located in the rural areas had severe connectivity problems. Against this backdrop, the study examines the advantages and challenges associated with the provision of online education. Using google forms, and framing questionnaires, a micro-level study was conducted. Responses were collected from faculty members. The results were mixed and concluded that the provision of the online mode of education was a challenging task for the teachers. Lastly, the study provided some suggestions for further improvement in the situation.

Keywords: COVID-19 pandemic, online education, teachers and challenges

Introduction

With the onset of the COVID-19 pandemic since March, 24, 2020, schools, colleges and universities all around the country were shut down. The pandemic had necessitated maintaining personal hygiene and social distancing norms as mandated by the Government of India. Hence, physical movement has been curbed to bring the situation under control. With the introduction of the first and second lockdown, the educational institutions in the country had introduced online classes via different apps such as zoom meeting, Cisco WebEx, Google Meet, WhatsApp, etc. In other words, a shift from physical day-to-day interaction in classrooms to fruitful online interactions. This shift has been fruitful as well as challenging. The advantages of online mode of teaching included lesser chances of getting risk and infection of the disease, no need for unnecessary travelling and movement with heightened travel restrictions, saving time and money, and maintaining social distancing norms and hygiene simultaneously. Teachers were able to conduct classes using digital educational platforms in the form of face-to-face through online mode of instructions.

But the inherent challenges were many. Firstly, not all teachers had the requisite digital skills, techniques of handling online classes, and habits of conducting the online classes. Secondly, there were issues of poor broadband connectivity and power cuts in some regions especially in the remote areas. Thirdly, some of the education providers or teachers did not have their own device in the form of personal laptop, smartphone or computers to conduct online classes. Fourthly, with the norm of Work from Home (WFH) culture introduced since the Covid outbreak, it was

difficult especially for those who did not have a strong Internet connectivity and not familiar with digital modes of imparting education. For some, Internet connections were not affordable after a certain degree of usage and led to extra charges after consuming certain limit of data. Lastly, back-to-back classes were sometimes cumbersome and taxing on the students in addition to no breaks between classes and longer screen time. In addition to these challenges, other challenges include problems of time-management, suitability of online teaching platforms such as CiscoWebEx, Google Meet and MS Teams etc., conducive environment, virtual face-to-face communication, and mode of assessment, lecture and assessment materials.

Literature Review

With the onset of the pandemic, the shift from face-to face to online classes is the only possible solution. The greatest challenges are in the form of distance, scale and personalised teaching and learning. As a result, some prominent studies have come up on the issues of online teaching using various digital platforms. To overcome problems related to teaching and learning, innovative solutions by institutions can help to deal with this current pandemic situation Liguori and Winkler (2020). According to Basilaia et al. (2020), there is an urgent need to shift to online mode and the products of google could be useful in this current challenging situation. Tools such as google hangouts, google drive, google Jam board could be useful for conducting the online face-to face classes. According to Selwyn (2021), half of the world's schools remain shut, and students have been studying from home. Management across the academic industry are rethinking of utilising digital technology for supporting the learning process. The pandemic era has witnessed the ripening of hybrid / blended teaching and has helped the teachers along with the stakeholders to tide over the situation. Informal learning system, social media coupled with other apps have helped the teaching process. With the onset of the pandemic, over 1.5 billion children across the world have to adopt remote teaching process. Adeyinka-Ojo and Ikumoro (2020) have identified several online and teaching challenges. The challenges include time management, suitability of online teaching technology platforms – (BB Collaborate, Cisco Webex, MS Teams, Face Book, Google Meet, Google Classroom, Zoom, GoToMeeting etc.). The other issues and problems include conducive environment, self-motivation, virtual communication, and consultation, learning resources and activities - lecture, tutorial, and assessment materials, problems of internet connection, IT skills and digital literacy, functional computer, laptop, tablets, smartphone and digital devices, and adaptability - (switching from traditional F2F classroom to virtual classroom). Dhawan (2020) in his study found that despite availabilities of technologies, online education is bestowed with number of difficulties ranging from downloading errors, issues with installation, login problems, problems with audio and video. Teacher's willingness to learn new technology for teaching a blended course, teachers lack of experience with creating instructional content on learning management systems was also not high (Maycock et al. 2018). Benjamin Luke Moorhouse (2020) emphasised on the need for exclusive trainings for online instructions as a replacement for face-to-face instructions so that the instructors are prepared to deliver courses online. Carey (2020) in his study examined the current COVID-19 situation in the context of shifting normal classes to e-classrooms and how educators had shifted their pedagogical approach. The findings concluded that the matter of concern is how far this online-teaching learning method can provide quality education and how far the educational institutions will be able to adopt this online learning in a massive manner. Against this backdrop, the objective of the study is to find out challenges faced by the teacher in the process of conducting online classes in the post-covid times. The next section will discuss about the methodology used for this purpose.

Methodology

To examine the objectives, a micro-level study was conducted by collecting responses from the faculty members/ teachers of the Institute. A google form containing questions mentioning the various internal and external challenges were circulated by constructing some 20 sample questions on the internal and external challenges to online teaching in the pandemic era. The questions were classified as the hindrances, challenges, constraints, online platforms, technical knowledge and connectivity issues faced by the teacher WFH during the COVID-19 pandemic. Around 40 responses were collected from the faculty members of the Institute. The responses were recorded in the form of "yes", "no" and "partly agree". In addition to this, some questions were formed to collect suggestions and advice

from the faculty members. After obtaining, the necessary statistics, responses were summarised in the table below (Table-1).

Table 1. Challenges to Online Mode of Teaching

External Challenges to Online Teaching			
	Yes	No	Partly
<i>Do you have a strong broadband connectivity?</i>	88.9%	11.1%	
<i>Do you support Buy Your Own Device (BYOD) Strategy?</i>	33.3%	27.8%	38.9%
<i>Do you have enough technical knowledge to take online classes and assessments?</i>	83.3%	16.7%	
<i>Technological support - Information Technology Professionals</i>	66.7%	33.3%	
<i>Did you face any difficulty conducting exams online instead of conducting a physical one?</i>	22.2%	50%	27.8%
Internal Challenges to Online Teaching			
<i>Are you in a position to afford the data cost incurred in the online teaching?</i>	44.4%	16.7%	38.9%
<i>Confidence in skills and knowledge</i>	55.6%	44.4%	

Source: Primary Response collected from Faculty Members (Christ University), India

Analysis

The overall primary survey indicated that the teachers have faced difficulty in conducting online classes due to a number of reasons. The main reason was lack of confidence in skills and knowledge, not in a position to afford the data cost incurred during the online mode of teaching training and not familiar with online mode of teaching. Furthermore, teachers had to buy their own device and take a strong internet connection (which was not needed during the pre-covid times). Internet connectivity issues such as installation issues, login issues, issues of connecting audio and video and lack of technological support were some prominent problems faced during the online classes. As a result, many teachers were not confident in handing online classes due to dearth of knowledge and skills.

Discussion

It is evident that the faculty members mainly use Cisco WebEx and Google Meet, as the most prominent online platform. Initially, most teachers were reluctant to use digital platforms in imparting education due technical glitches, internet connectivity issues, old school ideology, not habituated to online classes etc. Hence, the feedback from the faculty members suggested increase digital training program since the beginning of each semester should be continued every month. Lastly, feedback also suggested that the glitches in Internet connectivity and power cuts should be reduced.

Conclusion

Despite the challenges associated with the COVID-19 pandemic situation, effective strategies and tools are required to counter the difficulties coming in the way of online mode of teaching.

Some effective strategies which can be taken into consideration are: (i) Introduction of an effective virtual classroom, with the presence of multiple channels such as instant messaging, voice chat and video conferencing. (ii) Using several digital platforms like Cisco WebEx that permit breakout sessions alike to working in pairs or trivial groups in a physical classroom. Students can also work together through common files, digital whiteboards etc. (iii) Many teachers have started collaborating whiteboards in the classroom. Virtual schoolrooms can provide alike

benefits by letting instructors bring in diverse file types, embedded media and admission to an extensive range of knowledge material. Another great benefit of participating technology into the classroom is that it opens up multiple choices for student collaboration. For example, video conferencing and messaging software let scholars share and convey ideas and intermingle with their teachers.

Some tools can be devised to overcome the challenges associated with the online mode. The tools include communication tools, learning management systems or other tools that teachers can use to create educational content. Interactive learning modules and other resources can also be helpful to support students in acquiring the requisite knowledge about the topic. According to Challinor et al. (2019), Educational Institutions should heavily invest in digital technology to continue and support its online mode of learning and teaching in this new post covid era. However, in spite of the advantages and tools, there are some additional challenges too. Firstly, since the outbreak of COVID-19, students and teachers are working from home, using their own devices, schools must educate those participants on cybersecurity protection as well. The hackers may have a tendency to hack schools, colleges and universities. Secondly, some students have only one device per household and some students have learning disabilities. Hence, the government must strive to provide schemes and an equal learning chance for all. Thirdly, some students have problems focusing on the laptop and computer screens for a very longer period of time. Fourthly, online learning requires teachers to have a basic understanding of using digital forms of learning. However, this is not always true. In some cases, teachers have a basic understanding of technology and in some instances, they don't have sufficient resources and tools to conduct online classes. To solve this problem, universities, colleges and schools should invest in training teachers with updated knowledge of technology to conduct classes impeccably.

Limitations and Future Studies

Due to time-constraints, the study conducted mainly looked at the problems of the teachers conducting online classes using digital platforms. Hence, there is scope of extension of the study incorporating the student related problems faced in the post-covid situation including internal and external challenges faced by the students in this post COVID-19 period.

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Virtual Accreditations PRT Visits: A New Normal in the Accreditation World

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ABSTRACT

This research aims to depict the key challenges and opportunities in conducting virtual accreditation visits. Virtual accreditation visits have now become a new normal in the accreditation world. The accreditation agencies adapted to the changing circumstances to survive (Bryant, 2020). The business schools were exposed to a new but difficult experience. The virtual visits pose a new set of challenges to the business schools and the PRT teams of the accreditation agencies. The key challenges in virtual accreditation may be analogous to e-Learning, telemedicine, online education, online consultations, etc. We conducted a review of the literature drawing upon the literature from technology, online education, telemedicine, etc. We developed a detailed framework based on content analysis and the unstructured interviews of a few accreditation subject matter experts. The framework presents a set of key drivers critical to the success of a virtual accreditation visit for the business schools. We used the key respondent technique to collect our data.

The expert responses were classified as challenges and opportunities. All the responses related to challenges were analysed using Nvivo word-cloud and the frequency of occurrence of the various keywords. We filtered the undesired keywords from the analysis for the validity of the findings. The paper makes an academic contribution to the literature on quality control, educational learning and development, and virtual operations. The research has significant practice implications towards improved planning and better coordination. The findings of this research are expected to bring synergy between the education authorities and accreditation agencies. The findings would also encourage the policymakers and practitioners to look into the opportunities of cost and time savings, environmental protection by reducing travelling, fuel, paper printing. We close the paper with limitations and further scope of this research.

Keywords: virtual PRT visits, accreditation, quality assurance, programme evaluation, technology

Introduction

In response to the COVID-19 crisis, 107 countries implemented schools and colleges closure by March 18, 2020 (Viner et al. 2020). The sudden closure of the schools affected the quality of education and continuous evaluation of the programmes. Accreditations help the institutions to improve the activities in the chain of “input-process-output (feedback)” (Duc Hanh, Thi My Nga, Quynh Loan, & My Viet, 2019). There are schools whose accreditations are pending since 2020 awaited a PRT visit for several months. A few schools got an extension of one year. The COVID-19 crisis took on various shapes over the year 2020, and now in 2021, therefore, the only choice to proceeding for accreditation is PRT virtual visit.

Due to the pandemic situation, the accreditation agencies postponed or deferred peer review team (PRT) visits for upcoming accreditation cycles (Hussain et al. 2020). The prevailing local geographical situation and various government travel guidelines did not allow the agencies to conduct physical visits. A few accreditation agencies extended the accreditation validity period of existing accreditations by one year. Near the expiry of the extended re-accreditations, the agencies were forced to plan for virtual PRT visits. B-schools seeking accreditation needed to re-plan for the virtual visits as per the accreditation agencies guidelines.

Objectives

The advent of virtual accreditation visits has brought out the quest for the following research questions:

Research question 1: How does virtual accreditation visit bring new challenges?

Research question 2: What opportunities are unfolded out of virtual accreditation PRT visits in B- schools?

This article explains the better planning and execution of PRT visits virtually; challenges faced during visits and a clear understanding of virtual base room preparation. The virtual visit saves the time and cost of the schools and accreditation bodies. The key stakeholders of this research are B-Schools, universities, directors, deans, faculty members, administrative staff, students, alumni, employers, peer review teams, accreditation agencies. The novelty of this research is that the virtual visit domain is completely new and brings uncertainties to the accreditation agencies, PRT members, and schools. The findings of this research will unravel the important factors to the smooth and successful conduct of a virtual PRT. Since the concept itself is new, there are no reported studies around virtual PRT visits, and that makes this research cutting edge.

Accreditation Standard Process

We reviewed the accreditation process of reputed accreditation agencies. The national and international accreditation agencies' guidelines are generic and more or less standard. The schools submit a self-evaluation report 6-8 weeks in advance. The school prepares the relevant evidential documents in the base room. Based on the accreditation guidelines the below timelines are given: SER Submission → PRT Formation → Schedule a visit → Base room preparation → Feedback post-PRT → Issue of accreditation certificate

Literature Review

Accreditation is a quality assurance process for schools and is evaluated by external agencies (Sinha, 2013). If standards are fulfilled, the accredited status may be granted by the accreditation agencies. Accreditation is a continuous process to evaluate the quality as per standards to help the programs and business schools (Cobourne & Shellenbarger, 2020). The covid pandemic cannot stop the accreditation visits; a new way should be introduced for accreditation visits. In these uncertain times, individuals and organisations are still under a lot of stress, and the entire impact of the global health crisis is yet unknown (ABET, 2021). According to Bagranoff and Bryant (2020), given the Covid pandemic, the American Association of Collegiate School of Business (AACSB) leadership team has decided that all PRT visits will be conducted virtually/online. The Association of MBAs (AMBA) accreditation has already started virtual PRT visits all over the world. The pandemic situation is continuing, therefore virtual visits appear to be a potential choice now.

Virtual visits reduce travel time, reduces time, cost and stress (Morrison-Smith & Ruiz, 2020). Alyson Geary, deputy director, NEASC (New England Association of Schools and Colleges) commission on public schools, stated that they had done their last in-person accreditation visit on March 8-11, 2020, before everything shut down in the USA. Later they have cancelled all accreditation visits scheduled in Spring of 2020. The NEASC decided that the unknown future of the fall 2020 session did not want to waste the hard work of the schools who want accreditation and decided to do virtual visits.

Christine Page, principal West Bridgewater High School, USA, said in the NEASC global forum that the PRT cannot see the school culture, infrastructure, faculty and students through virtual visits. However, the PRT is able to interact with a few faculty and students during the virtual visit (NEASCforum, 2021).

Methodology

The study was operationalised in India. Unstructured interviews were conducted with key respondents who had the experience of organising virtual visits. A questionnaire containing 24 unstructured questions designed for qualitative analysis.

Participants: The qualitative response was taken from the experts of various B-schools in India who have completed their virtual visit recently. Six responses were received from the experts and they have been taken into consideration for analysis.

Data analysis: The expert responses were analysed and classified in challenges and opportunities. For this purpose, Nvivo 10 was used for qualitative analysis of unstructured data received from experts.

Research design: The questions were classified into three categories based on challenges, opportunities and facilitators for conducting virtual visits. A separate node was created for each category for Nvivo analysis. Responses were analysed using Nvivo word-cloud and the frequency of occurrence of the various keywords. Based on the frequency of keywords in word cloud, the challenges and opportunities were discussed.

Virtual Visit Challenges

With a detailed review of the accreditation guidelines, content analysis, and the interviews with the subject matter experts, we address our first research question. The key challenges that emerged out of the expert responses qualitative analysis were as follows.

Transformation to virtual visit: The arrangements for a virtual visit requires computers, high-speed Internet, cloud space, a virtual platform whereas a physical accreditation visit requires a meeting room, furniture, projectors, lights, etc.

Data bandwidth: High-speed Internet on either side is essential for the smooth conduct of the meeting. Schools must identify the meeting requirement, and deploy the IT Engineer for technical issues.

Virtual campus tour: The virtual campus tour may facilitate evaluation of infrastructure facilities, labs, libraries, classrooms of the school. For this, schools must arrange live video telecasts and drone-based video telecasts, etc. The AACSB included Virtual campus visit/tour in the schedule (Bryant, 2020).

Training: Technical staff must be deployed to look after the technical issues during the virtual accreditation visit. Even the school staff and faculty may require appropriate training. The knowledge of information communication technology and skills should be provided to all attendees to avoid the gaps in internet connectivity and IT services (Rahiem, 2020).

Multiple time zones: Scheduling a suitable time for everyone is a big challenge depending on the location of the members. One should take priority of all the members by rotating the schedule regularly (RAFAŁ MUSZYŃSKI, 2019). The time gap between the two PRT members can be as high as 12 hours.

Cost: Cost for purchase of technical equipment, high-speed Internet, cloud space, virtual platforms

Virtual evidence/base room: Access to the virtual base room is provided in advance to the PRT to examine the documents. A digital base room contains documents similar to a physical visit as per guidelines (Bryant, 2020). Virtual storage space is acting like traditional physical storage space accessible by multiple users from anywhere anytime. The accreditation agencies share the list of documents. The virtual evidence room may be prepared using cloud technology like Google drive, learning management system, Amazon web services, OneDrive, Dropbox, etc. (Gulley, Damron, & Simpson, 2019).

Opportunities with a Virtual Accreditation Visit

1. Reduces the cost of the meeting
2. Easy accessibility to base room documents easily
3. Effective timemanagement
4. Reduces travel time
5. Reduces the risk of physical contact
6. Increases the attendance ratio
7. Hospitality arrangements not required

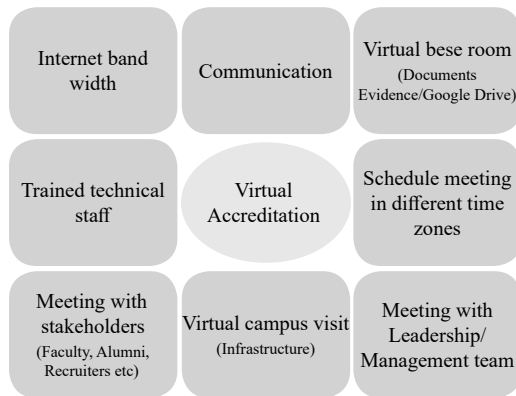


Figure 1. Challenges in the virtual visit



Figure 2. Virtual Accreditation Challenges



Figure 3. Opportunities from virtual visit



Figure 4. Virtual accreditation-facilitators

The word clouds based on the various categories have been placed as figure 2 to 4. Figure 2 shows the challenges for conducting virtual visits. The most frequently used keywords are bandwidth, documents (evidence room), time zone, meeting with stakeholders, infrastructure, cost, security, cloud space, virtual campus tour, training, saves paper (environment friendly), licensed software, etc. Figure 3 shows the opportunities for conducting virtual visits. The most frequent keywords identified are - saves travel time, hospitality, allows government guidelines, reduces the risk of physical contact, effective time management, increases the participation of stakeholders. Figure 4 shows the facilitators of virtual accreditations. The most frequent keywords identified are stakeholders, documents (evidence room), sharing-cloud space, tools, schedule of meetings etc.

The virtual visits save the cost for travel and hospitality. The cost of travel and stay of 1 mentor two times, 1 PRT chair making one visit before the visit, and 3 PRT members from the USA to India for 3–4 days can be approximately about INR 35 Lacs, which is substantially higher than the IT infrastructure needed in general.

Contribution and Potential Future Extensions

This is probably among the first attempts to examine and document the knowledge on the virtual accreditations' challenges and opportunities. This research helps conduct smooth PRT visits and address uncertainties of the new transformation of virtual visits. The key challenges in the virtual PRT visit are managing the time zones of members, development of base room, arranging the virtual space, preparation of virtual meetings, arranging the licences of the professional software. Our research reveals virtual PRTs visits are opening doors to opportunities such as saving papers, environment, and travel cost of PRT members whereby more affordability of accreditation by the schools, and more schools getting benefitted. Virtual visits comes with the cost for purchase and maintenance of technical

equipment, high-speed internet, cloud space, virtual platforms, may increase. Systematic cost analysis would be helpful to decide the future aspect of the virtual accreditation. This study may be extended for a detailed quantitative analysis to capture the perception of PRT members, directors and deans.

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To Investigate the Key Antecedents of the Acceptance of Accreditations in Business Schools

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ABSTRACT

Accreditations have picked up fast in America, Europe and Australia. The objective of this paper is to develop an initial comprehensive framework, which can facilitate to investigate the important drivers of adoption of international accreditations in developing countries. The potential drivers may range from the origin of the accreditation agency to the real value addition by them to a business school. We found evidence that the American accreditation agency AACSB (The Association to Advance Collegiate Schools of Business) has wider presence in the USA, whereas the European based EQUIS (European Quality Improvement System) and AMBA (The Association of MBAs) have a wider presence in Europe. The developing economies of South Asia has significantly less presence of these international accreditation agencies in comparison with the USA, Europe, and Australia. The facilitators and inhibitors of the adoption were the institute's vision and mission, faculty engagement, infrastructure, technology, budgets. The employees of lower income and small size institutes perceive the outcomes and factors of adoption of accreditations more than higher income and large size institutes. The study would help academic scholars to conduct research on accreditations and enhance the knowledge of learning and education literature. The knowledge generated from this research will encourage the Indian education to adopt the national and international accreditation.

Keywords: accreditation, education and learning, innovations, technology, systematic literature review, conceptual framework

Introduction

Accreditation is a powerful tool for quality assurance in management education (Kumar, Shukla, & Passey, 2020) on economic, cultural, scientific and political parameters. Education empowers people to transform from a human being to becoming a human resource. In the present context of globalisation, quality higher education is needed to uplift creativity, talent, adaptability and research mindset. In order to fully utilise the outcomes of education, it is important to ensure that education meets the minimal prescribed standards to fulfil ever-changing requirements worldwide. Accreditation, a powerful tool of quality assurance, is used to assess the national system of higher education. Accreditation is considered as a quality stamp, which ensures that an accredited institution/programme has undergone a rigorous process of external peer evaluation based on predefined standards/principles and complies with the minimum requirements. This paper focuses on the outcomes of accreditation to enhance excellence in higher education institutions (HEIs and International accreditations have become key means for B schools for perusing Global status and legitimacy (Arvi, Kettunen, & Sohlo, 2018). EQUIS (EFMD Quality Improvement System, awarded by the European Foundation for Management Development) and AACSB (The Association to Advance Collegiate Schools of Business) are continuously expanding and becoming most desirable and valuable accreditations in Management education (Arvi et al., 2018). The AACSB founded in 1916 and has accredited 901 institute across 58 countries, The European Quality Improvement System (EQUIS) founded in 1997 and has accredited 197 institute across 44 counties and The Association of AMBA has accredited 286 institutions across 57 countries (AACSB, EQUIS & AMBA Website). AACSB accreditation is widely spread in US, whereas EQUIS and AMBA are widely spread in European countries. Almost 64% of total AACSB accredited schools are located in United States, only three US schools have accredited with EQUIS accreditation. The school having AACSB, EQUIS

and AMBA is called Triple Crown. There are 67 European B Schools are with Triple Crown (Study.EU, 2021) whereas only three Triple Crown schools are present in US. Use of Triple Crown accreditations systems increases the competitiveness of the higher education (Dudin & Shishalova, 2019) and in particular - higher management education. The European schools are moving towards all three accreditations whereas US schools are moving towards US based AACSB accreditation. There are more than 40,000 Universities and colleges in India and has less than 1% of schools have accredited with international accreditations. In order to compete in global market, B schools should be able to improve the quality and continuous improvement (Avolio & Benzaquen, 2020). (Jacqmin, J., & Lefebvre, 2021) EQUIS and AMBA observed that, AACSB, EQUIS & AMBA accreditations positively and significantly influence students admissions and the impact of the US-based AACSB accreditation is more than the other accreditations.

Literature Review

There are a number of factors influencing the B schools for adoption of accreditation. In order to gain accreditation in B schools, it is important to identify the factors and barriers which are directly influencing and which are indirectly influencing. Liu, Meyerson, King, Yih, & Ostovari (2017) discussed the drivers and barriers using performance improvement model for adoption of accreditation in health department and concluded that the top management and organisation structure plays important role for adoption of accreditation. Saadati, Yarifard, Azami-Agdash, & Tabrizi, (2015) discussed the barriers and concluded that training of accreditation staff and commitment of management team are important for successful implementation of accreditations in Iranian Hospitals. Avolio & Benzaquen, (2020) stated the key drivers for b schools accreditations using the thematic analysis methodology. He discussed the key driver's leadership commitment, budget, faculty and staff involvement, Infrastructure, faculty qualification etc. for accreditation in B schools. Saadati et al., (2015) stated the solutions for successful factors implementation accreditation are Organisation Culture, Management, Financial Resources, Human Resource planning, Training & Education etc.,

We believe that the perception of employees of the school has differences about the accreditation outcomes and the factors affect the accreditation adoption. The presence of the accreditation agencies also potentially depends on the origin country of the agency. Based on our review of literature of various outcomes and factors we establish the following hypotheses.

H1A: The perception of the lower income employees about the outcomes of accreditation is more than that of the upper income.

H1B: The perception of the lower income employees about the factors of accreditation (related to institute, faculty and students) is more than that of the upper income.

H2A: The perception of the small size institute employees about the outcome of the accreditation is more than that of large size institute.

H2B: The perception of the small size institute employees about the factors of accreditation (related to institute, faculty and students) is more than that of the large size institute.

H3A: The perception about the outcome of the accreditation is more for employees where the accreditation decision is collegial than autocratic.

H3B: The perception about the factors of accreditation (related to institute, faculty and students) is more for employees where the accreditations decision is collegial than autocratic.

H4A: The origin country of the accreditation agency has a positive affinity with that of the country of the accredited institute.

H4B: The Triple Crown accreditation shows dominant presence in the USA, Europe, and Australia than rest of the world.

Methodology

We operationalised this study in India. A survey instrument was designed to capture the perception of the employees of business schools. In the initial exploratory stages, we collected 50 responses. The two independent sample T-tests and Chi square tests were used for conducting the analysis. We used MS excel and SPSS to conduct the analysis and test our hypotheses. The outcomes and variables of accreditation adoption were selected based on the review of literature and expert views.

Empirical Analysis

An initial ranking analysis based on the means of the outcomes and variables shows the relative importance in Table 02. We also find out the rank based on aggregation of the variable in various themes such as students, faculty, institute, infrastructure etc. Market reputation and student's outcome were observed highest ranked outcomes. At the same time, the institute faculty engagement is rated the highest among the various factors for adoption of accreditation.

The H1 was tested based on the income demographic (lower income, higher income). We find that the hypothesis H1A and H1B are true based on the differences in the means (Table 02).

The H2 was tested based on the size of the institute (lower employee strength, and higher employee strength). We find that the hypothesis H2A and H2B are not true based on the differences in the means (Table 03). We observed only a very few variables with differences.

Interestingly the H3A and H3B were not supported (Table 04). In case of H3A (Outcome) we observed that the perception about the outcomes is more when the accreditation decision has happened as autocratic. This finding is counter-intuitive, because we anticipated that the outcomes and variables would be perceived more for collegial decision case. The chi-square test of independence showed that the accreditation agencies have larger dominance in the countries where they originated. Therefore, hypothesis H4A is accepted. We did find the support for H4B also but at 10 per cent p value (Table 05). The predominant presence of AACSB is in the USA, EQUIS is in Europe, and AMBA is in the UK. The Triple Crown institutions are present predominantly in the USA, Europe and Australia.

Table 01. Ranking of Outcomes and Variables of Accreditation Adoption

Code	Name of Outcome	Mean	Rank	Code	Name of Variable	Mean	Rank
O1	Improve international recognition	6.18	1	V1	Institute vision and mission and its awareness	6.14	1
O2	Improve students placements/jobs	5.92	2	V2	Faculty training and development	5.98	2
O3	Promote transparency in the processes	5.54	3	V3	Faculty development facilitation	5.88	3
O4	Improve departmental processes	5.52	4	V4	Licensed software tools repository	5.88	4
O5	Develop the research ecosystem	5.52	5	V5	Regulator pressure (Government and regulators requirements)	5.84	5
O6	Increase the chances of getting funded research projects	5.45	6	V6	Long term strategic planning	5.82	6
O7	Bring policies to implementation	5.42	7	V7	Financial sustainability	5.82	7

O8	Increase accountability	5.35	8	V8	Faculty awareness of benefits of accreditation	5.81	8
O9	Improve the performance culture	5.20	9	V9	Recruitment of qualified staff	5.80	9
O10	Reduce disputes	4.80	10	V10	Sports & Extra curriculum facilities	5.80	10
				V11	Organisation commitment towards new initiatives	5.78	11
				V12	Staff awareness of the benefits of accreditation	5.78	12
				V13	Organisational culture	5.66	13

Table 02. Two independent sample T-test (Income groups)

Code	Outcome/Variables	P Val	Mean Diff	Lower Income Mean	Higher Income Mean
O1	Improve international recognition	0.038	0.715	6.45	5.74
O5	Develop the research ecosystem	0.015	1.008	5.90	4.89
O6	Increase the chances of getting funded research projects	0.024	0.905	5.80	4.89
O7	Bring policies to implementation	0.012	1.102	5.84	4.74
O9	Improve the performance culture	0.036	1.087	5.61	4.53
O10	Reduce disputes	0.028	1.036	5.19	4.16
V1	Institute vision and mission and its awareness	0.019	0.735	6.42	5.68
V2	Faculty training and development	0.045	0.647	6.23	5.58
V3	Faculty development facilitation	0.002	0.995	6.26	5.26
V4	Licensed software tools repository	0.045	0.740	6.16	5.42
V5	Regulator pressure (Government and regulators requirements)	0.017	0.846	6.16	5.32
V6	Long-term strategic planning	0.040	0.728	6.10	5.37
V7	Financial sustainability	0.003	0.983	6.19	5.21
V8	Faculty awareness of benefits of accreditation	0.047	0.643	6.06	5.42
V10	Sports and extra-curricular facilities	0.010	0.951	6.16	5.21
V11	Organisation commitment towards new initiatives	0.011	0.919	6.13	5.21
V13	Organisational culture	0.029	0.895	6.00	5.11

Table 03. Two Independent Sample T-test (Institute employee strength)

Code	Outcome/Variables	P Val	Mean Diff	Small Institute Mean	Large Institute Mean
V8	Faculty awareness of benefits of accreditation	0.098	0.563	6.00	5.44
V11	Organisation commitment towards new initiatives	0.073	0.688	6.00	5.31
V12	Staff awareness of the benefits of accreditation	0.097	0.688	6.00	5.31

Table 04. Two Sample Independent T-test (collegial versus autocratic)

Code	Outcome/Variables	P val	Mean Diff	M1 Collegial	M2 Autocratic
O2	Improve students placements/jobs	0.030	-1.023	5.30	6.32
O3	Promote the transparency in processes	0.026	-1.135	4.80	5.94
O4	Improve departmental processes	0.011	-1.168	4.80	5.97
O8	Increase accountability	0.044	-1.174	4.60	5.77
V9	Recruitment of qualified staff	0.044	-0.997	5.10	6.10

Table 05. Chi square Test of Independence (International accreditations)

Group 1	Group 2	Chi-Sig	Phi	Cramer's
AACSB	USA	.000	0.521	0.521
EQUIS	Europe	.000	0.299	0.299
AMBA	UK	.001	0.097	0.097
Triple Crown	USA/Europe/Australia	0.095	0.009	0.009

Conclusion

Our study indicated that the perception of employees with lower income group and small institutes have higher means for outcomes and factors of accreditation adoption. In institutes where the decision has been autocratic, the employees perceived more output and factors importance for accreditation adoption. We can infer from our research that the density of particular accreditation agencies has close relation with their country of origin. The small sample size may have caused a bit of bias in our test of hypothesis. While examining the density of the accreditation agencies, we conducted the analysis on absolute basis, while controlling for population and other economic parameters may change the results.

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Education of Generation Z: A Systematic Review and Research Directions

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ABSTRACT

The purpose of this paper is to gain an understanding of existing research and debate regarding the requirements expectations and attitudes of Education for Generation Z using the technique of Systematic Literature Review. The Review has been done by systematically collecting the existing literature between 2003 and 2020. The literature is categorised according to Geographical Distribution and types of studies undertaken. Literature is also categorised based on the type of study. A disciplined screening process resulted in 41 relevant research papers appropriate for the study. As these papers explain the emerging trends in the discipline since 2003, it can serve as a base for researchers who wish to conduct a meta-analysis about Generation Z. It would also enable establishing a framework for further empirical research. Due to the vast nature of topics related to the education of Generation Z, it is not possible to study the entire discipline in a single study. Hence the study only focuses on relevant and emerging trends about education for Generation Z. The study aims to fill the gap of unavailability of a structured systematic literature review in the domain of education of Generation Z. This serves as an important source of information for academicians, practitioners. The study postulates new avenues for future research. The study contributes to the methodology for conducting Systematic Literature. Reviews in the field of teaching and learning, specifically for the education of Generation Z. It highlights an effective method for mapping out thematically and viewing holistically emerging research trends.

Keywords: Generation Z, technology, education, students

Introduction

Generation Z refers to the cohorts born between 1995 and 2010 (Pew Research Centre, 2019). They are the first generation who are born with complete access to electronic technology. Most of the Generation Z students are currently pursuing their higher education or are likely to do so. Higher educational institutions are also going through significant transformations related to structure and pedagogy in order to make learning student-centric and effective. New formats and pedagogies in education are also gaining prevalence in the current times. As the expectations of Generation Z students are vastly different from their previous generations, universities and colleges need to come up with innovative measures to meet the challenges of instructing this new generation. The objective of this paper is to understand through a systematic literature review the expectations and attitudes of Generation Z with respect to education and also identify the prevalent technology and pedagogy adopted by new-age educational institutions. This study serves as an important source of information for academicians, practitioners, researchers and postulates new avenues for future research. It also contributes to the methodology for conducting Systematic Literature. Reviews in the field of teaching and learning, specifically for the education of Generation Z. It highlights an effective method for mapping out thematically and viewing holistically emerging research trends.

Literature Review

The first step for the review was done by taking into consideration the various relevant literature on Generation Z. A total of 40 research papers spread across the period of 1990–2019 were considered for the study. Initially, papers spread across the period of 1990–2020 were considered for the study. Due to the growing significance of understanding Generation Z as a discipline for research and the inherent changes in the education ecosystem, the researchers selected the period of 2003–2020 for the study.

Inclusion Criteria

Scholarly databases such as EBSCO, Emerald, Springer, Elsevier, Wiley, ProQuest, J Stor and Taylor and Francis were searched using the key phrase ‘Generation Z’ ‘Technology’ and ‘Education’, ‘Students’ between the years 2003 and 2020 focused on education of Generation Z are considered for this study.

Findings

Table 1. Subject-wise Distribution of Research Papers

Unit of Analysis	2003–2011	2012–2020
<i>Technology</i>	2	8
<i>Pedagogy</i>	1	7
<i>Attitude</i>	4	10
<i>Expectations</i>	4	4
Total	11	29

Table 2. Main Objectives of Research Papers

Papers	Main Objective	Element
Jones et al. (2007)	A brief idea of how much technology is essential for students and all the ways in which it can be used	Technology and Pedagogy
Catherine (2017)	Understanding how a generation z student thinks and acts while pursuing higher education	Expectations
Seemiller et al. (2017)	Use the resources and make education more involving for the students	Pedagogy
Töröcsik et al. (2014)	Understanding how millennials think about any issue and ideas in their head	Attitude
Moore et al. (2017)	What more advancements can be bought for engineering education for post-millennials	Pedagogy
Schwieger et al. (2018)	Making teachers and instructors understand what kind of atmosphere generation Z students prefer	Expectations
Frances (2017)	A brief idea about how the technology has become a major transformation for the classrooms in the present times	Technology and Pedagogy
Duse et al. (2016)	What changes should be made in the teaching to engage the Generation z with the studies	Technology and Pedagogy
Ieab (2009)	The use of technology is an extraordinary tool for shaping and enhancing the learning environment	Technology and Pedagogy
Gottipati et al. (2017)	Promoting the benefits of e-Learning	Expectations
Moscip (2019).	How the different factors of the community are leaving a major impact on Generation Z students	Attitude

Aman (2016)	Understanding how the behaviour of generation Z can help set a proper learning style for them	Attitude
Anthony (2015)	How much technology and social media influences the millennials	Technology and Attitude
End (2017)	In the current times, major learning is taking place with the help of technology and digitisation	Attitude
Oblinger (2003).	The pattern of thinking and behaving has changed in different generations	Attitude
Nandhakumar (2016).	The kind of teaching that will be appreciated by the students of Generation Z	Attitude
Cilliers (2017).	Understand the needs of the current time student and also to understand what changes could prove to be of major help to the students	Technology and Pedagogy
Nicholas (2020).	See how we should introduce technology to make education easier for students	Technology, Pedagogy and Attitude
Mohr et al. (2017)	The kind of changes that must be made to fulfil the demands of generation z and to satisfy them	Technology and Pedagogy
Hollywood (2018).	Communication and flow of information in the workplace in the new generation.	Technology and Attitude
Salubi et al. (2018)	Showing the recent developments in the libraries	Pedagogy
Holton et al. (2015)	Postmillennial in terms of their expectation, learning patterns, skillsets and social interactions	Pedagogy
Chillakuri (2020).	Understanding Generation Z expectations from the workplace	Attitude
Vişlar (2019).	How much social media affect Generation Z and how brands are present in every aspect of our lives	Technology and Pedagogy
Linnes et al. (2017).	Generation Z and its strong preference for open access and digitisation	Technology
Dolot (2018).	Understanding that generation z has a few specific characteristics	Expectations
Ozkana et al. (2015).	What Generation Z expects as employees	Attitude
Hollywood (2018)	Communication and flow of information in the workplace in the new generation	Technology
<i>The Chronicle of Higher Education (2019)</i>	Every generation has a different lifestyle and expectations and the same as with the current generation	Attitude and Expectations
<i>Ozkana et al. (2015)</i>	What Generation Z expectations will be as employees	Technology

Analysis and Inferences

Based on the literature available, the study has categorised and analysed four aspects related to education: Technology, Pedagogy, Attitude and Expectations. Through this we try to understand how different their mental

structures are compared to the previous generations and the need for methods and techniques different from the previous generations.

Inferences from Table 1

Table 1 comprises a subject-wise distribution and shows the patterns in literary studies of various sub-areas of the unit of analysis of education for Generation Z over the past decades. Some sub-areas indicate shifts in patterns. Subject areas like 'Attitude of Generation Z towards 'Pedagogy' has seen significant growth in studies. Also, patterns have changed for the Importance of Technology which also has seen a significant growth.

Inferences from Table 2

Technology

Importance: Generation Z has a very strong preference for open access and digitisation. The upcoming technology can be extremely beneficial if used in the right way.

Education improvements: Digital learning has many benefits for a student including convenience, cost, flexibility and more. It is more preferable for students over libraries.

Disadvantages: Level of technological understanding varies so some users today face problems performing some of the most basic tasks using current technology while others depend on its existence so much that they feel disabled without it.

Pedagogy

Requirements: The requirements for education can be fulfilled with the help of the Internet in the present day. Thus, it is important to include more involving and interesting teaching methods.

Improvements: It is important to develop the teacher-student relationship outside the classroom as well. It could help the teacher get a clear picture of the student, which could help to get a more effective plan to help them.

Attitude and Expectations

Generations Comparison: Every generation has different lifestyles and expectations and the same is true for the current generation. Their expectation from the education system is vastly different from the earlier generations as they prefer hands-on and participative learning experiences.

Personality: Generation Z is more outgoing and voices their expectations. They seek active feedback and open communication. Thus, we need to change the situations around education to accommodate the newer generations.

Conclusion

There seems to be no doubt that the education of Generation Z will uphold major challenges. The pedagogy should focus on extensive use of technology, experiential and hands-on learning. The student's expectation from education is to have a high degree of student engagement, active learning, a curriculum that increases their ability for better employment, short and crisp lectures, and practical approaches in learning. They also seek active and continuous feedback. Hence, educational institutions need to make significant changes to their pedagogy and methods to match Generation Z students' expectations.

Our review contributes to practice by focusing exclusively on the education of Generation Z. It helps practitioners to understand recent trends in The Education for the Generation Z. This will not only help in developing competent and strategically flexible Pedagogical Strategies but also develop better policies at Institutions. We hope this contribution inspires more research on Generation Z who are the future of society.

Limitations and Future Studies

This study is limited only to understanding and analyzing trends in the Education of Generation Z since 2003 as it is not possible to cover all the vast number of topics under Generation Z in one study. There are a large number of research papers and materials on other aspects of education that are available for study under the well-established discipline of Generation Z. Taking the inclusion and exclusion criteria for the screening of the papers, there is a great possibility of missing out on a few important research work or papers. This is one of the major limitations of the study.

Acknowledgement

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Next Generation Tools, Technologies and Aesthetics for Effective Online Teaching and Remote Learning: An Engineering Faculty Perspective

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ABSTRACT

Online Teaching and Remote Learning (OTRL) became more or less inevitable in the current scenario due to the corona pandemic. OTRL could be more productive using next-generation software and hardware tools, information, communication, and automation technologies (ICAT). In addition to the intelligent devices and ICAT, incorporating aesthetics such as poetry, art, and animation in teaching complex concepts and algorithms could potentially enhance the beauty of OTRL. In this study, the author presents several useful next-generation tools and ICAT for efficient OTRL. The tools include smartphone applications (apps), intelligent devices for experiment demonstrations, google tools, and others such as canvas and piazza. The use of these tools and technologies will certainly deliver a better teaching and learning experience. The author also shows fascinating examples of using aesthetics in teaching specific engineering courses. However, the author finds them more useful for selected courses and concepts in engineering. The amalgamation of traditional approaches and selective and intelligent usage of state-of-the-art tools will lead to effective OTRL. Furthermore, using these tools, techniques, and practices, sciences and engineering faculty can quickly and smartly teach online and motivate students to learn better and wiser remotely.

Keywords: OTRL, ICAT, apps, aesthetics, animation

Introduction

In the past few decades, the rapid growth of the Internet, information technology (IT) (e.g., world wide web), and electronic communication technologies significantly influenced education systems in academia. The commendable growth in wired and wireless Internet (e.g., Wi-Fi) speeds, information and communication technologies (ICT) enabled online teaching and remote learning (OTRL). When combined with automation technologies, ICT plus automation would enhance the quality of OTRL significantly, specifically in science and engineering (SnE) education. However, there is still much scope for improvements in information communication and automation technologies (ICAT). There is need for enhancing the quality and infrastructure to address challenging problems such as remote laboratories for SnE courses. This need for quick improvements is due to the following reason: Before the novel coronavirus (COVID-19) pandemic, OTRL and online evaluations (OLE) were optional or limited to specific subjects or labs. OTRL has become compulsory due to the pandemic and its possible existence for several years to come.

However, with the pandemic becoming more dangerous due to multiple virus waves, it is essential to develop OTRL, OLE in rural schools and colleges and almost all academia across India. OTRL could be more fruitful with the help of available ICAT that include artificial intelligence (AI), the Internet of things (IoT), the next-generation (NextGen, e.g., 5G) communications, and applications (apps). Of course, implementation of the ICAT is both challenging and time-taking. NextGen ICAT for high-quality OTRL is possible in multiple phases and based on priority and budget availability. In this article, the author presents ICAT tools with examples. In addition to ICAT, the quality of teaching of SnE courses needs to be improved by adopting novel and exciting approaches and avoiding traditional and linear methods. For instance, a faculty could explore aesthetics such as poetry-like forms, art, and animation techniques to explain complex concepts and algorithms.

Review and Discussion on ICAT

The author presents a review of ICAT and existing useful techniques for OTRL. Specifically, the review ICAT comprises various helpful software and hardware tools, 5G and beyond communication and automation technology. Fig. 1 illustrates information, communication, and automation technologies (ICAT) for effective online teaching and innovative remote learning. Firstly, the author reviews existing information and automation technologies (ICT). Later, the author discusses automation based on artificial intelligence (AI) and robots in the following section. Note that intelligent automation based on AI has not yet been explored in Academia.

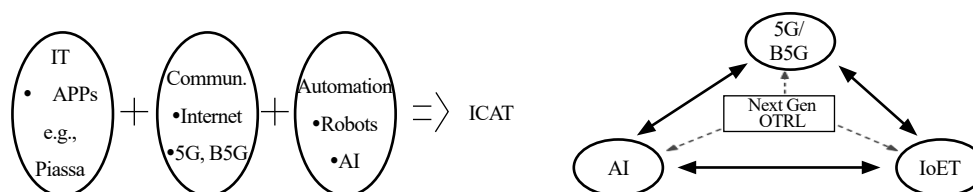


Figure 1. (left) Information, communication and automation technologies for OTRL

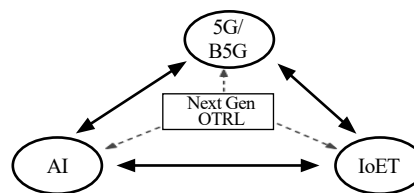


Figure 2. (right) The interplay between advanced technologies for next generation (NextGen) OTRL

Some of the open-source IT apps include the following: i) Web tools, e.g., Google tools such as, Google groups, Google docs; ii) Slack forum; iii) Piazza and iv) WhatsApp groups. Each of these tools has several helpful features and a few drawbacks. Below, the author discusses some of the IT apps.

Google tools: There are many Google tools available for education. For instance, using Google groups, faculty can create a dedicated group for a course using all the students' email IDs. Various valuable resources such as slides; eBooks can be easily shared by the faculty with a single group ID. However, there do exist similar proprietary tools developed by the institutes with the help of IT firms. For example, Nalanda.

Slack and Piazza: These apps are more practical and convenient platforms for discussing various course-related topics and sharing documents. This app comes with various exciting features including audio and video calls. However, one has to pay the quoted price to get all the advanced features. Piazza tool is essentially a learning management system. In it, students can pose questions in a forum-like structure. Faculty can moderate the discussions and appreciate accurate answers. Either slack and Piazza or one of the apps can be used by the course instructor. Some academic institutes have their proprietary apps, for example, Nalanda from BITS Pilani. If these apps have limitations, other apps such as slack can be explored and used accordingly.

5G/B5G in education: The fifth-generation (5G)/beyond 5G (B5G) communication technologies could help academia improve OTRL. It is possible to reap more benefits when we integrate (see Fig. 2) 5G/B5G with intelligent automation with the help of AI and the Internet of educational things (part of IoT for education). However, there are many challenges in realising the next generation (NextGen) educational eco-system for optimising the OTRL. Some of these challenges include selecting and adopting software and hardware resources and infrastructure, training the faculty and students to improve their skills in using these advanced technologies.

Internet of educational things (IoET), Intelligent automation with AI, robotics: The use of IoET in Academia significantly improves connectivity and collaboration among institutes for NextGen SnE education. IoET devices facilitate better access to everything from (e)learning resources to communication channels, and they allow teachers to evaluate students' learning progress in nearly real-time. Automation with AI or machine learning (ML) is helpful to find solutions for various problems. Some of these solutions include virtual classroom assistants, chatbots. Another critical issue lies in designing and developing remote laboratories that are entirely based on hardware. Due to the pandemic, SnE students could not access the equipment in labs. If these laboratories are equipped with robots that can assist students in executing the experiments remotely as per their instructions. However, the development of such labs is quite challenging and requires funding from sponsoring agencies from government or private. Fig. 3 illustrates the use of robots in hardware-based laboratories. In it, an advanced robot connects various components to build a circuit on the breadboard. Various courses like basic analog electronics and digital electronics need such robots to perform experiments based on instructions given remotely by the students and faculty.

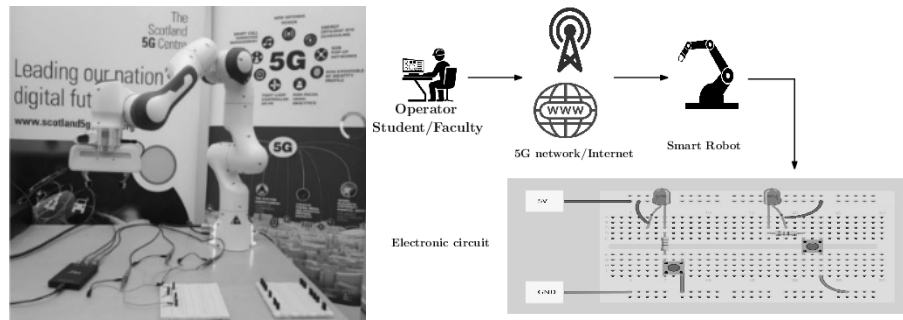


Figure 3. (left) Glasgow remote lab (Source: VTC conference (Spring), 2021); **Figure 4.** (right) Application of intelligent automation for performing experiment remotely.

Figure 4 depicts a simplified block diagram that shows smart robot-assisted, 5G/internet-enabled NextGen lab activity to experiment remotely. The establishment of such a remote lab requires integrating diverse technologies and also requires significant time and budget. Below, the author reviews and discusses the role of aesthetics in NextGen OTRL, namely, art and animation, poetry, algoRHYTHMs, and various techniques. Selective use of these techniques would help students develop an interest in learning the subject in a better and wiser manner.

Review and Discussion on Aesthetics in OTRL

Art and Animation: Fig. 5 illustrates the CR concept. Several fundamental courses in SnE involve concepts that require decent visualisation abilities for understanding. One such course is signals and systems, and the key concepts are convolution, correlation. Animation significantly helps students to understand graphical convolution and correlation (autocorrelation/crosscorrelation). Nice animation on the convolution of continuous-time signals, a critical signal processing operation, can be seen in the Wikipedia article on convolution.

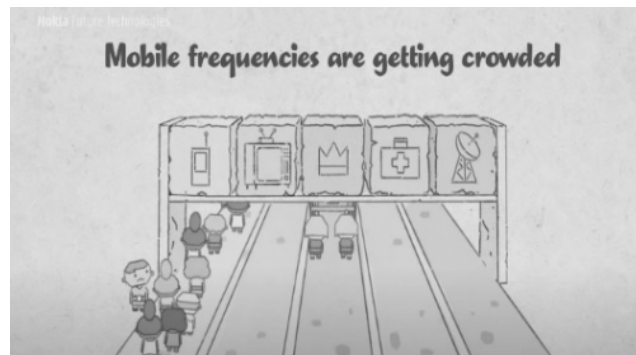


Figure 5. An artistic illustration of cognitive radio (CR) concept. [Source: Nokia labs]

Art: In SnE, Art could play a significant role. Faculty could use Art to convey subtle SnE concepts using suitable drawings. Excellent relevant art is worth a thousand words. Historically, in 1945, the Sci-Fi writer Sir Arthur C. Clarke described relaying satellites in art form. The following figure illustrates the significance of Art in understanding the concept of cognitive radio (CR), an intelligent wireless communication system.

Poetry: The author again considers the signals and systems course, an introductory undergraduate course for electrical engineering students. In it, students learn Fourier transform properties. Fourier transform is a mathematical tool that helps to analyse signals in the frequency domain. Some enthusiastic and creative learners came up with a song with lyrics as the Fourier transform properties in text. Application of the properties helps students to solve problems quickly, saving a lot of time. A few lines of the song are shown below to emphasise the usefulness of poetry.

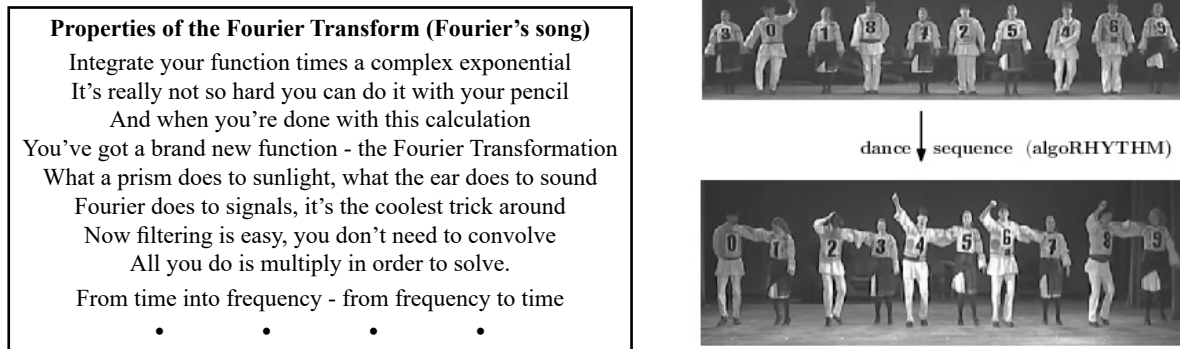


Figure 6. (left) Fourier song; **Figure 7.** An illustration of bubble sort algoRHYTHM.

algoRHYTHMs: Consider the popular algorithm known as the bubble sort algorithm. The sorting algorithm repeatedly swaps the adjacent elements if they are in the incorrect order. Some enthusiastic and creative learners choreographed a dance sequence based on the algorithm so that at the end, the dancers are in the correct ascending order (from left to right), as illustrated in Fig. 7. Two snapshots of the sequence are shown below. However, transforming complex algorithms into dance sequences is complicated and time-taking. In addition to the above, there are other techniques the authors like to discuss below.

Miscellaneous Techniques: Online demonstrations several SnE courses involve mathematical modeling and analysis. Students' understanding will improve if the faculty uses online resources to demonstrate some concepts, such as sampling and aliasing problems in signals and systems, signal processing courses, and central limit theorem in probability courses. In addition to mathematical details, a demo is helpful for students to understand and appreciate the concept.

Conclusion

In this article, the author presented various ICAT tools and apps for effective OTRL. Due to the pandemic, OTRL became inevitable. Conducting online courses involving lab (hard-ware/materials based) experiments. The author suggested exploring advanced technology such as 5G, intelligent automation, and robotics to develop remote labs. The author believes that the incorporation of aesthetics such as poetry, art, and animation in teaching complex concepts and algorithms, could potentially enhance the beauty of OTRL. The use of ICAT tools and technologies delivers better OTRL. However, the author suggests their optimal use for selected courses.

Acknowledgement

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The Way Forward to the Post-pandemic Evolving Education Ecosystem: An Institutional Theory Perspective

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ABSTRACT

With COVID waves continuing, the imagination of a pure classroom program is waning in developing countries. It is an accepted fact that online education is here to stay. There are, however, challenges to be overcome before online education becomes a part of mainstream offering without compromising on the learning possible through a classroom programme or reducing its business value proposition. This study attempts to understand the numerous challenges, benefits and perspectives of online education and their effect on parents' perception to view online education as a mainstream offering. The conceptual frameworks are grounded in the institutional theory perspective. The study juxtaposes this with the parents' idea of a school education that exists in their minds and tries to explore the possibility of the emergence of a hybrid system that tries to mix the best of both worlds. The study was conducted using a perception survey instrument to collect the primary data from the potential parents. Currently, this survey was conducted on 50 respondents (initial set). We tested hypotheses using multivariate analysis. The child's adaptability and teacher's ability were the keys to online education success.

Keywords: online education, face to face education, child's adaptability, teacher's ability

Introduction

Even before COVID-19, the world witnessed promising growth and adoption and acceptance in technology transforming education (Harper, Chen, & Yen, 2004). The rise of ed-tech companies primarily addressed the latent need of the market, with global ed-tech investments touching US\$18.66 Billion in 2019. At the same time, the market for online education is projected to reach US \$350 Billion by 2025. Students and teachers, both used to interacting with each other on-screen using technology, switched fully to online teaching with fewer people asking about the value of online learning this time. Everybody was already sold on COVID, and, therefore, online education is here to stay (Paudel, 2020; Rahiem, 2020).

We saw a surge in video conferencing tools, virtual tutoring apps, and online learning software since COVID-19. We also saw much consolidation in the education space with larger companies (acquirers) augmenting their existing capabilities with the innovative and digital offering of the target. The ed-tech industry is showing signs of mixing with the usual mode of classroom education (Rahiem, 2020). The basic requirement of online education includes a reliable Internet education which is not an assumed reality yet in India. Then there is an obvious question of the family's privilege and not only the child's acquaintance but at times even the parent's comfort with technology (Mehra & Mital, 2007). At the same, there are challenges to fight, such as the belief that online education has significant adverse health issues in children's eyes (Mohan, Sen, Shah, Jain, & Jain, 2021).

However, the discussions, challenges and opportunities perspectives about online education do not stop at the Internet and technology discussions (Goldschmidt, 2020). It also spans across the more important question – what do students go to school for? Is it just for attending classes, or does it have a broader aim? There is little doubt about the point that school is the starting point for personality development. When students sit in their classes, they do not just read notes from teachers. They learn to interact (Utha & Rinzin, 2019). They learn to understand team behaviour and team dynamics. It helps them develop social interaction skills important to lead a socially active life. Similarly, sports environment in school too has its importance and students learn to form teams and identify outside their classes their standings in different activities.

The Objective of the Research

Is the overall effectiveness of online learning atmosphere the same as in the classroom? We hypothesise that overall satisfaction would vary not only by demographics or ages but also by inherent characteristics, attitude and capability of students, and the technology adoption.

The key objective of the research is to identify the antecedents of successful online education compared to the face to face education. Also, to investigate the future of online education and blended education.

Around us, there are many discussions around the importance of spending money on the costly education of primary and high school. Parents in many cases do admit their wards into famous and costly schools but are not convinced that the learning in those schools is worth the money they have spent on it. Is online education the future of primary education? If so, how would schools offer something valuable in parents' eyes and not opt for homeschooling? What does it mean for different stakeholders – parents, teachers and schools- associated with this? How are they going to react to this? How will the system evolve? Will the value of the school and highly-priced education, in general, remain the same? Do parents view online education companies with a different eye now, and can ed-tech companies position themselves as schools of the future, or is it just a temporary surge?

The key research questions that emerged are:

Research question 1: what are the key antecedents of value for money for online education versus face-to-face education?

Research question 2: what are the key antecedents of the overall rating for online education versus face-to-face education?

Literature Review

Different ways of understanding preference were dwelled for various attributes of online education, suggested ways to an effective online environment and identified the attributes that make online education an attractive option as well the limitations and challenges that make it a difficult option (Muthuprasad, Aiswarya, Aditya, & Jha, 2021). The most important facilitators and inhibitors for online education from the perspective of college students and academicians were examined (Doyumğaç, Tanhan, & Kiymaz, 2020). How evaluation instruments assess “Seven Principles for good practice in undergraduate education” were investigated. They state that good practices encourage student-faculty contact, cooperation among students, active learning, give prompt feedback, emphasise timely delivery of tasks, communicate high expectations, and respect diverse talents and ways of learning (Baldwin & Trespalacios, 2017).

The factors of quality and quantity of online education, such as industry, governments at state and federal levels, and Internet penetration inside the country, apart from income and digital divide, were documented Palvia et al. (2018). The literature for challenges and issues for teaching successful online courses in higher education and identified three main issues related to online learners (readiness, expectations, identity and participation), instructors (teaching styles, face to face online, time management and teaching style) and content development were reviewed (Kebritchi & Santiago, 2017). The potential of online education has not been realised despite its explosive growth and questions its affordability (Protopsaltis & Baum, 2019). Furthermore, the evolution of online education was questioned related to institutional factors that help institutions inject innovation in online education, authenticity, and online education's holistic nature compared to traditional education (Kumar, Kumar, Palvia, & Verma, 2017).

Methodology

Research Design

The key research questions are answered using perception data from secondary research and using a structured survey instrument. Since we wanted to understand the online education system for students who have not yet entered high school, the survey was floated to the parents of these students, who are expected to take the majority of decisions. We are hopeful that, on this topic, everybody would have some perspective to offer which would enrich the research findings. We used multivariate regression analysis to test our hypotheses.

Respondents Profile

We capture the sample demographic and control for them in our causal model. Since the survey focused more on urban areas, one can notice the major respondents are income above INR 25 lacs, staying in the metro, and reasonably comfortable with technology, with less than two kids, and post-graduates.

Data Analysis

We developed three regression analysis models considering three dependent variables, namely M1 (value for money in online classes viz-a-viz face-to-face classes), M2 (value for money), M3 (overall rating for online w.r.t. f2f classes). The model M1 considered the construct level variables against the dependent variable as Value of Money (VOM). A few constructs did not show significance in model M1 (Table 1A). In order to further investigate, we delved further (Table 1B). We carried the significant constructs and all items of the non-significant constructs in regression against the VOM (Table 1B). In M1, we observed that the child's adaptability ($\beta = 0.492$, $p < 0.05$) showed a positive and significant association with the VOM. In M2, we observed that the teacher's ability to explain the concepts ($\beta = 0.349$, $p < 0.05$) showed a positive and significant association with the VOM. In M3 the child's concentration and focus ($\beta = 0.133$, $p < 0.1$), and teacher's ability to explain the concepts ($\beta = 0.171$, $p < 0.05$) showed positive and significant association with the overall rating of online classes w.r.t. f2f classes.

Table 1A. Construct Level Analysis (Value of Money of Online classes)

Relationships	β	T	P
Intercept→ VOM	1.960	2.108	0.042
Income→ VOM	-0.186	-1.765	0.085
City of Stay→ VOM	-0.243	-1.703	0.097
Youngest kid attending online classes→VOM	0.190	1.646	0.108
Child's adaptability → VOM	0.492	2.164	0.037
Teacher's adaptability → VOM	0.222	0.972	0.337
Interaction level of entities → VOM	0.200	0.999	0.324
Child's attitude towards classes → VOM	-0.344	-1.680	0.101

Table 1B. Significant Construct and Item Level Analysis (Value of Money of Online classes)

Relationships	β	T	P
Intercept→ VOM	2.612	2.952	0.005
Income→ VOM	-0.159	-1.672	0.103
City of Stay→ VOM	-0.264	-2.158	0.037
Youngest kid attending online classes→VOM	0.123	1.219	0.230
Child's adaptability →VOM	0.255	1.500	0.142
Teacher's ability to explain concepts→VOM	0.349	2.656	0.011
Parent's Teacher Interaction→ VOM	0.163	1.600	0.118
Punctuality of child → VOM	-0.156	-1.297	0.203
The distraction of child → VOM	-0.220	-2.226	0.032

Table 1C. Analysis considering Overall Rating of Online Classes as DV

Relationships	β	T	P
Intercept → OR	1.577	3.634	0.001
City of Stay → OR	-0.152	-2.023	0.050
Comfort with technology → OR	0.118	1.747	0.089
Parent's education level → OR	0.118	1.156	0.255
Quarterly fees of school → OR	-0.156	-3.243	0.003
Child's concentration and focus → OR	0.133	1.981	0.055
Child's participation and performance improvement → OR	-0.209	-1.597	0.119
Teacher's ability to explain concepts → OR	0.171	2.393	0.022
Teacher's ability to maintain discipline → OR	-0.154	-2.353	0.024
Teacher's ability to feedback and attention → OR	0.163	1.419	0.164

Conclusions

There have been multiple pieces of research done, and many are underway that talk about online education, its challenges and its future. We found that the value for money in online education is driven by the child's ability to adapt, while the overall rating for online education was driven by the child's concentration and the teacher's ability. The research is presented in an exploratory stage, and more data collection is underway, which would further improve the findings. The research contributes to the institutional theory (Zucker, 1987) for adapting to the emerging online education practices within the society. This research has the potential to understand the disruption in the education system post-COVID and the perceptions of parents and their wards about the value of education in online mode and ways to maximise it while suggesting alternate models of the education system. The small sample size is the key limitation of this research, and a larger sample would make the findings more focused. However, the research can also be extended to answer the thoughts around the possible education models and help us predict the kind of value additions that parents expect from the school for the short and medium term.

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A Survey on the Effectiveness of Innovative Teaching-Learning Methods Adopted by Academicians

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ABSTRACT

Every teacher aims to bring out the best in a student, but it is not enough to be a knowledgeable teacher, one needs to be creative and innovative in the 21st Century. Students throw different types of challenges to teachers in the classroom. So, it becomes inevitable for teachers to think beyond textbooks to engage the learners in the classroom and make them understand the concepts. An attempt was made with this study to know the innovative ideas and tools by current generation teachers to make the learning effective, this study also tries to examine the challenges faced by teachers by the digital technology. A survey was done with a self-administrated questionnaire circulated through Google forms among teachers from across India. A sample of 150 teachers from schools to a higher levels, have participated in this study. Statistical analysis of the data was done using SPSS version 25. The study concludes that there is a need for a change not only in the curriculum design but also in the teaching methods, which needs to be more interactive and engaging. Teachers must upgrade their knowledge of technology to become innovative and meet the needs of this generation's students.

Keywords: innovative teaching tools, ICTs, effective learning, technical knowledge, India

Introduction

Education these days is not just bound to classrooms, examinations, and grades. Flexibility in students' assessments has changed the education dynamics today. An interest that rushes curiosity and which further grows the human tendency to explore and learn more about the subjects leads in making more room for newer ideas and innovations. A student's tendency to ask questions has to be preserved and propagated. We can see that, innovation in education is walking outside of the box, questioning our methods and approaches to encourage all learners' success. Researchers usually say that learning is much deeper than remembrance or memorisation. Quite often, deep learning requires understanding, relating ideas and making connections between previous and brand-new knowledge, independent, critical thinking and an ability to shift knowledge to newer and different contexts. Learners get to see new concepts, ideas, and the world differently. Learning is not something done to students, but rather something students themselves do. It is the direct result of how students interpret and respond to their experiences. In addition, students need opportunities to develop interpersonal and social skills, team works, effective communication, conflict resolution and creative thinking.

An innovation in literal terms is an idea that can be transformed into a practical reality. Innovation in education is not just related to technological advancements. Innovation in education actually transcends the technical expertise. The words 'Innovation' and 'Learning' are synonymous with human nature and tendency. Both these words are beautifully interdependent on each other. The use of innovative teaching strategies has been a hot topic from the last decade. Creative and skilled teachers are using different innovative teaching methods at higher education levels. Many studies consider creativity as a personal trait and intellectual ability of different individuals, associating creativity with genius and intelligence (Albert & Runco, 1999), or with knowledge (Weisberg, 1999).

Literature Review

The review of literature on the selected topic is huge. Previous studies focussed on how ICT help students in self-paced learning with the assistance of vivid tools like computers (Anu Sharma, Kapil Gandhar, Sameer Sharma &

Seema, 2011). Another study focusses on classification of innovations, discusses the hurdles to innovation and offers ways that extend the size and rate of innovation-based transformations within the education system (Peter Serdyukov, 2017). In this study the effective use of ICT for education and learning and ICT as change agent for education was discussed widely (Syed Noor ul Amin, 2013). A study was undertaken to explore the assorted ways in which technology is often accustomed improve how and what youngsters learn within the schoolroom. (Jeremy Roschelle, Roy D. Pea, Christopher M. Hoadley, Douglas N. Gordin, Barbara Means, 2007). This study talks about how teaching tools, technology additionally exposes new prospects for the academics to style meaning learning experiences for his or her students the acceptable use of technology guarantees to deepen the educational of ancient attainment, accomplishment and therefore the mastery of subject information (Victor Lim Fei & David Hung, 2016). Focusing on teaching community, a study was undertaken to know the use of innovative strategies by the teachers to respond to students' diversity at higher education level in public and private sector of Pakistan. (Farah Nazand Hasan Sohaib Murad, 2017)

Aim

The aim of this study is to find out the innovative ideas and tools used by teachers of school/ college/university level to making learning effective.

Objectives

1. To know the demographic information of the teachers
2. To find out the use and practice of innovative tools and ideas of the teachers in classrooms
3. To know the perceptions of the teachers towards innovative tools and difficulties faced while adopting the innovation
4. To understand the challenges faced by teachers to adopt the innovations in teaching
5. To find out which level of education (school/higher) is more involved in utilisation of innovative teaching

Research Hypotheses

Hypothesis 1: There is a significant relationship between innovative tools and ideas and effective learning.

Hypothesis 2: There is a significant relationship between the use of innovative tools and ideas among male and female academicians.

Hypothesis 3: There is significant relationship between the use of innovative tools and ideas and different levels of education.

Hypothesis 4: There is significant relationship in the use of innovative teaching between private and government sector.

Limitations of the Study

1. The study was limited to know the perceptions of teachers only.

Research Design

The present study is **quantitative** in nature. A survey was conducted with a self-administered questionnaire which was circulated to teachers with the help of google forms to find out the answers for the hypothesis. The target population for this study was the teachers of government and private educational institutions from all over India. A sample of 150 academicians responded to the survey from all over the India. Majority of the respondents 83 are from two Telugu states Telangana and Andhra Pradesh, 52 participants are from Maharashtra, remaining few participants are from Karnataka, Chennai, Kerala, Rajasthan and West Bengal. Random Sampling technique was adopted. The survey data was analysed by using SPSS version 25.

Data Presentation, Analysis and Discussion

General & Demographic Profile

- A total of 149 academicians responded to the survey from all over the country. The respondents are drawn from across the country-India, to find out the innovative ideas and tools used by teachers to make learning effective. The participants are both male and female, the age limit of the respondents is between 20 to 63 years.

Demographic Variables

- 82 per cent of the respondents are female academicians, mostly from schools and undergraduate colleges. Majority of them are from private organisations. For all the demographic variables, the P-Value stands less than 0.05 indicating the statistical significance.

Age of the Participants: As per the study, the minimum age limit of the respondents was identified as 20 years, maximum age limit was 63 years and average age limit is 40 years with a standard deviation 8.99461 (See Table 1).

Table 1. Age of the Participants

	Minimum	Maximum	Mean	Std. Error	Std. DeviationStatistic
Age	20.00	63.00	40.3960	0.73687	8.99461

Most widely used Innovative Teaching Toolby Academicians: When questioned about the most widely used innovative teaching tool, majority of the respondents 20 per cent of them gave first preference to online discussions, followed by Brainstorming 19 per cent, role play with 16 per cent in third place and games 15 per cent as fourth choice. Whereas very few respondents 9 per cent choose movies and 7 per cent selected info graphics as tool for innovative teaching.

Frequency analysis was done for demographic and nominal scale response variables. The chi-square goodness-of-fit test was used to evaluate the frequency data for nominal variables were equally present or not. The Chi-square test of independence test used to determine whether two nominal demographic variables, (gender, teaching and organisation) with nominal response variables are likely to be associated.

Hypothesis 1: There is a significant relationship between innovative teaching and effective learning

The statistical values prove that the innovative teaching makes learning more effective (Table 2). This hypothesis is accepted statistically as teachers practice innovative teaching in regular classes irrespective of subject they teach. Tools like audio-visual materials, real-life examples, field trips, outside classroom engagement, use of storyboards are effective tools for making learning interesting. Thus, the null hypothesis is rejected and hypothesis 1 is accepted. Hypothesis 1 stands statistically significant. (Table 2)

Table 2. Responses of Participants on Innovative Teaching

Variables		Frequency	Percent	Chi square Value	P-value
Do you encourage the use of storyboards as a form of communication and let the students tell a story in pictures using their imagination for theory topics?	No	39	26.2	37.302	0.00
	Yes	84	56.4		
	Maybe	26	17.4		
Do you invite your students to suggest their views on improving your teaching methods?	No	26	17.4	63.148	0.00
	Yes	123	82.6		
Does your institution/college include imparting ethical values or empathetic learning?	No	5	3.4	129.671	0.00
	Yes	144	96.6		
	Yes	54	36.2		

Hypothesis 2: There is significant relationship between the use of innovative tools and ideas among male and female academicians

The statistical evidence shows that for majority of the opinions are similar between male and female academicians regarding use of innovative tools and ideas for effective learning. Little variations between male and female can be identified regarding using innovative teaching techniques on regular basis in classrooms, only 42 per cent of male say yes, whereas female are 72 per cent who said yes. *P*-value found to be significant therefore hypothesis 2 is accepted.

Table 3. Association between Gender and Response Variables

Variables		No (%)	Yes (%)	Maybe (%)	Chi square Value	P-value
Do you believe that Innovative teaching makes learning more interesting?	Male	1(3.8)	24(92.3)	1(0.03)	4.797	0.091
	Female	0(0)	119(96.7)	4((3.2)		
Do you apply innovative teaching techniques in your regular classes?	No		Yes	Sometimes	10.945	0.004200525
	Male	0(0)	11(42.3)	15(57.6)		

Hypothesis 3: There is a significant relationship between the use of innovative tools and ideas and different levels education.

Variation in opinion was found with usage of story boards as form of communication for theory topics, school teachers use this activity extensively 79 per cent when compared with the higher-level teachers of UG (40 per cent), PG 35 per cent. Interestingly 66 per cent of the intermediate teachers said no to the storyboard method. *P*-value found to be significant therefore hypothesis 3 is accepted.

Table 4. Association between Levels of Teaching and Response Variables

Variables		No	Yes	Maybe	Chi square Value	P-value
Do you encourage the use of storyboards as a form of communication and let the students tell a story in pictures using their imagination for theory topics?	School	5(7.9)	50(79.3)	8(12.6)	31.018	0.000
	Inter College	2(66.6)	0	1(33.3)		
	UG	27(40.9)	28(40.9)	11(16.6)		
	PG	5(29.4)	6(35.2)	6(35.2)		

Hypothesis 4: There is a significant relationship in the use of innovative teaching between private and government sector teachers.

The statistical evidence proves that there is a significant relationship between the use of innovative teaching methods among private and government teachers. It is also observed in the results that the private institution employees' attitudes are little more positive towards adoption of innovative methods compared with government employees, these differences are found in questions such as engaging students outside classroom, use of storyboard for theory topics. This could be because of the reasons that the private organisations are competitive in nature and have to adopt innovative methods to attract more students, whereas government employees don't face much pressure from government. For hypothesis 4 *P*-value was found to be significant therefore it is accepted.

Conclusion

With the pandemic-led shift to online mode of learning, there are concerns over the attention span of students. According to studies, an adult's maximum attention span is 20 minutes. This may go down as time passes by with more students gaining access to the Internet, therefore digitisation of education is unavoidable. This study concludes that all the academicians strongly support using innovative technology which makes learning more effective. Majority of the respondents choose online discussions as the most effective way to engage students to make learning more interesting. Government educators are less privileged to engage students with innovative methods due to lack of resources at government schools and colleges, whereas, all the private institutions employees are adopting innovative methods rigorously as part of their regular curriculum on daily basis. They all feel that online games, quizzes, brain-storming, audio-visual support etc. are effective tools to use to engage students in the better learning process. There is a need to bring balance between content and approach, and to do so it is important to include multimedia presentations, interactive games, online quiz, and many more activities. Thanks to the growing technology which is giving us plenty of options for the present day teachers with interesting and interactive methods, which can be adopted to make learning effective. While digitisation is the future, the importance of offline classrooms cannot be erased altogether.

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- https://www.researchgate.net/publication/279640233_Role_of_ICT_in_the_Process_of_Teaching_and_Learning
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Exploring Opportunities of Engaging Students through Technology-Driven English Classrooms

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ABSTRACT

Technology has opened new vistas of the teaching-learning process. Although, language educators have been frequently using various visual aids as tools to make learning interesting, but the COVID-19 scenario has given us an opportunity to explore and share different technological tools/online platforms to make the process even more fascinating. Language teaching has become an ever-evolving domain, wherein language teachers have to keep searching for new and interactive ways. One such scenario is finding excellence while exploring new dimensions of the teaching-learning process through integration of tech tools. Integrating innovative technological tools in the teaching process makes the task of the facilitator lot easier as well as makes the session fun and creative for the learners.

This paper aims to provide insights into the use of technological tools and innovative methods to make language classrooms more interesting and participative not only for students but also for teachers while integrating numerous tech-driven activities during the learning process. It aims to achieve functional proficiency in the language while improving the grammar, vocabulary, diction and skillsets of learners. This paper attempts to explore opportunities to engage students by using innovative ways and technological tools and methodologies for language teaching among language teachers. To reach the desired conclusion the researcher has adopted an observational study approach to analyse the learners' response and involvement in the process.

Keywords: technological tools/online platforms, ever-evolving domain, new dimensions of the teaching-learning process, achieve functional proficiency

Introduction

Change is the only constant, and we have kept changing and evolving since time immemorial but this pandemic has made us accept and adapt to change in the shortest time possible. The present times have almost forced us to accept the reality that we must be ready to accept the already changed scenario of the teaching-learning process.

There have been various types of learning or language teaching systems prevalent all throughout the world, and the present scenario has made the whole world stand on a common platform finding excellence in post-covid world where a whole new dimension of teaching-learning process needs to be explored. In present times we, as teaching-learning fraternity, are exploring numerous tech-tools, innovative practices and methodologies to involve students in the classroom and engage them in the learning process in an interesting manner.

Literature Review

As Clark (2018) has mentioned that since the advent of Internet in the 1990s, English language teachers have had to face difficulty accepting and embracing digital ways of teaching and learning. It was a common feeling that English language teachers have been poorly prepared to use the latest tech tools. Other than that there have been three common concerns on the way of introducing technology into teaching:

1. Learning a language requires learners to be interactive, whereas using technology limits learners' interaction. However, the truth is that if managed correctly, tech tools facilitate lots of interactive opportunities to learners.
2. Another prominent fear was that the teachers are being deskilled, but it is to be admitted that English language teaching itself has been very dynamic since English. Language teachers are more of facilitators providing learning opportunities to students, and giving feedback for improvement.

3. Fear of teachers becoming redundant with the rise of Artificial Intelligence (AI). Whereas it has no match with teachers' range of skillset including command over subject, problem-solving ability, counselling skills, and emotional and intellectual intelligence.

In 2014, Selwyn has talked about the Internet playing a critical role in English language education and stressed on the fact that academicians around are working hard to find the ways of incorporating traditional modes with contemporary methods catering to the growing demands of the internet age.

The reason behind this was students' growing expectation, change in societal demands, and coping with the technology advancement (while we were still considering all these factors). But the pandemic has acted as a catalyst for us to embrace technology in education as an integral part of the learning environment and has accelerated the developments which were already occurring.

Younesi & Khan (2020) in their brief study entitled "English language teaching through the Internet at Post COVID-19 age in India: Views and Attitudes", emphasised the nationwide lockdown in India has made approximately 300 million students opt for online mode of education. In a nation like India, Information Technology is not only a complement for traditional education but also is a part of numerous online and virtual English Teaching Institutions.

At the same time he stressed that even students' expectations differ with regard to technology. They are more tech-savvy and therefore teachers also have to devise innovative strategies to cater to their demands.

Scope of the Paper

The present paper studies different facets with regard to teachers' engagement with technology and the utility and benefits of various tech-tools to identify effectiveness, formulate effective strategies and explore improvement areas.

The paper follows the observational method where the researcher applied tech-tools in her classrooms and observed and analysed the learners' responses. The benefits of tech tools in ELT are highlighted with the following two major factors while using tech-tools (Ferlazzo,2021):

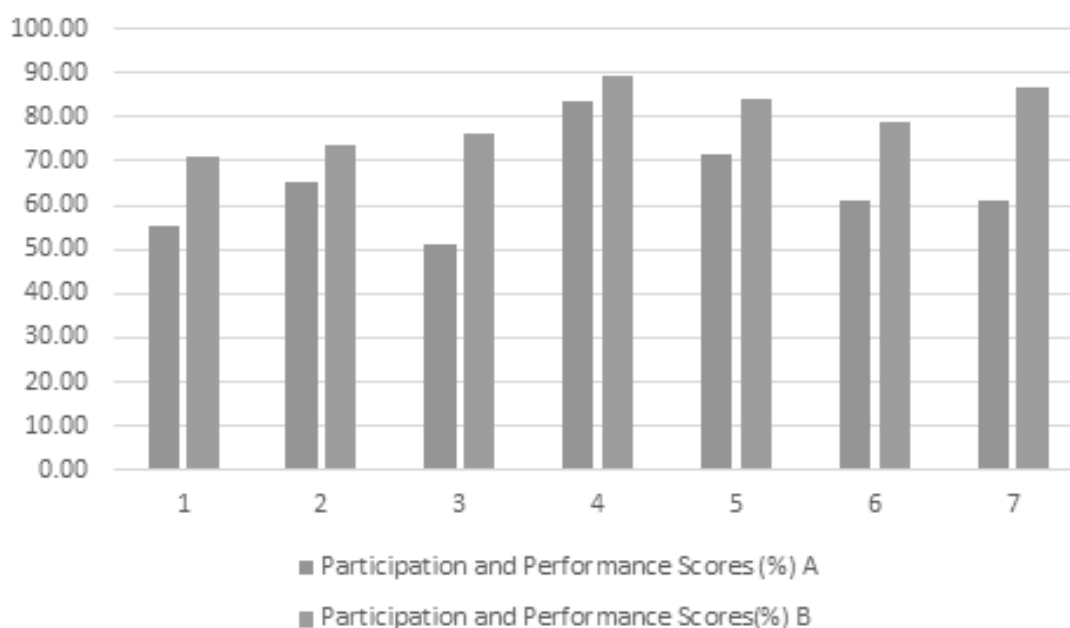
1. The role of a teacher in online education is more of facilitator where they provide the learners with the most appropriate content (videos, e-books) while also using the appropriate tools and technology.
2. In such process the learner is at the centre and pedagogical approaches are decided with a flexible and personalised approach catering and adjusting to the learners' requirement.

Methodology

The study was done in a regular classroom observation by the researcher. Two classes of the strength of 49 and 38 respectively (undergraduate programme-Amity University, Rajasthan) were chosen for the study, for General English paper where vocabulary (Synonyms, antonyms, one, word substitution) and grammar were the major components of the curriculum. For a duration of 1 semester (4 months approx.) one section (49 Students-Batch A) was taught through the regular non-tech-based methods whereas the other batch (38 Students-Batch B) were taught through various tech driven tools. However, the platform was online (MS Teams) for both the groups, but advance technological tools were differently applied.

Analysis

It was observed that as compared to Batch A, learners in Batch B were more participative and responsive in the classrooms. Learners seemed enthusiastic about the new tools as well as the interesting way of dealing with the lessons. Students engaged in worthy discussions, and their learnings also reflected positively in their test scores. The comparison between their scores and participation in various assignments are reflected through the chart given below:



Comparative analysis of participation/performance score of batch A & Batch B in different activities

Discussions

During the study, various online platforms and tools were used to engage students actively in the assigned tasks. Out of the plethora of tech-tools, the researcher selected the following ones for classroom implementation based on the need of the class.

- One such tool that was used in these sessions was Nearpod, which is a web-based learning application. It gave access to multiple ways of engaging learners in an active learning process. It helped in increased collaborations in the class and allowed the teacher to present materials such as slides, videos, quizzes etc. It also assisted in analysing learning progress and providing feedback to the learners.
- Another tech-app used was Kahoot App, which is a platform that contains quizzes, discussions and surveys using gamification mechanic helping learners practice their English and build their language skills. Students thoroughly enjoyed these test sessions as well.
- Next was Quizzes, which is an online assessment tool. It acts as a timed competition or can be assigned as homework. It helped in providing clear visual of the students' performance, comparing it with the rest of the class and also helped to analyse the problem area accurately.

Conclusion

Benefits of Using Online Tools

The trend of integrating online platforms into modern blended ELT systems is not just essential; but also very beneficial for the following reasons:

1. Encourages students to learn at their own pace:
Digital technology lets learners discover the way of learning that suits them the most. It provides individual learning opportunities and engages them in multifold ways.
2. Provides easy exposure to the subject:
No language educator can deny the importance of developing confidence in the learner. Social media is one such tool that is very popular among students and is used for both professional and social purposes.

3. Helps developing wider life-skills:

Using technology in language teaching also leads to developed critical thinking skills, leadership ability, communication skills etc. which are crucial for their professional life.

4. Better Teacher-student relationship:

Engaging learning resources and online tools helps teachers improve their classroom performance as well as it gives them time and scope to focus on students requiring more support.

5. Easy to track progress:

Online platforms provide ample scope to keep track of the students' achievement and work for improvement right from the onset of the course.

Online English teaching has opened up a range of possibilities connecting the teaching-learning community across the globe. Availability of endless free tools have made the virtual classroom even more interesting and innovating. It is up to the facilitator to decide upon the ways that increase collaborative learning in the classroom. Finding the right tool and resource calls for the creativity of the teacher and the requirement of the classroom.

The research concludes that a thoughtful and unified incorporation of technological tools not only engages students more but also makes them take control over their own learning as well.

Limitations and Future Studies

During the research, the greatest challenge towards successfully implementing online teaching lessons was to align subject matter, students' access to the tool, teaching pedagogy and assessment with appropriate technology and online teaching strategy. Although technology helps in deriving innovative approaches to the language-teaching process, it is also important to address and explore the strengths and challenges for the specific technology, students' approach towards the tool/method used, scope and limitations of the given technology, and the difference it brings to the entire process. Hence, a lot of technological advancement opportunities and their classroom applications in language teaching and learning need to be explored.

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Online Learning and Academic Performance: Mapping Literature through Bibliometric Analysis

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ABSTRACT

In the present era, amidst the pandemic, several challenges have been thrown upon the community. The academic fraternity has also been hit by this in several dimensions. Also, in the last decade, online learning had emerged but the hard-hit of the pandemic had induced a complete shift to a virtual mode of interaction.

The paradigm shift to digital learning has posed some gruelling challenges (Ahn, 2020). Henceforth, paramount research is required in this area. It has become pertinent to understand the outcomes and challenges associated with it. The current study has been conducted using the PRISMA framework approach. The database employed to gather literature review is the Web of science. The primary and secondary keywords were utilised to search the relevant documents and suitable filters were incorporated to refine the search. For relevancy check, the research papers were scanned to ensure the appropriateness of the subject matter under study. The relevant research documents capitulated from WOS and results were captured using Biblioshiny software. The most relevant keywords were identified through the author keyword and keyword plus. The most relevant authors were Hwang Gj and Linch. The most relevant journal on the basis of the H Index was found to be “Computers and Education” with H Index 37. The word growth shows a cumulative increase in the occurrence of the keywords over the years. The data indicated the trend topics which were related to online learning, flipped classrooms, and the challenges faced in online learning setup. The present study is to bridge the gap by providing the relevant literature and imparting themes for future research.

Keywords: online learning, flipped learning, bibliometric analysis, academic performance, biblioshiny

Introduction

In the present times, online teaching has become an imperative part of the academic routine. There has been a complete transformation in the education sector since the time classes have shifted to online mode. Virtual learning has become customary for both learners and educators. There has been a radical shift in the paradigms of teaching pedagogy. It can be recognised through novel teaching practices, innovative learning methods, and increased utility in online practices of teaching. Inculcating information and communication technology (ICT) in the education sector has been one of the most innovative trends for decades. With the increased usage of ICT tools, it is common to experience a surge in the adopters of online classes. Withal the study also gives special emphasis to blended learning. In simple words, blended learning refers to the combination of online learning and learning through traditional methods such as through face-to-face and physical interactions. Amidst the current turbulent times online learning has served as the strong mechanism to accelerate the curriculum and continue the learning process. With improved and intensified use of online learning, analytics has also set in to enter this sector (Analytics Insights, 2021). The seminal literature provides a plethora of information encircling online learning. A mixed opinion is expressed by the students regarding online education. A proportion of learners find online classrooms more effective and conversely some found offline interaction more functional (Thomas, 2021). In their defence they find the emotional and physical presence of educators much rewarding (Huang et al., 2021).

There are numerous challenges faced by the learners as well as educators due to online learning which include obstruction of seamless delivery of online lectures. There can be network issues from any end of the parties. It is found that online learning can supplement offline education but cannot replace it (Board, 2021). In the resumption of this, the present study aims to answer the following questions:

- RQ1 To measure the publication trend in the area of online learning.
- RQ2 Report the descriptives and evolution of the keywords in the field of online learning.
- RQ3 What are the future themes for online learning and academic performance?

The remainder of the paper is structured as follows. The succeeding segment describes the methodology handed down in this review. The next section includes the process deployed and reports the key results obtained. This section describes the keywords analysis and descriptive statistics of the studies obtained. The further section provides for discussion and reports the significant insights. The last section encompasses the limitations of the study.

Methodology

Bibliometrics is one of the methods which is widely used to acknowledge the past publication trend and also decipher the future trend of the topic under study (Stefano et al. 2010). It helps to quantitatively summarise the content of one particular research idea (Williamson, 2013). The PRISMA (Preferred reporting items for systematic review and meta-analysis) approach was utilised to frame structure of the systematic review.

PRISMA approach is a four-step scientific method which includes identification, screening, eligibility and then leads to the final set of the research papers. In the first step of the identification process the keywords and the search criteria are defined. In the second step that is screening the exclusion and the inclusion criteria are defined keeping in mind all the pertinent considerations. In the third step that is eligibility, quality assessment of research papers is done on the basis of refined purpose also duplication of papers is checked if any. Lastly, the final articles were extracted after practicing all the above steps.

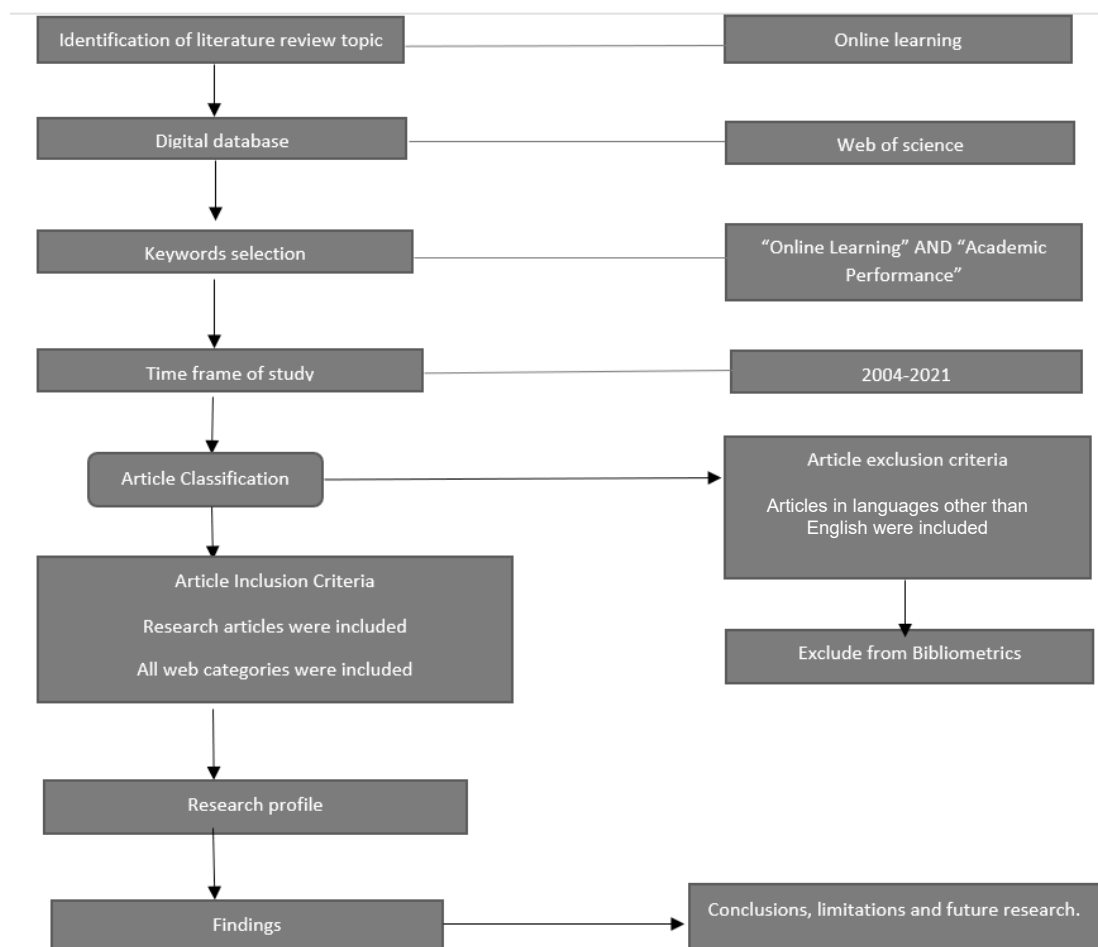


Figure 1. Methodological approach

The process of this search was conducted on May 12, 2021. The keywords were selected after scrutiny of research articles available on Google Scholar and only relevant keywords pertaining to online education and academic performance were considered eligible for the study. An exhaustive list of primary and secondary keywords was devised for both the variables under study to ensure that relevant research studies are not omitted in the process. The idea behind selecting relevant keywords is that it should be in line with the research objectives and to make sure pertinent research articles are fetched (Aveyard, 2018). The Table 1 shows the keywords used for both the variables under the current study. Boolean operators such as “AND”, “OR” were also utilised to make the search more admissible.

Table 1. Keyword Diary

Keywords Used	
Online Learning	E-Learning, Technology based learning, Online classes, Virtual classroom, Virtual learning, Remote learning, Blended learning, E-Classroom, Flipped learning, E-resources, Online resources, Social-media based learning, E-Classes, E-Education, Web based Learning, Hybrid learning, Mobile learning, On-screen Learning, Online Education, Online tutorials, Digital Classroom, Digital Learning, Digital Classes, Dash-board Learning
Academic Performance	Academic performance, Academic outcomes, Student performance, Academic achievements, Educational achievement, Scholastic achievement, Learning outcomes, Educational Performance, learning achievement, student performance, Educational achievement, academic results, education outcomes, educational results, school achievements, academic progress, education performance

The succeeding segment exhibits the inclusion and exclusion criteria for the selection of study. The search string was incorporated in the search bar of Web of Science (WoS) which resulted in 1203 documents. After this, the inclusion criteria were established to filter the research more efficiently. As per IC1 in the field of document type, only articles were selected whereas review papers, books, early access, conference proceedings, book chapters and editorial material and correction were excluded. In line with IC2, the time frame undertaken for the study had no restrictions and the study proceeded with a span of 2004–2021. As the remark of IC3, the study includes articles from all domains of education. The study includes online learning in the context of all disciplines ranging from medical sciences, engineering, social sciences. In order to ensure that all the categories from section web categories were selected. Lastly, as per IC4, only English language articles were included for the present analysis.

Further, the articles and titles were thoroughly reviewed for relevance refinement and only the articles which demonstrated the academic effectiveness resulting due to online learning were included. Finally, 1109 research studies were incorporated for bibliometric analysis. The current study utilises the R package Bibliometrix for bibliometrics analysis of research documents.

Data Analysis

Bibliometric analysis was employed upon the refined research articles. The analysis consists of descriptive and relational analysis to recognise the publication trend and highlight the pertinent descriptives in this field. Through this process, themes for future research directions can also be devised.

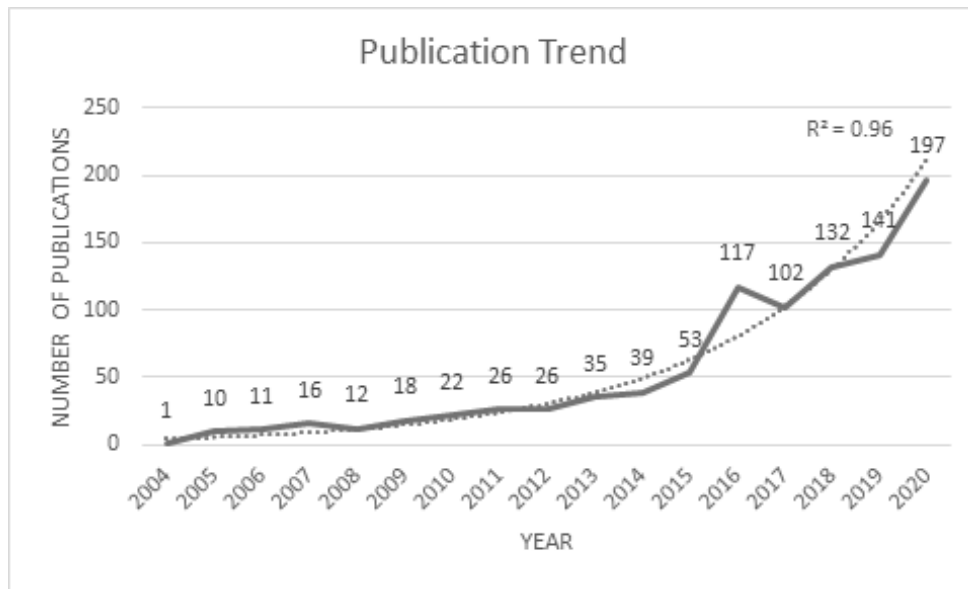


Figure 2. Chronological publication trend in the field of online learning

Chronological Publication Trends

Figure 2 describes the annual publication trend of the research studies in online learning. The first pertinent study on online learning was found to be in 2004. It also shows that there has been static growth in the initial years of publication nevertheless there has been a substantial growth since the year 2015. It was witnessed that there had been an exponential growth in 2016. The coefficient of determination R square is found to be 0.96 which suggests scope of publication in upcoming years.

This measure represents the significant growth and rise in the number of publications in the review period. In recent years there has been rapid growth in the field of online learning. Further, the figure also shows the exponential trendline which appropriates a substantial growth in the annual publications.

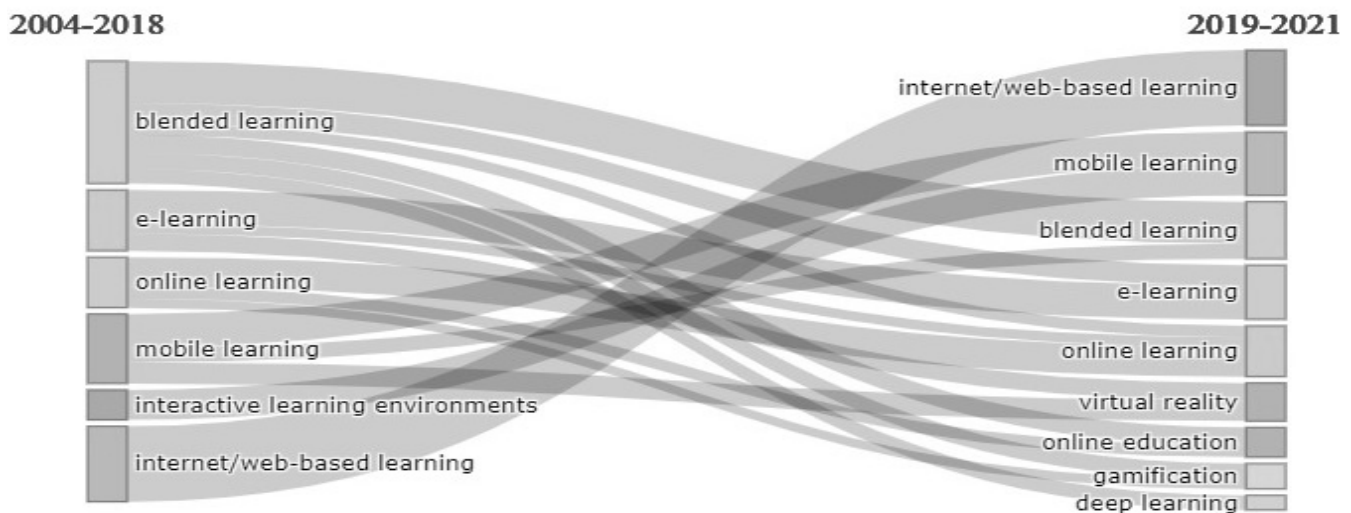


Figure 3. Sankey plot of keyword plus

Keyword Analysis

The above Figure 3 shows the drift in the keyword plus trends from the year 2004–2018 and also indicates the changing dynamics till the year 2021. It is exhibited that the trend of blended learning has slightly decreased with an increase in web-based learning and mobile learning which shows a promising publishing trend in the field of education. Figure 3 also presents the most relevant keywords which can be casted in the present research scenario.

Journal Quality

Table 2. Top 10 Most Productive Online Journals

Journal (Label)	Total Articles	Hindex	TC
Computers & Education	84	37	4247
Journal of Chemical Education	10		
International Journal of Engineering Education			
Interactive Learning Environments	10		
Computers in Human Behaviour			
Bmc Medical Education	10		
Anatomical Sciences Education	7		
Etr&D Educational Technology Research and Development	6		
Education and Information Technologies	7		
Sustainability	5		

Table 3. Trending Topics from Author's Keywords

Authors; Keywords	Frequency
Web-based learning	14
Problem-based learning	10
Cooperative/collaborative learning	7
Evaluation methodologies	6
Human-computer interaction	5

Table 2 exhibits the top contributing journals in the literature of online learning. It is evident from the table that the most contributing journal in the field of online learning is “Computers and Education” with the maximum number of articles and 37 H index. It was followed by the “Journal of Chemical Education” and the “International Journal of Engineering Education” each of which contributed 39 articles in the field. The H index indicates the author level of metric that measures both the productivity and citation impact of publications. The total published articles are an evaluation of the journal's usefulness; moreover, the count for citations is an estimation of the influence of the journal (Svensson, 2010).

Major Themes Developed

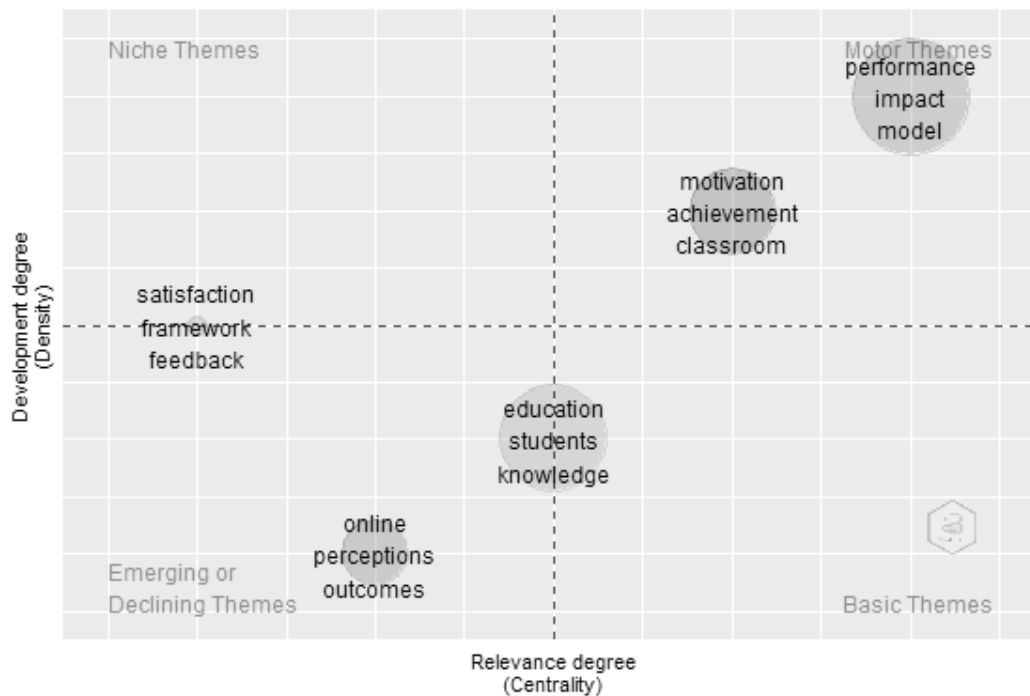


Figure 4. Thematic map

Figure 4 shows conceptual structure through scientific mapping which displays thematic map. Seminal work has been done on education, student knowledge and performance motivation achievement. This quadrant explains the same as it represents high centrality and high density. Third quadrant shows the emerging themes in the field of online learning. Some of the emerging themes are online participation systems, perception science and design model games.

Figure 4 shows the thematic map which demonstrates the changing dynamics in the themes. Through the thematic analysis, a detailed set of further research ideas is established. The trend topics found in the present research are found to be flipped learning and learning outcomes. On the basis of author keyword, the trend topics found are web-based learning, problem-based learning, cooperative/collaborative learning, evaluation methodologies, human-computer interaction.

Discussion

The present study undertakes bibliometrics analysis to decode the topic of online learning. The data results elucidate the key journals, top contributing authors and other important statistics to understand and develop a deep understanding of the topic. Through the annual scientific production analysis, it is deduced that recently this area has been trending and has much scope for research. The trendline shows exponential growth in the publications after 2015. Through keyword analysis of author keyword and keyword plus it is confirmed that all the appropriate keywords are taken into consideration and no significant ones are omitted. Through thematic analysis latest themes are devised for providing future research directions. The trend topics were also scrutinised to find out what are the latest trends in the field of online learning. Blended Learning can be one of the methods which can be adopted by Academic Institutions. Thus, the current study lays out an organised knowledge structure for further research in virtual learning.

Conclusion

Learning through the web has become an inevitable part of our daily routine. The current scenario has pushed the walls of educational institutions and forced them to inculcate learning through virtual mode. The main aim of this paper is to identify the relevant themes in the field of virtual learning. Through the PRISMA framework, the study proposes to provide structured search criteria in the domain of online learning. The present study provides a detailed roadmap and an aggregate of cardinal literature for further research. Through the critical scrutiny only material research articles are included to anthologise literature.

Limitations of the Study

The study possesses the following limitations. Firstly, the current study is based on the Web of Science (WoS) database. A more comprehensive collection of research studies can be obtained from other databases as well. The framework that was used to develop the study was the PRISMA approach. Meta-analysis and other forms of literature review like TCCM could also be performed. The focus of the present study was on learning through online mode and its effect on academic performance. The study is delineated to expend the effectiveness on performance. Further research can be performed on the challenges faced by academicians in the online mode. Lastly, the study includes only English language research papers. These limitations can be worked upon to obtain additional insights in the field of education and technology

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Design of Remote Labs for Continuing Education Students in Engineering Domain

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ABSTRACT

Problem-solving is the key skill expected in any industry, especially in continuing learning related to engineering and technology. In the industry, the study requires stopping production and conducting the trials requiring a lot of time with financial implications. In the physical laboratory at the institute, the presence of the student and the faculty is limited by time and space. Remote labs and virtual labs can ease these concerns with the help of technology. Considering these factors, remote and virtual labs have been developed and offered for continuing education students across engineering domains. This research work has focused on the demonstration of the design and establishment of the Fluid Mechanics and Machines remote lab. The study includes IT, physical infrastructure and instructional strategy deployed in the lab. It also presents the statistics with respect to the number of experiments performed, assessment and feedback by the students.

Keywords: WILP, IoT, remote labs, virtual labs, fluid mechanics and machines

Introduction

Laboratory setups are the best tools to understand and observe concepts. According to Potkonjak et al. (2016), the effectiveness of physical laboratories is limited by availability, accessibility, flexibility, scalability, safety and affordability, that can be overcome by remote laboratories (Dervis et al., 2003). The concept of remote laboratories and its application is growing rapidly due to the many flexibilities it provides to the learner especially in the continuing education demonstrated by online learning programs such MIT Open Courseware, PROLEARN etc. Corter et al. (2007) affirmed that remote labs can be effective when teaching basic concepts. Moreover, this technology has been cited as one of the important developments in learning technology for higher education in 2015 to enhance the learning skills of the student (Johnson et al., 2015). The objectives of this study are: a) To establish a standard procedure to deploy remote labs for engineering education, b) To study the impact of remote labs on the student learning and performance, and c) To study the student feedback to achieve continuous improvement.

Literature Review

There has been continuous development of education policies that aim to use information and communication technology into teaching practices according to the Organisation for Economic Co-operation and Development (OECD) report (OECD, 2016). The universities can implement relevant practical experiences using the power of web technologies (Feisel & Peterson, 2002). Initially remote laboratories were developed in controls and robotics (Marc et al., 2002) using Labview as it integrates hardware and software well. Many examples of this type of lab have been highlighted in the previous literature (Potkonjak et al., 2016; Heradio et al., 2016). The various classifications based on the ICT (Information and Communication Technology) have been listed (Munawar et al., 2018; Balamuralithara & Woods, 2007) as Shared remote lab (many students share the findings among themselves as the equipment may be costly), In-campus remote lab (an intranet within campus for students to access the equipment (Viegas, 2018)), Distant remote lab (useful for learners who are away from the campus (Grodzki et al., 2018)), and Research lab (useful for testing a very specific instrument or an equipment for research).

In distant remote lab to conduct an experiment, the following infrastructure required to build a complete web-based remote lab (Munawar et al., 2018): Workstations (a personal computer with Internet access), Internet

(Public IP to be exposed to the workstations), Remote lab Server (server(s) with application to provide access to the equipment), Microprocessor / PLC enabled equipment (a set of equipments and devices, which are used for conducting experiments), and Instrumentation unit (sensors and measurement systems to be part of the measurement and instrumentation system). Further, the following points were considered while design the lab (Ozana & Docekal, 2017): Measurement clarity (variable to be measured should be of clear view and the display of the unit undertaken should be clear), Reliability and flexibility (the access to the remote lab must be flexible to the students and the devices should have less downtime in the system), Cost (cost of the moving and non-moving parts to be minimum) and Learning experiences (student should learn the concept and explore more learning opportunities).

This paper will cover the three important aspects of this remote lab, organisation structure, pedagogy structure, IT and physical infrastructure which will be discussed in the next section and further will highlight the demonstration of one of the experiments in remote lab.

Design of Remote Lab

The organisational structure hierarchy is shown in Figure 1. Once the team approved the process, literature survey and the infrastructure plan was initiated and the design of remote labs process started. The first step is the mapping of the lab with the course and the lab course handout was designed for the following courses: Fluid mechanics and machines (FMM), and Mechanical technology (MT)

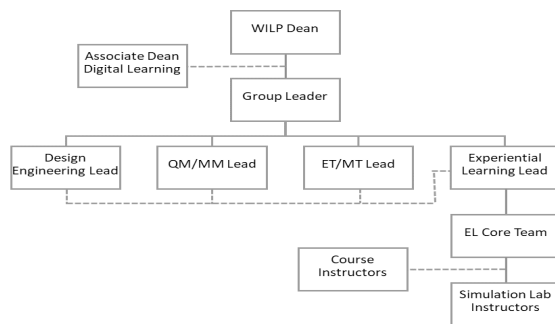


Figure 1. The organisation structure

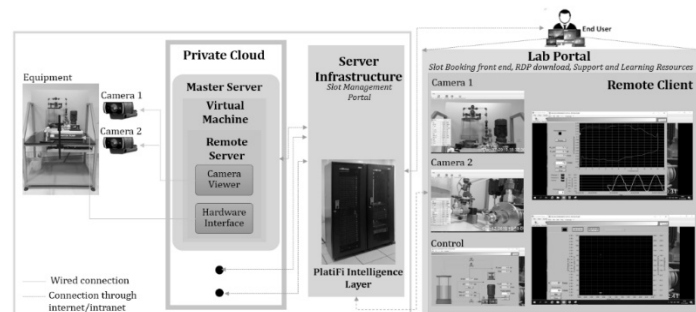


Figure 2. Remote lab architecture

Pedagogy Structure

Students required to perform experiments as a part of their course work at their suitable time by scheduling a session and accessing equipment remotely based on step-by-step instructions. Students can control the machines using remote console while watching those through multiple cameras installed with the help of pan, tilt or zoom functions for better view. The pedagogy encapsulates the following key steps in chronology: Lab course handout with evaluation schema for remote lab, Instruction delivery, Practice session, Assignment creation in LMS, Assignment submission, Evaluation, Feedback, and Statistics submission to program committee.

Remote Lab Architecture

Remote lab architecture (shown in Figure 2) contains three major elements: private cloud, server with slot management system and PlatiFi intelligent layer (Balamuralithara & Woods, 2007; Viegas, 2018). Private cloud consists of master server with virtual machine. For every equipment an individual master server is allocated. Server infrastructure is the gateway between user and remote desktop, once the user books a slot in web front end, slot management at the back end will send the subscription ID (unique equipment ID) and the unique user ID to the master server, master server will give the entry to the specified user during stipulated time period into the virtual machine. Remote client is configured as a virtual machine in a specific domain inside the master server itself. Multiple cameras and the equipment interfacing cable is connected to the master server, virtual machine is configured to interact with the same. Customised desktop will be configured to every user once he/she is logged

into a remote client. Remote server is allocated to the local administrator, they will manage the machine and in case of any emergency they will control the user's actions through shadowing option (just for the emergency backup).

Lab Portal (for Students)

This is the common web portal (shown in Figure 3) for all remote lab users. Here, students will book a slot, access the equipment remotely, access the learning resources and chat with Gargi support team (24/7 support where automated answers are generated to the student queries and integral support for the lab team) for any technical issues.



Figure 3. Lab web portal front-end for students

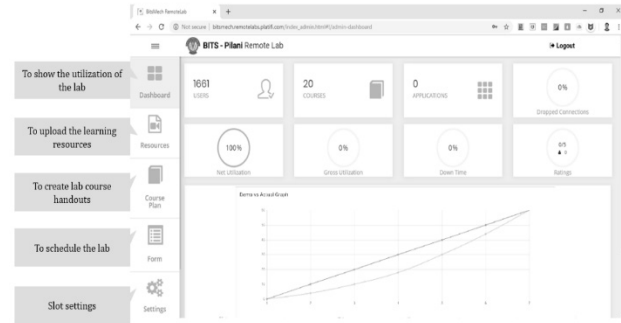


Figure 4. Lab portal for administrator

Slots (duration needed to perform an experiment) will be opened, based on the demand. Students shall book the slot by selecting suitable date and time, RDP will be available for download once the slot is booked and confirmed from back end. PlatiFi intelligence system will secure the master server by not allowing other users access and monitor the user's action such as idle time, mouse movement and keyboard inputs. It will also maintain the log of user's action and record user's login and logout time. User will be disconnected when the user is inactive for certain period.

Lab Portal (for Administrator)

Lab administrator portal (shown in Figure 4) is configured to monitor the pulse of the lab by checking lab utilisation and other details. Dashboard shows the net utilisation (number of booked slot vs logged in), gross utilisation (number of opened slots vs logged in) along with the number of registered users in remote lab, student's ratings for a specific period of time, dropped connections and lab down time. PlatiFi intelligence system constantly communicates with master server (where remote server and client is configured), once the connection fails, it starts counting the students who tried to log in during the downtime and shows in the dashboard. The lab architecture highlights the features of the remote lab deployed for the WILP (Work Integrated Learning Programme) students. The next section will highlight the demonstration of Pelton turbine experiment offered in the MT course in engineering technology programme.

Demonstration of Remote Lab

The lab consists of five pieces of equipment: Pelton turbine, Piston pump, Axial fan, Radial compressor and Heat conduction. The learning objectives are prepared by the lab and the theory faculty. The step-by-step methodology to perform the experiment is demonstrated by the lab faculty in two sessions of two hours each through the online lecture and then the students book a slot and perform the experiment with a stated objective and interprets the result (Baladoh et al., 2016). One of the experiments is the effect of variable of turbine speed at constant throttle valve on turbine efficiency and there are five experiments to find the correlation among the key variables. The main console of called as system diagram (shown in Figure 5) where the parameters or values are to be changed (García et al., 2009). Click on start and select measurement diagram, where the measured values are displayed in the graph or in tabular form (Figure 8). Also, other varying parameters are displayed in system diagram. The two-camera front and side top will focus on the clear pictorial view as shown in Figure 6 and 7 respectively. The student will upload the measurement diagram, the interpreted results and submit the assignment for grading on the LMS.

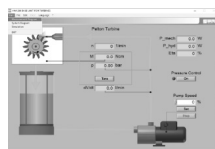


Figure 5. System



Figure 6. Front view

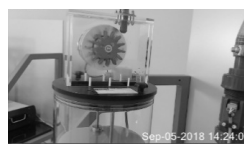


Figure 7. Topview

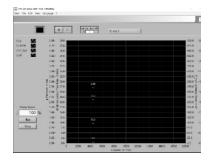


Figure 8. Measurement

Assessment and Feedback

Continuous feedback from the student is collected on the remote lab. There were nearly 158 students registered for the MT course and they scored 95-100 per cent in the remote lab compared to 80 per cent in the virtual lab in the same course. The average rating for the lab by the students is 4 out of 5 (4 stands for very good in the Likert scale). Qualitative feedback was very good with students requesting for greater number of slots for practice. Already 38 remote and virtual labs in several courses were implemented till now. These have provided better experience to the students in terms of various learning aspects and received positive feedback. Bose (2013) has presented similar kinds of results in their study.

Conclusions and Future Scope

The remote labs were successfully designed and deployed for the two courses (FMM i.e. Fluid mechanics and Machines and MT i.e. Manufacturing Technology). Compared to the traditional laboratories, remote laboratory concept at WILP provided the skills to the students to interpret the phenomena related to their course. Baladogh et al. (2016) have implemented similar kinds of remote labs to enhance the student learning prospects for a specific course. Even though remote and virtual labs were implemented across core engineering domains in multiple courses, this study has presented one remote lab outcome only. It is also observed that the student learning outcomes of the courses are better achieved through such labs. This kind of simulation and virtual labs are helpful to the students who are learning while working in the organisations. This concept was further applied to three other courses. The teaching and learning activities at BITS, Pilani will be improved through similar labs in future.

Acknowledgements

We acknowledge the permission granted by Prof. G. Sundar, Director, BITS Pilani, Hyderabad campus for establishing and commissioning the remote lab at BITS Pilani, Hyderabad Campus. We also thank Arun Karthik and Ravaali Narayanan for their tireless efforts in the successful operation of remote lab.

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A Study on Effectiveness of Interactive Tools in the Online Teaching-Learning Process

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ABSTRACT

In the present context of the pandemic situation when various sectors of the economy are trying to mobilise their goods and services through virtual platforms, academics is no exception. However, it is a serious concern for instructors as well as learners to maintain effective teaching-learning methods and ensure active participation virtually. For the students, it is difficult to manage the same level of interest in all the classes throughout the day. Everyone is in search of efficient techniques to enrich online teaching. Apart from using regular teaching methods like delivering online lectures, sharing study materials, there are some procedures available which can increase the number of active participations in online classes. Different tools related to educational technology are available online for this purpose. Research is going on throughout the world to introduce more variety in this field. A case study has been organised to observe the effectiveness of the online tools where the learners are asked to use those tools during the online lecture. The study has been conducted on a class having 120 students in different phases to identify the active class participation of the learners. R-Studio has been utilised to conduct the statistical analysis. It has been found from the study that the extensive use of online tools positively correlates with the number of active learners. In reference to the class performance, it was also found that the proper use of online tools enhanced the overall class performance. This study has been analysed with every stage of Bloom's Taxonomy (1956) and revised Bloom's Taxonomy. The focus was kept on different grades of difficulties to represent Bloom's pyramid properly. Overall results show that the use of online tools in class improve active participation, develop students' interest in study materials, positive attitude, inquisitiveness towards learning as well as students' exam performance.

Keywords: effective teaching-learning, active learners, interactive tools, correlation, class participation, online teaching

Introduction

Education is one of the most important factors of human life through which we can acquire knowledge, skills, morale values, etc. It differentiates individuals from other animals and created them as socialised personage. The development and prosperity of a country depends on higher education and research. The Indian higher education system is the third largest in the world. Nowadays, amidst the pandemic, the education sector is facing huge challenge as most of the educational institutions remain closed for a long duration. Consequently, just like other sectors, 'Work from Home' strategy has been adopted in education field also. Physical classroom teaching has been transformed into virtual mode almost in the whole education sector starting from the primary level upto higher education. However, virtual teaching-learning in online mode is not so easy as the chance of interaction between the teacher and learner is very less. Interaction is one of the most important factors of a good teaching-learning environment. In some situations, online teaching is found to be more time-consuming due to the lack of proper interaction. In almost every situation the online teaching-learning is facing challenges in terms of interaction. Sometime students become tired due to longer duration of screen time. This can also be an issue due to of lack of interaction.

In this work, an experiment has been carried out to study the effect of various online interactive tools in the online teaching-learning environment. Various tests are conducted in virtual classroom with and without using the interactive tools and comparative analysis has been conducted on the responses received from the students.

Literature Review

Laszlo, A., conducted a study on the effectiveness of various interactive technologies (Laszlo, A., & Castro, K., 1995). Long time ago they suggested that future generation would be much more interested to work with interactive tools. Hassan, M., M. et al. reviewed the online teaching-learning during the COVID-19 phase. The purpose of their study was to investigate the teachers' perspective on this mode of learning in India, as well as the challenges and issues they faced in migrating to an online platform, their experience with online tools/platforms used for instructional delivery, and their recommendations for improving the process for effective teaching (Hassan, M., M. et al., 2020). Hina S. et al. conducted their study on higher education, where the experiments were done to show the effectiveness of interactive tools for teaching and learning procedures (Hina, S., et al., 2020). Reyes-Fournier, E., et al. developed an effectiveness measurement scale in online teaching to develop and validate a measure based on this well-defined construct, as well as to provide a psychometrically sound framework for online teaching efficacy (Reyes-Fournier, E., et al., 2020). Since the late twentieth century, the role of online educators has piqued the educational community's interest. Gomez Ray, P. et al. conducted a study which used a bottom-up (inductive) approach to look at not only the duties of online instructors from the perspective of students, but also how successfully these roles are carried out (Gomez Ray, P. et al., 2018). Donnelli-Sallee, E., explored a study on supporting online teaching effectiveness at scale by peer review to improve efficiency and effectiveness (Donnelli-Sallee, E., 2018). They examined one institution's efforts to bring diverse assessment procedures for face-to-face, hybrid, and online education together.

In this paper, a study has been conducted with various online interactive tools to observe the effectiveness in the online teaching-learning process. A review has been conducted on 120 students with and without using the interactive tools and results are observed.

Framework

The framework of the online teaching-learning has been represented in Figure 1. The learning platform is the central element of this structure. Instructors or teachers and learners or students are two most important parts of this framework. Flow of knowledge is required to be flowed from instructor to learner in an uninterrupted pattern. Online teaching is one of the parts of modern day's educational system of knowledge transferring. Interactive tools can be used as an important component in this system.

Methodology

In this study, an experiment has been conducted on a group of 120 B.Tech. students. Study was done in regular online class timing. Various external factors were kept under consideration while preparing this test. Data reading was taken on similar condition on each time. For example, the students were asked to respond in reference to some queries made by the instructor. In this case the students were not provided any option to use any interactive tool to respond. The same type of queries were made again on the next week, same day, same time. This time students were asked the question through online interactive tools, and they were supposed to respond through the same platform. In reference to the interactive tools, 'Mentimeter' (Ioana, J., 2018) and Acadly (Kriz, T., D., 2020) were used in online session for the evaluation and assessment task. In another phase of the study, online test was conducted two times. Initially, a test was conducted after 10 online lectures without using any interactive tool and another test was conducted after taking 10 online lectures incorporating the use of online interactive tools. Comparative analysis was done among all the results. RStudio has been used for the analysis.

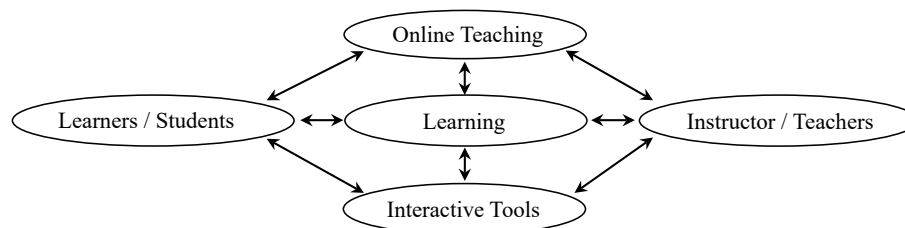


Figure 1. The framework for learning platform in online mode

Table 1. No. of Students Attended and Responded in the Online Class (the data was collected on a specific date and time of every week)

Week	Attended	Responded
Week 1	72	27
Week 2	54	11
Week 3	47	26
Week 4	71	46
Week 5	87	61
Week 6	92	67
Week 7	102	71
Week 8	97	68
Week 9	98	46
Week 10	92	37
Week 11	74	29
Week 12	68	43
Week 13	54	32
Week 14	52	37

Analysis

In Table 1, the data reading for number of students that attended a lecture and responded to some given queries by the instructor has been listed. To take this data, some external factors were kept under consideration. Only Wednesday's data has been listed here as the class timing was convenient to the learners. Initially, online class was started without using any interactive tools to record student responses. This pattern was continued for two weeks. From the third week some interactive tools were introduced in the online class through which students could respond to some specific queries made by the instructor. This pattern was continued up to ninth week. In week 10 and 11, again the use of interactive tools was stopped in the class and students were asked to respond manually. The number of responses were recorded. Twelfth week onwards, again use of tools were incorporated and data was observed. It was found from the observed readings that initially the ratio of recorded responses of the students to number of attendances started to decline after two weeks. From third the week onwards when the interactive tools were incorporated in the class, the ration started to increase. More number of attendances were also observed along with an increased student response. It was continued up to mid-semester examination in week eight. After the exam, in the 9th week and 10th week tools were not used in class. A decline in student responses were observed. From the 12th week onwards, as the semester was approaching towards the end, student attendance was found to be gradually decreasing but their responses again increased due to the use of interactive tools again in the class.

This data has been statistically analysed in R-Studio. The Pearson correlation coefficient was calculated between the attendance and the number of student responses. The plot has been given in Figure 2. along with the R value and p value of the data. It was found the spearman correlation efficient (R) has been calculated as 0.77. That signifies they are positively correlated i.e., use of online interactive tool increases the overall class participation. The p-value has been measured as 0.0013 which is less than 0.05. It indicates that the statistical analysis is significant in 95 per cent confidence interval. Use of online tool can increase the attendance in class. The number of attendance is positively correlated with the number of responses. Hence an improved class participation is observed.

In the second phase of the experiment, two tests were conducted in two different times. Average marks were noted as 6.13 out of 10 and 7.09 out of 10, respectively, in two tests mentioned in methodology section. A clear indication of performance improvement can be noted from this.

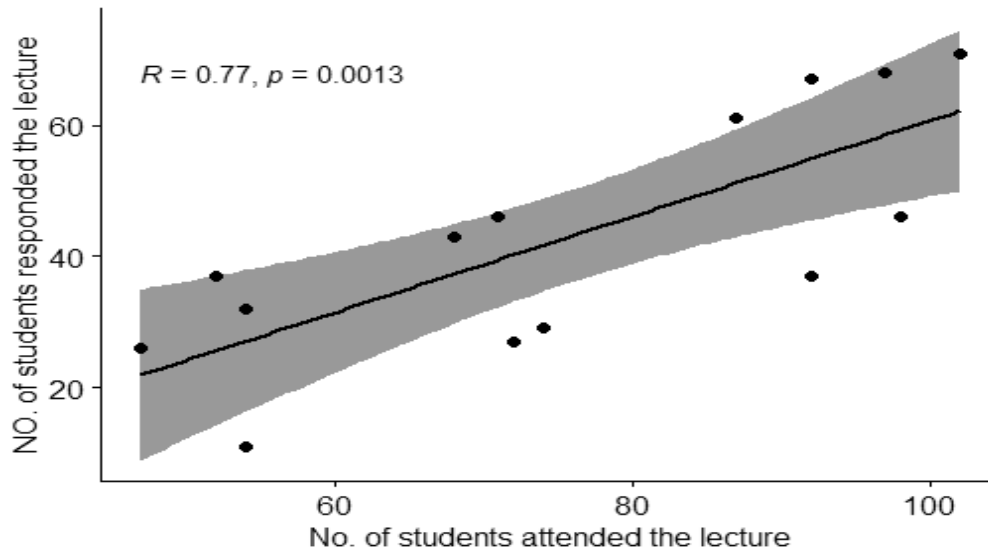


Figure 2. The Scatter plot for number of students and their responses

Discussions

In this work, till now the study only has been analysed for a particular course. The data has been used from only a specific day of a week. All the other data are also recorded from the other day and times. A higher number of comparative studies can also be done from those data. Lot of statistical analysis needs to be done. Result was also justified with Bloom's Taxonomy. (Armstrong P., 2016). Starting from the knowledge phase to the comprehension, application, analysis, synthesis, and evaluation, the use of interactive tools can boost the outcome in every phase. In reference to the modified Bloom's Taxonomy also the effectiveness of interactive tools can be justified.

Conclusion

In this study, the main target was to identify the effectiveness of interactive tools in online teaching-learning methodologies. Some of the experiments have been done. Some experiments are still going on. Implications of class timing is also a very important factor in online teaching. It may be difficult condition to attend a lecture at the end of the day due to lack of energy. Course-wise analysis needs to be done also as choice of courses can be varied from students to students. Extensive statistical analysis needs to be done to get more clarity.

Limitations and Future Studies

Till now the study has been conducted for a specific course. If any student does not like this course, then interactive tool also cannot do anything to make that course interesting to that student. This constraint was not considered in this study. When the data was recorded after taking test, it is not sure how many students completed it without malpractice. Subjective factors should also be kept under consideration. That is why all the data regarding the other course has been recorded also. The statistical analysis is also going on with those data.

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Effective Online Teaching and Learning for Adolescents: Innovations and Challenges

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ABSTRACT

The part of training in a person's self-improvement, expertise advancement and majority rule mindful conduct accordingly contributing gigantically to the general success of a country, is evident. With a section of time, the training framework everywhere in the world has gone through an emotional change. The standard preparing system no longer fulfils the state-of-the-art complex necessities where everything is dynamic and progressing at an extraordinarily high velocity. There is a colossal proportion of progress that occurs in the current world in every nanosecond. Along these lines, another and present-day strategy for preparing is expected to manage such change arising on account of creation of a huge proportion of information in a deliberate manner. Appropriately, to decide the deficiencies of the standard tutoring structure, the world is moving towards modernised guidance which tends to all of the issues and troubles of standard guidance. Automated education can be portrayed as the usage of a blend of development, progressed substance and direction in the guidance structure to make it more fruitful and capable than the traditional preparing system. Through this investigation paper, an undertaking has been made to discuss the diverse progressed devices for educating and learning purposes, the troubles and approaching examples in electronic preparing structure that will shape the destiny of our coming ages to further develop things.

Keywords: advanced tools, innovations, challenges, online teaching, web-based learning

Introduction

Current Situation of Education

Regardless of the way that India scored well in improving from basic 13 per cent training at the hour of self-rule to 75 per cent as per 2012 insights, it really falls behind the world typical of 85 per cent. Coordinated undertakings at fundamental and helper tutoring like SSA (Sarva Shiksha Abhiyan) have undeniably exhibited valuable fairly anyway an extraordinary arrangement ought to be never truly educating India. Data figures and enrollment extents may have presented a becoming flushed picture, but one must invigilate the dull corners of Indian preparing. Beside the fundamental twin ills of access and reasonableness which monitors an immense child people from school doorways, we need to enquire about the level and nature of preparing one gets offered with modern education tools.

Difficulties in Online Learning

Standing out face-from-face learning with web learning conveys enormous insufficiencies in the online mode, for instance, non-attendance of human interface, non-appearance of chances of communitarian learning, instructor oversight and the most glaring being non-attendance of opportunities for including learning in complex subjects like science and number-crunching. Moreover, amidst the flood of working with on-the-web classes, the best appearance practices, a particularly watching over understudies' multiples intelligences, learning styles and giving an isolated learning experience have been transferred to the sideline.

Quality in Online Learning

The significance of a qualitative preparation has gone through a change in the online mode, and presently the ICT assists in overcoming all of the hardships that exist due to the genuine distance between the educator and the understudy. ICT has the power and potential to assist the clients with conquering these difficulties similarly as

make some startling worth increments to classes that could accomplish a further created educator and understudy execution, impelling an overhauled learning experience. Here are some ICT joined training learning techniques that can up the quality rest of an online class.

Computerised Education: A Positive Intervention

In this hopeless picture of preparing in India, the ICT disturbance has prepared to introduce a couple of forward jumps in different circles like banking, tutoring, prosperity and the like. Guidance is one of the most significant areas where reformist developments have recently been observed. Modernised Education is the remedy for this utter abomination of tutoring, no matter where it occurs on the planet.

Parts of Digital Education

Principally, Digital Education has three parts:

1. The substance
2. The advancement stages
3. The transport establishment

The Indian IT region normally or regardless holds adequate cut off and character to give shocking mechanised substance and supporting mechanical stages. With the presence of a couple of corporate giants like TATA, BSNL and RELIANCE in cutting-edge guidance and the resulting cash stream, this sector is getting ready for some quality turn of events. Regardless, improvement is one thing that has no end and thus would reliably invite different collaborations with the government, content subject matter experts, technology firms, users, teaching social class to cooperate and configure front line advancements and methodologies to empower the digital education sector.

Digital Education Tools for Teachers and Learners

Many improved tutoring instruments are currently available for self-administration by the understudies, working in association with the academic cycles, enabling participation, and empowering correspondence among teachers and understudies. Here we present 13 of the most notable and tools widely used digital education tools.

Edmodo

Edmodo is an enlightening tool that partners educators and understudies, and is accustomed into a casual local area. In this one, educators can make online synergistic social occasions, direct and give educational materials, measure understudy execution, and talk with watchmen, among various limits. Edmodo has more than 34 million customers who partner with making a learning cycle that is genuinely progressing, modified, and brings forth the possibilities brought by advancement and the modernised environment.

Socrative

Arranged by a social occasion of finance managers and experts excited about tutoring, Socrative is a system that grants teachers to make rehearses or enlightening games which understudies can settle using PDAs (Personal Digital Assistant), whether or not mobile phones, PCs, or tablets. Teachers can see the eventual outcomes of the activities and, dependent upon these, change the subsequent activities to make them more redid.

Projeqt

Projeqt is an instrument that grants you to make blended media presentations, with dynamic slides in which you can embed insightful aides, joins, online tests, Twitter schedules, and accounts, among various decisions. During a class meeting, teachers can bestow to understudies academic acquaintances which are ostensibly changed with different contraptions.

Thinglink

Thinglink grants educators to make keen pictures with music, sounds, messages, and photographs. These can be shared on various destinations or on casual networks, similar to Twitter and Facebook. Thinglink offers the chances

for teachers to make learning techniques that mix the premium of understudies through keen substance that can develop their knowledge.

TED-Ed

TED-Ed is an educational stage that grants putting forth enlightening activities with the joint attempt of educators, understudies, artists generally people who need to broaden data and shrewd musings. This site grants democratising induction to information, both for teachers and understudies. Here, people can have a working collaboration in the learning connection of others.

cK-12

cK-12 is a site that hopes to decrease the cost of educational books for the K12 market in the United States and the rest of the world. This stage contains an open-source interface that allows for the creation and dissemination of educational material via the web, which can be altered and includes accounts, noises, and smart activities. It can moreover, be printed and concur with the fundamental article standards in each district. The books that are made in cK-12 can be changed in accordance with the necessities of any teacher or understudy.

ClassDojo

ClassDojo is an instrument to further develop understudy direct educators outfit their understudies with second analysis so extraordinary attitude in class is repaid with centers and understudies have a more open mindset towards the learning cycle. The information that is accumulated about understudy lead can be conferred later to gatekeepers and supervisors through the web.

eduClipper

This stage licenses instructors and understudies to share and explore references and enlightening material. In eduClipper, you can accumulate information found on the web and thereafter share it with the people from as of late made social affairs, which offers the probability to direct even more effectively the academic substance found on the web, further develop research techniques, and have a high-level record of what understudies achieved during the course.

Storybird

Storybird expects to propel structure and scrutinising capacities in understudies through describing. In this instrument, instructors can make astute and inventive books online through a direct and easy to use interface. In Storybird, educators can make projects with understudies, give consistent analysis, and set up classes and grades.

Animoto

Animoto is a high-level device that grants you to make extraordinary accounts in a short period of time and from any PDA, moving understudies and working on educational activities. The Animoto interface is pleasing and practical, allowing teachers to make fluctuating media content that acclimates to enlightening necessities.

Kahoot

Kahoot is an enlightening stage that relies upon games and questions. Through this instrument, instructors can make surveys, discussions, or audits that supplement academic activities. The material is projected in the homeroom and questions are answered by understudies while playing and adapting at the same time. Kahoot! progresses game-based acknowledging, which grows understudy responsibility and makes a dynamic, social, and fun enlightening environment.

Learn Boost

Learn Boost is centered around the two educators and gatekeepers, since it grants them to follow understudy progress ceaselessly and throughout a particular time frame. Adjacent to going probably as a high-level gradebook,

it can moreover outfit instructors with the ability to move new exercise plans, make arrangements, and even track understudy investment. This gadget can similarly consolidate with Google Apps and store exceedingly significant information safely in the cloud. On top of everything, it is also free.

Moodle

Moodle, which is a shortening for Modular Object-Oriented Dynamic Learning Environment, is a broad instrument that is a Learning Management System at its middle, anyway which in like manner engages understudies and teachers to set up their own custom learning conditions that fit their prerequisites perfectly. Also, it is furthermore an open-source movement, which makes it free, and its value can be reached out through joining of different features, modules, and modules.

Upgrading Effective Digital Learning

Relating Digital Learning to Offline Learning

Exactly when an understudy can interface and relate what he gathers in the investigation corridor with what he understands online through cutting edge classes, it works on his/her level of cognizance and helps in understanding planning thoughts with no issue. Making this co-association makes progressed learning a significant and compensating experience for the understudy. This cycle ensures better perception of critical thoughts.

Learning Practical Application of Knowledge

In planning, if the data isn't applied in every practical sense, getting together a lot of speculation might get bleak and wasteful. Consequently, it is essential to know rational usages of the subjects being inspected. A feasible technique to do this is to join certified shows, circumstances and fake generations joined with the theoretical thoughts. This would give an aggregate and escalated cognizance of the subject for the understudy.

Getting Continuous Feedback and Analysis of Progress

e-Learning programs for planning go with examinations and tests that help understudies in assessing their knowledge and following their learning progress. The stages in like manner give understudies an information region where they are encouraged to add their thoughts, grievances or whatever other analysis that would help in further developing the e-Learning stage.

Enabling Social Engagements

Likely the best advantage of e-Learning stages is that they license planning understudies to blend, group up and speak with singular understudies on the web. Understudies can coordinate, pool in their resources, concentrate together and share accomplishments while seeking after a common goal.

Learning through a Mixed Approach

Investigation shows that hand created, mixed tasks will overall further develop the data support power and dominating capacities of understudies. Modernised learning courses can be clubbed with other learning mediums like accounts, webcasts and surprisingly intelligent media courses to work on their assumption to learn and adjust.

Results and Discussions

Digital Learning Strengthens the Education System

Gigantic mechanical movements have been made possible with the assistance of tutoring as the essential primary purpose. The benefits of progressed learning can be seen in a few basic habits.

Youngsters Use Web-Based Media To

1. Connect with, comment on and look at things with others, through long reach casual correspondence, informing and web educating
2. Find, make or offer captivating photos, accounts and articles

3. Join or follow vested gatherings
4. Play web games
5. Learn more about subjects that interests them
6. The examination instrument for initial stages of youngsters which is represented by from school levels.

Expected Advantages of Innovation for Teenagers

Youngsters love surfing on the web generally to find the best explanation. By utilising the web, they can:

1. Easily access data to teach themselves
2. Maintain and create strong connections
3. Form their personalities (through self-articulation, learning and talking)
4. Advance an impression of having a spot and sureness through overabundance related with associates and being locked in with organised associations.

Conclusion

Another report found that adolescent aged 14 to 19 go through taking everything into account, 44.6 hours seven days on screen-based advancement at home. By far most of Australian youngsters created 14 to 19 were addressed to have a cell similarly as tablet. A solid relationship was figured out between parental screen time and that of their youngsters - guards who point by point basic degrees of screen-based use themselves will without a doubt report having teenagers with clear degrees of screen-based use. Two hours used to be the mind-blowing rule for the extent of screen time young people ought to be permitted each day. That is as of now being changed in light of the fact that it essentially isn't reasonable in the best-in-class world where improvement is utilised for coaching and easygoing correspondence, comparatively concerning redirection.

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New Technologies and Education: Transparent Lightboard

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ABSTRACT

Birla Institute of Technology & Science, Pilani, conducts Work Integrated Learning Programmes (WILP) as a means of continuing education for employed professionals. WILP introduced the Transparent Lightboard in 2017 with the objective of enhancing student engagement. The “lightboard” is a transparent board that is placed between the instructor and the camera and enables the instructor to face the camera while delivering lectures. The instructor can note the key points, write equations, and draw relevant diagrams on the transparent whiteboard using a special neon marker. LEDs are placed along the edges of the “lightboard” such that it illuminates the board and makes the writing “pop out”, using a Physics principle called total internal reflection of light. The camera image is “flipped” using either a mirror or via technology, enabling instructors to make eye contact with students leading to a more engaging delivery. The lightboard makes it easy to demonstrate things and facilitates experiential learning. Initial feedback suggests that students like the enhanced level of interaction/ engagement with the instructor. Our study has found that there is a positive impact of the Lightboard on student engagement.

Keywords: transparent lightboard, student engagement, work integrated learning programs

Introduction

A lightboard is a large panel of glass with LEDs along the edges and is placed between the instructor and the camera, which cause the special neon markers to fluoresce on the board. It allows an instructor to create videos where they are on screen by writing directly on the board (see **Figure 1**). Lightboard technology was originally developed by Prof. Michael Peshkin, to address his need to create videos for his students and to use class time for more valuable interactions, thereby, involving students undergo experiential learning in the class (<https://digitallearning.northwestern.edu/article/2016/04/12/lightboard-studio>). There is currently little available literature on this aspect (Mark et al., 2019). Those articles that do exist either discuss how to design and modify the Lightboard (Skibinski, DeBenedetti, Ortoll-Bloch, & Hines, 2015) or how it has been used (Fung, 2017). There are few empirical studies regarding its effectiveness. This paper aims to identify the effectiveness of the Lightboard technology and the impact of Lightboard videos on student engagement and learning.

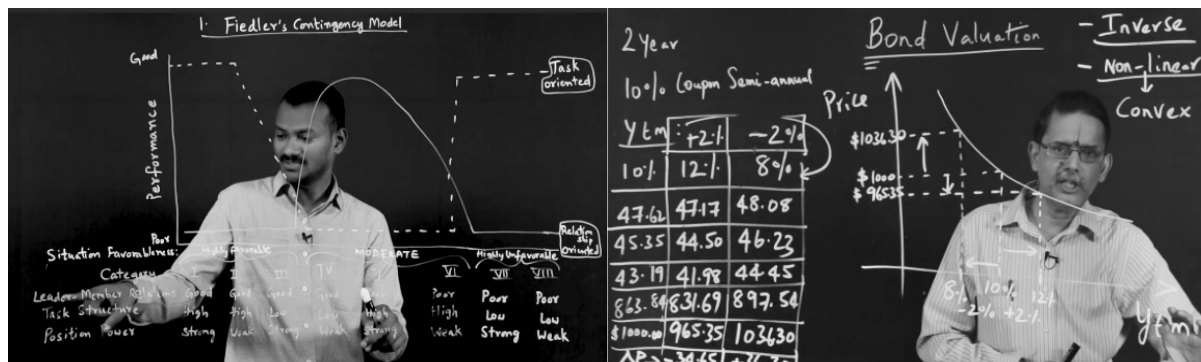


Figure 1. Dr Srikanth teaching principles of management and Prof. Bindumadhavan teaching global financial markets and products

Literature Review

Since the subject in this study is used in a flipped classroom context, this section starts by giving a brief introduction of the flipped classroom model. Unlike traditional classroom model, where students are first exposed to concepts in a live class and then learn the content through after-class activities like homework problems and assignments, the flipped classroom model uses pre-recorded videos (using Lightboard or any other means), expect the students go through them and come prepared to the next day's class. The objective of the flipped classroom model is to use majority of the class duration for the active-learning activities. This in turn leads to opportunities for students to engage in advanced concepts in the live class and take the learning to a different level (Tucker, 2012). The use of Lightboard videos can create learning opportunities such as: facilitating problem-solving, case study discussion during the class and student engagement (Alpay et al., 2017). Various instructors across the world have experimented with new ways to make videos more interactive and engaging (Kaltura, 2015). What makes use of the Lightboard special from use of all other classroom white board work is that the Lightboard enables instructors to face "towards" students when writing on the board. This gives a live classroom feel to the student as if he or she is sitting in a normal class. VanderMolen et al. (2018) found that Lightboard videos prove to be useful in flipped classrooms. Making the pre-recorded videos available to students to go through prior to attending class; class time being used to engage students in various methods of experiential learning adds to the learning process of the students. The pre-recorded videos can be of more use to students who need the challenging concepts, in particular, to be explained more than once; those students are able to view the video as many times as needed and pause them as necessary. Smith et. al (2017) found that Lightboard is quite innovative and engaging and it leads to an effective understanding of the concepts. Skibinski et al. (2015) found that this Lightboard set up has many advantages which has led to a positive student response. Anderson (2016) tells that it helps to maintain a sense of connection. On a lighter vein he also adds that it would feel awkward to go back to a whiteboard after using Lightboard. Peter's (2018) findings relating to the Lightboard videos are as follows: the videos that have good content are effective in helping students visualise the problem solving process and help students grasp fundamental concepts quickly and easily. Also, the instructor needs to make the videos more entertaining and appealing to the students such that the students enjoy the videos, believe that the videos enhance the course content, and feel that the videos strengthen their understanding of the subject matter better. Sarah et al. (2020) acknowledges that the success of the Lightboard pilot was determined by the instructors using these tools as these were the ones to champion the method of making the pre-recorded videos. Professional development workshops can be conducted for faculty to promote the Lightboard and these workshops also serve as an opportunity for the instructors to think critically about technology selection and gaining insight into best practices in teaching. Mark et al. (2019) said that there is no conclusive evidence about whether lightboard videos will be effective. It seems likely that they will not increase cognitive load, even with the instructor on the screen. Utilising gestures and using coloured markers, could be helpful in realising the full potential of these videos. Peter et al. (2019) in his study, which targeted 68 civil engineering undergraduate students at a 4-year public university in USA, found a positive response from the students towards Lightboard videos for understanding, engagement and satisfaction. Fung (2017) in his research mentioned that the Lightboard mode allows instructors to prepare engaging and concise videos. For the flipped classroom, it could potentially serve as a replacement for the existing whiteboard-based and Power Point-based lecture videos.

Methodology

Students pursuing WILP MBA program were asked to complete an online survey on Lightboard technology. We obtained approximately 500 responses from about 2200 students surveyed.

Analysis

We used Cronbach's alpha to measure the reliability or internal consistency of our survey. According to the literature the acceptable range for Cronbach's alpha is 0.70 to 1.00 (Nunnaly, 1978). We computed the Cronbach alpha for our survey to be 0.97, which suggests that our survey has "Excellent" level of reliability and internal consistency. We have developed bar graphs with respect to the responses gathered by the students. We discuss the key findings from the analysis in the next section. To adhere to the page limit, we are not displaying bar graphs.

Discussions

- We found that 85 per cent of the respondents either strongly agree or agree that the videos using Lightboard technology are easy to watch and understand. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that the videos using Lightboard technology are easy to watch and understand.
- We found that 81 per cent of the respondents either strongly agree or agree that the videos using Lightboard technology are easier to pay attention and follow. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that the videos using Lightboard technology are easier to pay attention and follow.
- We found that 70 per cent of the respondents either strongly agree or agree that the length of the videos using Lightboard technology are appropriate. Only 8 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that the length of the videos using Lightboard technology are appropriate.
- We found that 80 per cent of the respondents either strongly agree or agree that watching the videos using Lightboard technology are an effective use of time. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that watching the videos using Lightboard technology are an effective use of time.
- We found that 81 per cent of the respondents either strongly agree or agree that the videos using Lightboard technology is an appropriate way to engage students. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that the videos using Lightboard technology are an appropriate way to engage students.
- We found that 81 per cent of the respondents either strongly agree or agree that the videos using Lightboard technology are interesting and stimulating. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that the videos using Lightboard technology are interesting and stimulating.
- We found that 78 per cent of the respondents either strongly agree or agree that the Lightboard technology is an attractive technology. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that the Lightboard technology is an attractive technology.
- We found that 79 per cent of the respondents either strongly agree or agree that they would recommend the videos using Lightboard technology to their peers. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results suggest that majority of the respondents would recommend the videos using Lightboard technology to their peers.
- We found that 76 per cent of the respondents either strongly agree or agree that the videos made using Lightboard technology are more engaging. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that videos made using Lightboard technology are more engaging as compared to videos made without using the Lightboard technology.
- We found that 71 per cent of the respondents either strongly agree or agree that the videos using Lightboard technology help them to learn better. Only 3 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that videos using Lightboard technology help the students to learn better as compared to videos made without using the Lightboard technology.
- We found that 80 per cent of the respondents recommend developing and using more Lightboard videos for other courses. Only 2 per cent of the respondents either disagree or strongly disagree with this recommendation. These results support the view that respondents strongly recommend developing and using more Lightboard videos for other courses.
- We found that 78 per cent of the respondents either strongly agree or agree that the Lightboard videos improved the understanding of students. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that videos using Lightboard technology improve the understanding of students.
- We found that 77 per cent of the respondents either strongly agree or agree that the videos using Lightboard technology were engaging. Only 2 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that videos using Lightboard technology are engaging.

- We found that 75 per cent of the respondents either strongly agree or agree that they enjoyed and would recommend the videos made using Lightboard technology. Only 3 per cent of the respondents either disagree or strongly disagree with this notion. These results support the view that participants enjoyed and would recommend the videos made by using Lightboard technology.
- We asked the respondents to rate the videos made by using Lightboard Technology on a scale from 1 to 5, where 5 was the highest and 1 was the lowest. The average rating was found to be 3.93 suggesting that the videos made by using Lightboard Technology is rated very highly by students.

Conclusion

Overall the results of the survey suggest that students are finding that the videos made by using Lightboard Technology are easy to watch and understand, engaging and beneficial in multiple ways. It suggests that institutions of higher education should consider developing their instructional videos using interactive approaches such as the Lightboard technology in order to maximise the learning of the students.

Limitations and Future Studies

This study was based on the responses of MBA students who are pursuing a degree programme with Work Integrated Learning Programmes Division of BITS, Pilani. Additional studies like qualitative analysis and comparison of pretest and posttest results may need to be carried out to generalise the conclusions.

Acknowledgement

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