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About the Journal

CIET, NCERT has been a premier institution for development and dissemination of resources and techniques related to Educational Technology (ET) for better understanding of teaching-learning at school level. With renewed thrust on educational technology using digital platforms, need for a quality journal on educational technology in India is felt more than ever. Keeping this in regard, Indian Journal of Educational Technology will be a medium for scholarly presentation and exchange of information between researchers, professionals and practitioners of technology related field of education. The journal aims at covering disciplinary areas of educational technology (ET) for school education and teacher education. The specific objectives of this journal are: i) to provide an open access journal for sharing updated and peer reviewed research on Educational Technology for easy access and ii) to promote research on the integration of technology in school and teacher education, promote innovative practice, and inform policy debates on educational technology. This bi-annual open access online peer reviewed journal will be a platform for exchange of ideas and would also become a basis for further innovation in ET in school and teachers' education.

Notes to Contributors

Indian Journal of Educational Technology is a peer reviewed bi-annual journal especially designed for scholarly discourse of use of various forms of technology in education. Some of the themes encompassed under its broad purview are: Education Technology (ET), Information and Communication Technology (ICT) in education, Distance education and technology, Technological integration into pedagogy and content, Open Educational Repositories (OER) and FOSS, Innovation in educational system, Computer-based learning, Audio-video and multimedia in education and issues thereof, Technology cognition and curriculum, Impact of technology in education, Nature of technology and learning, Mobile learning, Learning through social media, Technology assisted evaluation systems, Technology support for differently abled population, Flipped classroom, Virtual and Augmented Reality, Artificial Intelligence, robotics and education, Impact of technology on learning, Social media and children, Economics of technology and its impact on education system, Educational planning administration and technology and Online courses for school education and teacher education. We look forward for your contributions in the coming issues. Your feedback and suggestions are also welcome on the following address:

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Editorial

[To live is to suffer, to survive is to find some meaning in the suffering.]

- Friedrich Nietzsche

Much water has flown down under the bridge since the previous issue of this journal was published in January, 2020. A marauding tiny virus, which is known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing illnesses termed as COVID-19, has taken over our lives. If not infected already then most of our attention is to keep the virus away. Except a small group of islands in the northern hemisphere, there is not a single region in the world which has not been affected by the virus. First detected sometimes in December, 2019 in the city of Wuhan in China, it soon spread to the other parts of the world including in India. As I write, more than 16 million people, worldwide, have been infected by SARS-COV-2, out of which 0.6 million people have died due to COVID-19. About 10 million people have recovered already. In India, 1.3 million people have been infected by this virus, causing the death of more than 32 thousand people. India stands at the 3rd position after USA and Brazil in terms of total number of COVID-19 cases and deaths due to COVID-19. India has seen 23 deaths per 1 million populations, while the world average is 83 deaths per 1 million of population. USA has 452 while Brazil has 407 deaths per million of the population. While USA tests 0.16 million people per million of its population, Brazil tests 23 thousand and India tests 12 thousand people per million of their respective population.

It is in this context that schools, colleges and universities have been closed down to prevent the spread of the epidemic. What was initially for a few weeks has now been more than 4 months when schools and other educational institutions have been closed down. There is nothing to suggest that schools and other educational institutions will re-open soon. This is unprecedented. Several studies point to very serious implications for learners. It has impacts on their learning behavior. It has ramifications on their socio-economic well-beings. Students' careers have been impacted. It has the potential to push a large number of children into abject poverty. Once out of schools, the discriminations against the children have exacerbated. Their mid-day meals have stopped. Education of the children with special needs (CWSN) has been impacted negatively. Education of a girl child has suffered serious setbacks. Whatever we achieved through long and arduous struggles in the field of education may again be lost in the backdrop of new realities.

In such a situation, governments and other agencies came forward to see that the learning curves of children don't dip. They started leveraging technology for the best possible learning outcomes of the children in the given situations. In the beginning of the lockdowns, the emphasis was on optimal utilization of already existing Edtech recipes such as SWAYAM, SWAYAM Prabha, ePathshala, NROER and DIKSHA, etc. especially in the context of school education. Online and remote learning became order of the day; both for school education and higher educa-

tion. However, soon we started facing some serious shortcomings in the use of technology for education. One was at the level of technology itself in the sense that technology that was available was not adequate to meet the new challenges of lockdowns & etc. So to get the optimum output from technology, one had to tweak the educational goals, not the vice-versa. The second was at the supply side of the technology. The digital divide was so huge that imparting education with the help of technology did not yield desired results. And the third issue was the stress and the related physical health problems that the excessive use of technology was causing to children.

As the economy opened up, the Government of India announced an ambitious program, called PM e-VIDYA with an objective of taking learning to the doorsteps of children's homes. It entails broadcasting/telecasting/podcasting all kinds of e-Contents (audio/video/interactive/etc.) over all possible media such as radio, TV and internet using state of the art technologies available to us. So, instead of a few TV channels for school education, now there would be 12 TV channels (one each for class 1 to 12). Extensive use of radio for broadcasting audio e-Content is envisaged. Universities have been encouraged to start online courses. Manodarpan, an initiative to provide psycho-social and counselling services to students has been launched recently. A DIKSHA (Digital Infrastructure for Knowledge Sharing) mobile app and portal will host all types of resources including energized textbooks (QR coded), e-Contents, teaching-learning resources, practice items, etc.

However, all such initiatives reinforce our collective learning that howsoever smart technologies might be, it cannot replace schools. They can at the best be used as supplementary to the learning at schools. Schools too should adopt new technologies to face new realities. Technology should be such that it frees us; doesn't enslave us. In the words of Shakespeare, "Old fashions please me best; I am not so nice to change true rules for odd inventions." However, in the times of COVID induced lockdowns, it is the technology which has helped learning to continue unabated.

In this issue, we have ten research articles encompassing various themes of ET and ICT ranging from teachers' training to pedagogy integration of technology, mobile learning, film viewing, gamification and online courses to cyber security. We have one review article titled, Media and Visual Subjectivity: Senses and Mediation and one general article on Sustaining Digital Language Resources and Sign Language. Keeping in view the recent pandemic, we invited special correspondence on the topic 'Coping with COVID 19: teaching-learning with technology'. The response from the academic fraternity was overwhelming and more than 50 articles were received. These were the short communications by practicing teachers of their reflections on using technology for teaching and learning during the lockdowns caused by COVID 19. Out of these, nine articles have been selected for publication after review. We also have a book review of the title, 'The Social Photo: On Photography and Social Media'.

It gives me immense pleasure to take out the fourth issue of the journal on time

despite the pandemic and related difficulties. We are thankful to the reviewers and members of the Editorial Board for taking their precious time out during the 'new normal' and helping in deciding appropriate manuscripts for the Journal. The contributions to the journal under various article types have been even higher than the previous issue. We extend our thanks to all the authors as well. A large number of manuscripts could not be accepted for publication. We hope the journal is able to make a mark as a healthy and productive platform in the academic circle for its content and vigour.

(ABHAY KUMAR)
Editor

Research Article

Technology – pedagogy integration by pre-service teachers during internship programme: an analysis with special focus on Science Teaching

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Abstract

The quality of school education has a positive relationship with teachers' training programme in the country. In the era of technological advancements, many strategies and pedagogical practices have been replaced by the technology driven practices. A reflection of this shift has been realized in most of the teachers training programmes; both; pre-service and in-service. However, the extent of integration of content with technology and pedagogy still needs to be studied in details. Also, there is a need to explore the ways of blending content, technology and pedagogy by the teachers in order to provide timely corrective measures. The paper analyses the current status of technological pedagogical content knowledge integration in four years integrated teachers training programme namely B.Sc. B.Ed. of Regional Institute of Education (RIE), Bhopal. It also recommends more synergy towards inclusion of technological pedagogical content knowledge (TPACK) in pre-service teachers training programmes besides suggesting ways for the same

The analysis is based on lesson plan diaries of pre-service teachers maintained during internship period. Results of the study reflect that the pre-service teachers incorporate technology – pedagogy integration in the 30percent lessons during the internship programme. None of the pre-service teachers uses this integration for assessment purpose. Analysis reflects that the prospective teachers need to be made more equipped with the skills of technological pedagogical content knowledge integration. Also, TPACK should be a compulsory component in the curriclum of teachers training programme. At the end, paper discusses difficulties faced by pre-service teachers for integrating technology with pedagogy during their intership programme. Findings of the paper may be used for improvement of pre-sevice teachers training programme with respect to technology pedagogy integration.

Keywords: Pre-service teachers, technological pedagogical content knowledge (TPACK), internship in teaching, science teaching

Introduction

Progress and prosperity of any nation has positive relationship with the quality of education and teachers' training programme of the country. Well-designed teachers training programme leads to the assurance of quality teachers for school education. The very famous quote of Kothari commission has got its relevance always in the school

education system of the country; 'The future of the country is being shaped in its classroom'. As command of the classroom lies with the teachers, it is mandatory that teachers are equipped with all essential skills for designing meaningful learning experiences for 21stcentury learners. Effective use of information communication technology is one of them. Many research studies advocates that the adequate use of ICT in teaching learning processes positively affects students' learning (Bullet, 2011 & Costley, 2014) On the other hand it also mentions a number of barriers associated with the teachers in the way of using ICT for classroom teaching (BECTA, 2004). Literature review also reveals that use of technology in education is strongly affected by teachers' personal factors (Jimoyiannis & Komis, 2008) and personal entrepreneurship is a key factor in a teachers' ability to use technology in teaching and learning (Draper, 2010).In the present context, teachers are required to equip with the essential skills to make best use of technology by integrating it with suitable pedagogy for specific content area (TPK). In the present context teachers are supposed to possess essential skills for integration of content with adequate pedagogy (PCK) and content with suitable technology (TCK). Still, there is a challenge ahead which demands adequate blend of technology with pedagogy and content knowledge. This integration of technology, pedagogy and content knowledge is referred as TPACK (technological, pedagogical content knowledge) (Mishra & Koehler, 2006). The TPACK is not a simple combination of technology, pedagogy and content. Rather it demands interactions and connections of technology with pedagogical content knowledge (Koehler & Mishra 2009). The idea of TPACK has got emergence in the year 2006 by Punya Mishra and Matthew J. Koehler in their work titled "Technological Pedagogical Content Knowledge: A Framework for Teachers Knowledge" (Mishra & Koehler, 2006). According to the TPACK framework, specific technological tools (hardware, software, applications, associated information literacy practices, etc.) are best used to instruct and guide students toward a better, more robust understanding of the subject matter. The three types of knowledge – TK, PK, and CK – are thus combined and recombined in various ways within the TPACK framework (Kurt, 2018).

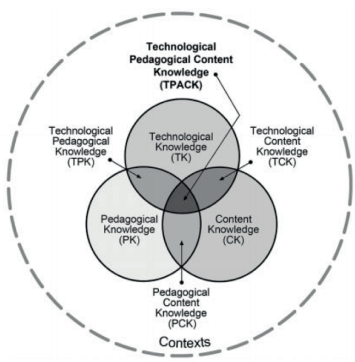

Figure - 1: Technological pedagogical content knowledge model

Need and significance of the research work

It is observed that teachers have initiated the integration of technology with content and pedagogy at various levels of schooling through their own ways. However, the extent of technology, pedagogy, content integration is not clear. In the same manner, pre-service teachers also have been found to take

care of this integration during internship programme. There is an urgent need to realize the extent of content, technology, pedagogy integration being practiced by the teachers so that the required input can be provided for further improvement in this area. Further, there is a need to identify the difficulties felt by the teachers and address them timely. Research studies conducted in this area also suggest the need of exploring the current trends of TPACK in the field of science education (Setiawan, 2019).

Objectives

- To find out the status of technology – pedagogy – content knowledge integration in science subject (at upper primary and secondary level of school) by pre-service teachers during internship programme.
- To find out difficulties faced by pre-service teachers for technology – pedagogy - content knowledge integration in science subject during internship programme.
- To provide suggestive measures for technology – pedagogy - content knowledge integration in science subject for pre-service teachers.

Methodology

The study analyses the present status of technology pedagogy integration in pre-service teachers training programme. This analysis is based on randomly selected 25 lesson plan diaries of pre-service teachers (maintained for Internship in Teaching Programme during July – September, 2019) in the subjects namely; Teaching of Physical Science and Teaching of Biological Science at upper primary and secondary level of schooling. The lesson plan diaries were analysed with the intention to identify the lessons where teacher trainees have tried to integrate technology with the pedagogy with the help of a self-prepared tool. Further, extent of technology - pedagogy integration was analysed with special focus on mode of integration and type of technology used. Pre-service teachers were interviewed to know about the difficulties they face in order to practice the idea of technological pedagogical content knowledge.

Samples

After the completion of internship programme, pre-service teachers are required to submit their learning situation notes (lesson plan diary) in the institute. A number of 25 lesson plan diaries were randomly selected for this study. Randomly selected 25 lesson plan diaries of pre-service teachers (students of B.Sc. B.Ed. course of Regional Institute of Education, Bhopal, Madhya Pradesh). 20 pre-service teachers for focus group discussion (regarding difficulties faced by them for integration of technology, pedagogy and content knowledge) were randomly selected.

Result and Discussion

Internship is an important activity of pre-service teachers training programme of Regional Institute of Education, Bhopal. All essential theoretical inputs for real classroom teaching are provided from first semester onwards to the pre-service teachers. As a requirement of syllabus, pre-service teachers (B.Sc.

B.Ed. students) in their seventh semester (4th year) are required to create a total of 40 learning situations in the identified schools. Prior to this, students are exposed to rigorous preparation for teaching in real classroom situation through Core training Programmes I and II. During fifth semester (third year), they are exposed to various activities of the schools under 'School exposure programme'. In the sixth semester they are provided opportunities for development of essential skills for integration of pedagogy with content knowledge. In semester VII (fourth year) students are again exposed to Pre Internship Training Programme before they actually go to the schools for Internship. As a requirement of syllabus, students maintain 02 lesson plan diaries; one each in their 2 selected pedagogical subjects (ref.; syllabus for four year integrated B.Sc. B. Ed. Course, RIE, Bhopal). An analysis of such 25 randomly selected lesson plan diaries (in teaching subjects namely; Teaching of Physical Science and Teaching of Biological Science) having 20 learning situation notes in each diary was done.

Table-1 shows the practices adopted for technology, pedagogy and content integration by pre-service teachers in the schools during internship.

Table-1: Practices adopted for technology, pedagogy and content integration in the learning situations

S. No.	Content	Class	Practices adopted for technology-pedagogy integration
1	Crystallization (Separation Method) Ionic Compound	VII	Video on purification of salt Video showing transfer of valence electrons from metal to non-metal
2	Thunderstorm & Cyclone	VII	Video of Thunderstorm & Cyclone
	Destruction caused by cyclone	VII	Images on after effect of destruction by cyclone
3	Climate, Adaptation	VII	Photographs of different regions (polar, desert) & of penguins
4	Nervous Tissue	IX	Animation of working of nerve system
5	Cell	VIII	Comparative image of animal & plant cell
6	Tissue	VII	Images of types of tissue
7	Structure of Atom	IX	Animation showing structure of atoms and spins of electrons
8	Friction : a necessary Increasing & reducing friction	VIII	Video on how friction works
9	Soil Profile	VII	Images of layers of soil
10	Percolation rate of Soil	VII	Video on percolation, how soil absorbs or holds water

11	Blood Vessels, Heart	VII	Video on how blood flows in heart and vessels
12	Digestion in Human: Mouth & Buccal Cavity	VII	Images of interior of mouth and buccal cavity
13	Cell : Introduction	VIII	Image of first cell discovered, microscopic image of cork cell
14	Some Plant Fibres: Cotton, Jute, Spinning, Cotton yarn	VI	Video on how different fibres are obtained
15	Plastics: characteristics of plastics	VIII	Video on how we can use plastics efficiently & why should we avoid using plastics
16	Evaporation and condensation process	VI	Videos on process of condensation and evaporation
17	Saturated Solution	VI	Videos of solution preparation
18	Water Cycle	VI	Videos on water cycle
19	Molecule and ion	IX	Video on how molecule and ions are formed
20	Daltons & Atomic Theory	IX	PowerPoint presentation
21	Sources of Water	VI	Images of different sources of water
22	Methods of Separation	VI	Videos on different methods of separation
23	Magnesium	VII	Video of Burning of magnesium
24	Method of separation	VII	Video of winnowing
25	Thunder storms & cyclone	VIII	Pictures of the natural calamities
26	Wind, storm & cyclone	VIII	Video of cyclone
27	Story of coal	VIII	Images of natural resources
28	Types of coal	VIII	Images of different types of coal
29	Polar regions	VII	Images of animal living in polar regions
30	Tropical rainforest	VII	Images of animals
31	Conservation of plants & animals	VIII	Images of area of forest before and after
32	Conservation of plants & animals	VIII	PPT & video of national parks & animals living there
33	Climate, whether & adaption	VII	Video- animals adopted to particular area
34	Climate, whether & adaption	VII	Video – animal living in tropical region
35	Body movement	VI	Video regarding movement of earth worm, fish & snail

36	Dell structure & function	VIII	PPT for comparison b/w plant & animal cell
37	Living organism & their surrounding	VI	Video (animals and their surroundings)
38	Reproduction in animals	VIII	PPT male reproductive system
39	Reproduction in animals	VIII	PPT female reproductive system
40	Transportation in humans	X	Circulation of blood (Video)
41	Plastids & Vacuoles	IX	Video showing plastids & Vacuoles
42	Plant tissue	IX	Video showing types of tissues
43	Animal nervous system	X	Video of conduction of nerve

The outcomes of the analysis of lesson plan diaries and discussions with students are presented in the subsequent paragraphs.

Review of lesson plan diaries

The pedagogy and content are the indistinguishable part of each other (Shulman, 1986). For each piece of content, pedagogy is must for teaching. PCK (pedagogical content knowledge) of pre-service teachers is found satisfactory. After analysis it is found that all the pre-service teachers (100percent) have tried to incorporate technology with content (TCK) during their internship programme. However, this integration is observed only in 30percent learning situations which mean that out of total 20 learning situations, integration is practiced only for 6 learning situations. Also, the finding reflects that extent of technology content integration is not very appropriate. For example, while teaching about separation methods, a video on crystallization of salt was shown. It is found that video was shown in the isolation after the explanation of the concept. In this case it is expected that after the completion of video, teacher will hold a discussion about crystallization and relate it with various known examples from students surrounding. Also, video may be paused in between and students may be given opportunity to share their understanding about the concept. Further, paused-time may be used by teacher to provide additional inputs to the students. In the same manner, teacher has explained the concept of ionic compounds and after that she shown the video about transfer of valence electrons from metal to non-metal. In this case also an adequate blend of technology with pedagogy is lacking. Another example of inappropriate timing of use of technology in the class includes a video on burning of magnesium. Video was shown in the beginning of the lesson. In the later part of lesson, during discussion about the properties of metal, teacher fails to establish a connection between the video shown and the concept (properties of metals). In this case too, teacher was not able to establish a strong connection of used technological means with pedagogically

appropriate timing and with content. Further, pre-service teachers are not able to select an appropriate technological tool for a specific content and blend it with appropriate pedagogy. This is another important area which needs to be addressed by pre-service teachers. Power point presentation (without any animation) is used for class IX students for teaching of Dalton's Atomic Theory which is not very appropriate to the content and to the cognitive level of learners. Instead, some other more effective tools have been used at this stage where students are just introduced about atom and other related sub-concepts.

Although students have used some power point presentations, videos, etc. during the teaching of a particular concept but they fail to establish a connection of that concept with slide presentation or video at appropriate time. It is found that various technological means were used in isolation during teaching and were not integrated with the concepts properly. In most of the cases, it was observed that various technological means were used only for the sake of using technology during teaching. Majority of students use images, GIF images, power point presentations, animated videos and videos of real life situations (self-recorded), etc. for integrating content with pedagogy. None of the students has used technology for assessment purpose. With respect to TPACK (technology, pedagogy and content knowledge), it was found that pre-service teachers fail to integrate and interrelate technology and pedagogy with content knowledge meaningfully.

Findings of the focus group discussion

A discussion with the prospective teachers brings their difficulties on the surface. It has emerged from discussion that they are not able to understand the complex interrelationship between the technology used by a teacher, instructional methods and understanding of subject matter. Majority of pre-service teachers are well versed with the existing technological advancements but they find it difficult to establish a meaningful interrelationship between technology, pedagogy and content to be taught. Though pre-service teachers use technology in several ways such as video, presentation and images, etc. However, they fail to relate these effectively with the content. Another important point which has emerged from discussion is about identification of appropriate timing to use technological tools during teaching learning processes. Sometimes they use the technology during teaching just for sake of using. Most of the pre-service teachers have technical knowledge and understanding of pedagogical aspects of science teaching but they lack the knowledge to integrate technology, pedagogy and content knowledge (TPACK). Majority of pre-service teachers consider lack of proper guidance for integration of technology, pedagogy, and content knowledge as a major difficulty. Another barriers point to lack of training for creating their own technological teaching-learning resources, lack of infrastructure in majority of schools during their internship period, shortage of timing during pre-internship phases and difficulty in selection of suitable

pedagogical strategy for a specific content.

In a nut shell, it is reflected from the analysis that 100percent pre-service teachers try to integrate technology with pedagogy in their class during internship programme in the schools. Teachers having internships in KendriyaVidyalayas and NavodayaVidyalays reflect better evidences for integration of technology with pedagogy and content knowledge. This may be because of better infrastructural facilities and guidance of teaching staff of these schools as mentors and cooperative teachers... Further, pre-service teachers tried the idea of integration in very less number of learning situations (6/20 which is 30percent). This seems more disappointing when viewed in relation with science subject which provides many opportunities for utilizing the idea of TPACK.

Extent of technology – pedagogy integration is also not very appropriate. Though pre-service teacher use technology in their teaching but are not able to integrate it with pedagogy and content knowledge. Majority of pre-service teachers treat technology separately from pedagogy and content. All of them use images, GIF images, power point presentations, animated videos, videos of real life situations etc. for integrating knowledge with pedagogy. But they fail to integrate their content knowledge with technology. Science teaching provides very vast scope for integrating technology for assessment purposes. In the present analysis such integration is nil.

Conclusions

The analysis reflects the demand for more concrete efforts on the part of science teacher educators in the direction of TPACK. There is a strong need to incorporate the concept of TPACK in the teachers training programme in order to equip prospective teacher to meet with the future challenges in class rooms.

Analysis reveals that pre-service teachers are able to integrate technology with content up to some extent (30percent only). However, they fail to integrate technology and pedagogy with content for effective classroom experiences for their students. Technological tools used by pre-service teachers are also common. Majority of them used images, GIF images, power point presentations, animated videos and videos of real life situations (self-recorded), etc. in their classes. The prospective teachers need to be more sensitized and equipped with required skills to practice technology, pedagogy and content knowledge integration in the classroom settings.

Way forward

In this technological driven society, not only teachers are required to be aware of latest technological advancements but to be able to integrate PCK (pedagogical content knowledge) with the upcoming technology. For this purpose, TPACK should be incorporated in the syllabus of teachers training programme (Apau, 2017). Pre-service teachers need to be provided adequate learning opportunities to internalize concept of TPACK (technological pedagogical content knowledge) not only theoretically but to practice it properly before they placed for internship in

various schools. Also, there should be proper opportunities to develop required set of skills to design learning experiences using technological, pedagogical content knowledge in the routine classrooms in schools. Science teacher educators should model TPACK in such a way so that pre-service teachers have better opportunities for learning through observation throughout the entire course. The greatest value to the science teaching in the class rooms can be added only when the teacher has a high technological pedagogical content knowledge. Expectations and training needs of pre-service teachers are also to be taken into consideration for designing syllabi comprising TPACK components and for identification of training strategies

Teacher training programmes are considered as the backbone of education system in India. Future of country depends on the quality of education in the schools. Quality of education is directly proportional to quality of school teachers. In order to meet the future challenges of the classrooms and the demands of the new age learners, teachers should be able to design adequate learning experiences by generating technological, pedagogical content knowledge integration for their learners. Training on TPACK should be incorporated in the curriculum of teachers training programme. An analysis of difficulties faced by teacher educators related to TPACK may also be done. This analysis can help the science teacher educators for better understanding of their learners' difficulties. Identification of grey areas in this regard will provide focused directions for better use of TPACK for science education.

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Research Article

Perception of teachers and students towards computer-based tests: An analysis in terms of gender, subject background and computer efficiency level

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Abstract

This paper concerns about the perception of government intermediate teachers and Biology intermediate students regarding the mode of examination as computer-based test (CBT) verses paper-pencil test (PPT). Perception is very close to attitude and easy to measure by the intended behavior. The survey analysis highlighted the significant difference between the perception of intermediate teachers and intermediate students towards modes of examination with reference to their gender, subject background and computer efficiency level. It has been suggested that male teachers and male students perceived more positively about computer-based test and same with the science background and computer efficient participants. The effectiveness of computer-based test was also studied based on 16 parameters of effectiveness as perceived by the stakeholders, which supported that computer-based tests is more effective than paper-pencil tests.

Keywords: Academic achievement, Computer-based test, Paper-pencil tests, Perception, Computer efficiency level

Introduction

In the mid twentieth century, Frederic Mather Lord, who contributed significantly to the theory and applications of educational measurement, postulated computer-based and computerized adaptive testing (Wainer, H., & Stocking, M., 2000). According to Frederic Mather Lord, computer-based tests are defined as tests or assessments that are administered by a computer in either a stand-alone or networked configuration or by other technology devices linked to the World Wide Web via the Internet.

There are strong interests in computer-based test and earlier researchers have identified many positive merits of this approach of assessment, including: efficient administration, students preference, self-selection options for students, improved writing performance, built in accommodation, immediate results, efficient items development, increased authenticity, etc. (Noyes & Garland, 2008). However, with computer-based tests (CBT), there are also potential negative unintended consequences. These may include the possibility of additional training for students with disabilities to interact successfully with computers and the challenges of determining the best way to present and accommodate

accessories like screen readers for visually impaired and other assistive technologies for students with other disabilities (Ozden, M.Y., Erturk, I., & Sanli, R. (2004).

Despite its popularity, computer-based tests face accessibility challenges also, which reduces the validity of the assessment results and exclude some groups of student from assessment participation. Studies also reported the disadvantage of computer-based tests as students' anxiety increases among those who are unfamiliar with use of computers (Lim, et al., 2006) and such students agreed that they are "technophobic". The challenge to test examinees by means of microcomputers demands appropriate software design but it also confirms that computer-based tests are not a cost effective and fully secured as compared to the paper-pencil test method but studies of Choi and Tinkler, 2002; Kim and Huynh, 2007 reported that computer-based tests are fully secured and cost effective. A study conducted by Peter, et al. (2004) advised that teachers with many years of traditional teaching experience do not want and support computer-based tests. They are more comfortable to facilitate traditional mode (paper-pencil test) of test over computer-based test.

In contrast, a paper-pencil test (PPT) is a test where the problems or queries are penned, printed, or drawn and the answers are penned on paper. Paper-pencil test refer to a general group of assessment tools in which candidates read questions and responded on paper. In India, it has been the norm since the establishment of formal education and all the stakeholders are very well adapted with paper-pencil tests.

Many earlier studies strongly supported that computer-based tests are more effective compared to paper-pencil test in terms of flexibility, lesser chances of double answering, mock practices, immense set of question papers, lesser clerical mistakes, easy accessibility, immediate feedback, disable student friendly, cost effective, fully secured, time saver, user adaptive and curbs impersonations (Lim, E. C., Ong, B. K., Wilder-Smith, E. P., & Seet, R. C., 2006). As computer-based tests began to be used for summative assessment in several examinations, it is important to establish whether computer-based testing is perceived equally to paper-pencil test (Powers, D.E. & O'neill, K., 1993; (Anakwe, 2008).

Advancement in technology is forcing educational institutions to update and use educational technologies within its education system. Several entrance tests and other annual test are now conducted as computer-based test therefore it becomes critical to ascertain teachers' and students' perception towards computer-based test for its efficient usage and paper-pencil test. Many answers are still unanswerable especially the differences in perceptions to computer-based tests with respect to the gender, subject background and computer efficiency level of various stakeholders. Finally, it is also necessary to evaluate which mode of testing is more effective in terms of parameters like cost effectiveness, easy to use, time saving and others. It will be helpful for government to fill up, if such gaps are identified.

Review of the related literature

Earlier studies have been done to develop the relationship between the impact of ICT and academic performance. Evidence based relationship were seen between the use of computer in assessment and attitude of teachers and students. Although, many participants knew as they were part of an experiment, which affected their responses towards computer-based tests (Elsaadani, 2013; Varol, 2013; Lal, 2014; Nugroho, et al., 2018). Perception is also very close to attitude and easy to measure by the intended behaviour. It is a process by which organisms interpret and organize sensations to produce a meaningful experience of the world (Jimoh, R. G., Shittu, A. J. K., & Kawu, Y. K., 2012). Receptivity of the stimuli is usually decided by the person's awareness and acceptability for the stimuli, a person's existing beliefs, attitude, motivation, and personality, which are helpful to perceive (Assael, 1995). Attitude and perception towards the use of computers needs to be evaluated for effective implement of technological advancement in the classroom (Stevens, 1982). Elliott (2008) believed that computers, especially in teaching, are already playing a big role in achieving its target but the test is also an important part of teaching which should be conducted accurately and in a formative manner according to the latest instructions.

Drent and Meelissen (2008) provided a broad discussion of those teachers and students having positive attitudes towards computer and ICT uses in the classroom leading to purposeful and innovative practices in the teaching-learning process. If teachers' attitudes are positive toward the use of educational technology, then, they can easily provide useful insights about the adoption and integration of ICT into teaching-learning processes as supported by the study of Keengwe, et al. (2008).

Cavas, et al. (2009) revealed that relationship between teachers' attitude and factors which are related to teachers' characteristics (gender, age, and computer efficiency) indicated that science teachers have a positive attitude towards ICT uses although teachers' attitude towards ICT uses do not differ regarding gender, it differs regarding age and computer efficiency.

A study of Flowers, et al. (2011) reported that students perceived more to prefer the CBT to the PPT, and students believed they performed better using the computer. Additional research that controls extraneous factors such as instructional time and familiarity with the testing environment is recommended to better evaluate the relationship between testing modes and academic performance.

Jamil et al. (2012) reported that teachers' attitudes were positive towards computer-based tests but in some situations they preferred paper-pencil tests. Female and teachers who have computer training certificate and experiences were more positive towards computer-based test.

Jeong (2014) clarified that computer-based tests offer real-time scoring and immediate feedback, facilitate the use of individualised testing methods, improve test administration

and reduce test expenses. Thus, most previous studies have tended to focus on the technical advantages and effectiveness of computer-based tests and implementation issues.

There is a moderate and positive relationship between the age of participants and their attitude towards ICT has been found thus, when considering attitude towards ICT by teaching staff members, age is a significant factor (Elsaadani, 2013). Lal (2014) investigated that the vast majority of secondary school teachers have a positive attitude towards ICT about their school teaching subjects for many reasons.

Sern, et al. (2017) suggested in their study that video technology is plausible to be used in teaching practicum evaluation. Besides, their findings also reflect that the students possess a high level of flexibility and ability to adapt innovative technology in their works.

A study on the topic "Students Perception on the Use of computer-based Test" concluded that there was significance difference between the paper-pencil test and computer-based test. Practically, this result suggested that students with different test method prefer to have tests other than what they were having (Nugroho, et al., 2018).

Billions of examinations and assessments are administered every year across. By delivering a test, one is aiming to use the information provided by the test in making a decision about the individual taking the test. Tests have been traditionally administered through the paper-pencils tests methods but at advent of the twentieth century, researchers sought to find a more or rather convenient means of administering tests. Thus with the introduction of the computer-based test, it continued to impress and has been seen by more and more institutions to adopt it as a reliable means of test administration (Jawaid, M., Moosa, F. A., Jaleel, F., & Ashraf, J., 2014).

Objectives of this study

The goal of this study is to identify the perception of stakeholders towards computer-based tests and paper-pencil tests as well as effectiveness of computer-based tests. In the current study the following research questions were addressed:

1. Does the teachers' perception differ towards computer-based tests in reference to their gender, subject background and computer efficiency level.
2. Does the students' perception differ towards computer-based tests in reference to their gender, subject background and computer efficiency level.
3. To measure the perception of teachers and students towards computer-based test based on several effectiveness parameters.

Method

Procedure

To assess the perception difference regarding two modes of tests, a planned "Perception rating scale for computer-based test" was constructed with high 0.71 reliability and validated by experts. This scale had consent letter

in front followed by two other sections. In the first section, participants were requested to fill about gender, subject background (science or non-science) and their computer efficiency level, ranging from very poor, poor, medium, good and excellent. Second section had 26 perception-based statements for computer-based and paper-pencil tests. Participants noted their responses as agreed; undecided and disagreed and recorded as +1, 0 and -1 respectively. Quantitatively data was collected and analysed by its distribution (percentage) and using chi-square. Out of the total 26 statements, 16 different statements were selected based on the previous studies for effectiveness parameter of computer-based tests.

Participants

A list was prepared by purposive sampling method from target population followed by random selection from enlisted purposefully selected sample. Random selection was made possible by lottery method. Samples were chosen from the CBSE board schools, Kendriya Vidyalaya, a central government regulated premiere school in Uttar Pradesh, India for the survey. 150 intermediate teachers were selected from Kendriya Vidyalaya Schools of Prayagraj and Varanasi where 60 intermediate students were selected from Kendriya Vidyalaya (KV) School of Prayajraj district in Uttar Pradesh (09 KVs from Prayaraj and 03 KVs from Varanasi for teacher sample). Data was collected durng the end session of 2017-2018 (Appendices A & B). The reason for selecting only Kendriya Vidyalaya was that these schools are supposed to be fully equipped with working computers with good internet facilities. Therefore, it was supposed that the participant in the present study would be very much familiar with the use of computer and also have some experiences of computer-based test along with paper-pencil test.

Result and discussion

Table-1 shows the results of intermediate teachers' perception towards computer-based and paper-pencil tests at an intermediate level in reference to their gender, subject background, and computer efficiency level.

Gender-wise comparison: Significant differences were found between the perception among male and female teachers for the statement 3 ($\chi 2 = 6.6381 > 5.991$, $\alpha = 0.05$, $df = 2$) and 5 ($\chi 2 = 8.3672 > 5.991$, $\alpha = 0.05$, $df = 2$). The result showed that 74.4% male teachers and only 35percent female teachers agreed that students can practice mock test before final computer-based examinations (statement 3), while 62.2percent male and 41.7percent female teachers agreed that students waste their few minutes in redrawing any diagram on rough (statement 5). The probable reason for significant difference among male and female teachers regarding mock practices and wastage of time in redrawing the diagram in computer-based tests is that male teachers may be more exposed to ICT and technology as compared to female teachers. The same finding was suggested by Karamti, (2016); Jegede, (2009).

Comparison by subject background: Significant differences were found between the perception among science and non-science teachers or the statement 1st ($\chi2 = 6.0135 > 5.991$, $\alpha = 0.05$, $df = 2$), 2nd ($\chi2 = 6.9382 > 5.991$, $\alpha = 0.05$, $df = 2$), 6th ($\chi2 = 8.9679 > 5.991$, $\alpha = 0.05$, $df = 2$), 16th ($\chi2 = 9.3870 > 5.991$, $\alpha = 0.05$, $df = 2$), and 24th ($\chi2 = 7.3920 > 5.991$, $\alpha = 0.05$, $df = 2$). Results indicated that 89.9percent of non-science teachers and 76.1percent of science teachers agreed that students can choose their schedule of tests as per their convenience in computer-based test (statement 1), hence it offered the students to appear in the test, whenever they were well prepared. Flexibility in the test showed to motivate the students and resulted in their greater engagement in studies. This finding was strongly supported by the study of Jamil, et al., (2012). Similarly, significant differences were reported for statement 2, 6, 16 and 24. There are several possible explanations why teachers' perception differs with respect to their subject background, not gender and computer efficiency level. Science teachers largely agreed with these statements (1, 2, 6, 16 and 24) about computer-based tests because science teachers are more exposed to computer & ICT and also familiar by administering the test more frequently in contrary to the non-science teachers. The present study suggested that teachers with science background and non-science subject background have different perception towards computer-based test in choosing the test schedule by students' convenient (statement 1), making changes in answers before final submission (statement 2), preparing unlimited sets of question paper (statement 6), measuring psychological and biological changes during the computer-based test (statement 24) and CBT also needed very efficient teachers (statement 16), (Heisele, et al., 2007).

Computer efficiency level-wise comparison: Significant differences were found in the perception of computer-based tests among the different level of computer efficient teachers for the statement 6th ($\chi2 = 8.0818 > 5.991$, $\alpha = 0.05$, $df = 2$), 17th ($\chi2 = 7.1540 > 5.991$, $\alpha = 0.05$, $df = 2$), 20th ($\chi2 = 6.0903 > 5.991$, $\alpha = 0.05$, $df = 2$) and 23rd ($\chi2 = 6.9001 > 5.991$, $\alpha = 0.05$, $df = 2$). Results showed that the majority of computer non-efficient teachers (65percent) agreed that unlimited number of question sets can be prepared in computer-based tests (statement 6). Statements 17th, 20th and 23rd also indicated the significant differences among the both groups of teacher. These statements are as followed, students are prejudiced about computer-based tests (statement 17), students can access the question in a set order (statement 20) and screen resolution is also one of the major problems of computer-based tests (statement 23). Johnson and Green (2004) also mentioned the above listed disadvantages of computer-based tests as perceived by students. Many statement of disagreement are higher among computer efficient teachers compared to their counterparts. It may be possible due to the more familiar with the advantages and disadvantages of utilization of computer among the computer efficient teachers.

The perception of teachers does

not differ significantly for the rest of the statement in the questionnaire with respect to their gender, subject background and computer efficiency level.

Table –1: Calculated χ2 value regarding teachers' perception

S. No.	Statements	Gender (χ2value)	Subject background (χ2 value)	Computer efficiency level (χ2 value)
1	Students can choose their day and time of the computer-based test according to the slots available based on their convenience.	0.8741	6.0135*	0.7355
2	The correct answers marked can be changed before final submission with no error of double answering.	1.6755	6.9382*	0.5230
3	Students can practice mock test before final computer-based examinations.	6.6381*	1.9842	2.5067
4	Proper training is not provided for the computer-based approach of the exam.	2.3913	0.6260	5.6755
5	For several questions in Maths and Physics accompanying certain diagrams, students have to redraw in rough, this opportunity leading to a waste of 2 crucial minutes.	8.3672*	0.2170	1.6026
6	In computer-based examination, an unlimited number of question sets can be prepared.	0.6190	8.9679*	8.0818*
7	Computer-based tests are easily accessible for students and teachers also.	2.0810	5.0151	3.5525
8	A computer-based test gives complete feedback about student performance immediately.	0.4489	0.5206	0.6723
9	Disabled students can access the computer-based question paper easily.	0.5789	3.1580	0.7440
10	A computer-based test reduces the chances of leakage of question paper with full security of the question paper.	0.1270	0.5946	2.8881

11	Students with varying exposure towards technology perform differently in computer-based examination.	0.7739	2.2115	2.0372
12	A computer-based test is very economical.	0.3637	2.9480	4.7598
13	A computer-based test requires a lesser number of support staff during test time.	0.3231	0.8452	4.5328
14	Once a computer-based question paper is prepared, it can be saved in the question bank for future concern.	0.1837	5.8449	1.9933
15	A computer-based test always needs good internet connectivity and an efficient power supply.	0.1837	1.8767	0.6577
16	A computer-based test needs very efficient and competent teachers.	4.2225	9.3870*	0.0969
17	Students are prejudiced about computer-based examination.	0.0829	1.0487	7.1540*
18	A computer-based test is not very useful for lower classes.	0.5435	4.9614	4.0613
19	It is difficult to measure the creative writing skills through computer-based examination.	0.3169	4.2444	1.8042
20	In computer-based examination, students can access questions in a set order only.	6.0315	0.4749	6.0903*
21	A computer-based test allows more time to think on each question.	1.3445	0.8060	5.6631
22	A computer-based test is a time saver on the part of students as well as teachers.	0.9172	1.9327	0.4349
23	In computer-based tests computer screen resolution may create concentration problem.	4.7727	1.8974	6.9001*
24	In computer-based examination, students psychological & biological monitoring and their each movement can also be checked.	3.4003	7.3920*	0.8165
25	A computer-based test needs extra trained staff as administrator prior to test hours.	2.8347	4.3486	0.2074
26	Only genuine students can appear in computer-based test without any fake identity.	5.9547	0.5390	1.1232

Table – 2 indicates the results of the intermediate biology students' perception towards CBT & PPT at the intermediate level in reference to their gender and computer efficiency level.

Gender-wise comparison - Significant differences ($\chi 2 = 6.1973 > 5.991$, $\alpha = 0.05$, $df = 2$) were found in the perception between male and female biology students for the statement 8 i.e. computer-based test gives complete feedback about student performance immediately. 44.4percent male and only 25percent of female students agreed for the above statement. The study of Darrell, (2003) suggested that male students are getting more chances of exposure to ICT which they utilize in learning and academic performances. Similar results were concluded by the study of Peter, et al. (2004), Jimoh, et al. (2012).

Computer efficiency level-wise comparison - Results showed that 74.5percent computer efficient & 44.5percent computer non-efficient students agreed that their time gets wasted in redrawing the pictures from screen to paper in computer-based test, which is a drawback of computer-based test (Ayebi-Arthur, 2010). This perception between the different level of computer efficient students regarding the statement 5 is significantly different ($\chi 2 = 8.9305 > 5.991$, $\alpha = 0.05$, $df = 2$).

Perception of students do not differ significantly for the rest of the statement in the questionnaire with respect to their gender and computer efficiency level and giving a mixed response which showed that there is not much difference in the perception of students about computer-based test and paper-pencil tests.

Table –1: Calculated $\chi 2$ value regarding teachers' perception

S. No.	Statements	Gender ($\chi 2$ value)	Computer efficiency level ($\chi 2$ value)
1	Students can choose their day and time of the computer-based test according to the slots available based on their convenience.	0.3846	1.6290
2	The correct answers marked can be changed before final submission with no error of double answering.	0.2842	0.9637
3	Students can practice mock tests before final computer-based examinations.	0.0277	1.5608
4	Proper training is not provided for the computer-based approach of the exam.	0.1379	0.4614

5	For several questions in Maths and Physics accompanying certain diagrams, students have to redraw in rough, this opportunity leading to a waste of 2 crucial minutes.	1.3599	8.9305*
6	In computer-based examination, an unlimited number of question sets can be prepared.	0.3175	1.3445
7	Computer-based tests are easily accessible for students and teachers also.	0.2377	0.5977
8	Computer-based test give a complete feedback about student performance immediately.	6.1973*	4.3001
9	Disabled students can access the computer-based question paper easily.	0.9091	0.7130
10	A computer-based test reduces the chances of leakage of question paper with full security of the question paper.	0.4441	0.8285
11	Students with varying exposure towards technology perform differently in computer-based examination.	0.2303	0.1778
12	A computer-based test is very economical.	0.6699	0.6988
13	A computer-based test requires a lesser number of support staff during test time.	0.2568	1.3164
14	Once a computer-based question paper is prepared, it can be saved in question bank for future concern.	2.3243	1.9971
15	A computer-based test always needs good internet connectivity and efficient power supply.	1.6733	3.6770
16	A computer-based test needs very efficient and competent teachers.	2.500	2.3529
17	Students are prejudiced about computer-based examination.	0.1648	5.1454
18	A computer-based test is not very useful for lower classes.	0.0956	3.9722
19	It is difficult to measure the creative writing skills through computer-based examination.	3.0952	0.6981
20	In computer-based examination, students can access question in a set order only.	5.4340	0.2941
21	A computer-based test allows more time to think about each question.	1.1902	0.8669
22	A computer-based test is a time saver on the part of students as well as teachers.	0.9173	1.4611
23	In computer-based test computer screen resolution may create concentration problems.	1.7411	1.8725

24	In computer-based examination, students psychological & biological monitoring and their each movement can also be checked.	0.5258	2.3343
25	A computer-based test needs extra trained staff as administrator prior to test hours.	0.0608	1.5966
26	Only genuine students can appear in computer based test without any fake identity.	0.6250	0.4412

Effectiveness parameter for computer-based examination

Table-3 displays the perceived effectiveness for computer-based tests over paper-pencil tests among the teachers and students in different parameters.

From the given table-3, it was depicted that the majority of sampled teachers (83.3percent) and intermediate biology students (86.7percent) strongly agreed that computer-based tests provide flexibility to students in choosing their test schedule.

Table - 3 shows that nearly 74percent teachers as well as 71percent students agreed that double answering is not possible in computer-based test. It was further illustrated from the table that a chunk of stakeholders (68percent teachers and 72percent students) agreed that computer-based test provides mock practices to students before the test. Likewise high percentage of teachers and students agreed for rest of the effectiveness parameter towards computer-based test as it has lesser clerical mistakes, immense set of question paper, easy accessibility, real-time quick report, disabled-students friendly, fully secured, cost-effective, less support staff requirements, futuristic approach, time saver, user-adaptive and curbs impersonation. Study of De Witte, and Rogge, (2014); Hismanoglu, (2012) showed that fewer students were found confident about computer-based tests before completing the assessment, while more number of students stated a preference for computer-based tests over paper-pencil tests.

The benefits of computer-based tests are enormous over paper-pencil tests as corroborated by Tinio (2002) and Ommerborn, R & Schuemer, R (2001) in their survey on computer use by disable students in Germany, found that the cost of acquiring and using a computer in tests is the greatest barrier due to the lack of training opportunities which include lack of access to ICT infrastructure, affordable connectivity with sufficient bandwidth, and a reliable supply of electricity.

It may be inferred that computer-based test is certainly more effective as perceived by the teachers and students in providing more flexibility to the students, no chances of double answering issues, availed mock practices, saves time because majority of teachers and students agreed with these statements. In addition, computer-based tests free up the time of teachers which can be utilized in other constructive works or in-depth discussion (Anakwe, 2008). Moreover, computer-based tests easily provide the repeated testing opportunities for

practice purposes and multiple-choice, true or false, and matching items can be easily administered through it (Anakwe (2008).

In addition, the perception of teachers and students inferred that computer-based test to be more effective as compared to the paper-pencil test in enabling the immense set of question paper set, in its accessibility, giving real-time quick results, disabled-students friendly, needed less support staff, providing extra time during, efficient test and users adaptive (Hosseini, M., Abidin, M. J. Z., Kamarzarrin, H., & Khaledian, M., 2013). This was also proved earlier that feedback plays a key role in assessment processes and is an important element of the learning process (Anakwe, 2008; Marriott, 2009). Garland (2008), who also believed that the benefits of standardized computer-based tests, such as quick and objective results and the ease of comparing results with others make this method very popular. This result reflects the similarity with Hewson (2012).

Table –3: Effectiveness parameter towards computer-based examination

S. No.	Parameters (Statement No.)	Respondents (N)	Agree (N) %	Undecided (N) %	Disagree (N) %
1	Flexibility (1)	Teachers (150)	(125) 83.3%	(16) 10.7%	(9) 6%
		Students (60)	(52) 86.7%	(4) 6.6%	(4) 6.7%
2	No chance of double answering (2)	Teachers (150)	(110) 73.3%	(19) 12.7%	(21) 14%
		Students (60)	(43) 71.7%	(12) 20%	(5) 8.3%
3	Mock practices (3)	Teachers (150)	(102) 68%	(12) 8%	(36) 24%
		Students (60)	(43) 71.7%	(10) 16.7%	(7) 11.6%
4	Lesser clerical mistakes (4)	Teachers (150)	(69) 46%	(66) 44%	(15) 10%
		Students (60)	(34) 56.7%	(10) 16.6%	(16) 26%
5	Immense set of question paper (6)	Teachers (150)	(69) 46%	(36) 24%	(45) 30%
		Students (60)	(20) 33.3%	(28) 46.7%	(12) 20%
6	Easy accessibility (7)	Teachers (150)	(60) 40%	(47) 31.3%	(43) 28.7%
		Students (60)	(33) 55%	(17) 28.3%	(10) 16.7%
7	Real time quick report (8)	Teachers (150)	(61) 40.7%	(57) 38%	(32) 21.3%
		Students (60)	(22) 36.7%	(21) 35%	(17) 28.3%
8	Disabled students friendly (9)	Teachers (150)	(64) 42.7%	(53) 35.3%	(33) 22%
		Students (60)	(33) 55%	(12) 20%	(15) 25%

9	Fully secured (10)	Teachers (150)	(50) 33.3%	(51) 34%	(49) 32.7%
		Students (60)	(23) 38.3%	(19) 31.7%	(18) 30%
10	Cost effectiveness (12)	Teachers (150)	(54) 36%	(55) 36.7%	(41) 27.3%
		Students (60)	(19)31.7%	(21) 35%	(20)33.3%
11	Less support staff requirement (13)	Teachers (150)	(62) 41.3%	(42) 28%	(46)30.7%
		Students (60)	(27) 45%	(16) 26.7%	(17) 28.3%
12	Futuristic approach (14)	Teachers (150)	(55) 36.7%	(58) 38.6%	(37) 24.7%
		Students (60)	(29) 48.3%)	(13) 21.7%	(18) 30%
13	Provision of extra time during the test (21)	Teachers (150)	(64) 42.7%	(34) 22.6%	(52) 34.7%
		Students (60)	(19) 31.7%	(16) 26.6%	(25) 41.7%
14	Time saving (22)	Teachers (150)	(92) 61.3%	(9) 6%	(49) 32.7%
		Students (60)	(24) 40%	(5) 8.3%	(31) 51.7%
15	User adaptive (24)	Teachers (150)	(65) 43.3%	(30) 20%	(55) 36.7%
		Students (60)	(35) 58.3%	(4) 6.7%	(21) 35%
16	Curbs impersonation (26)	Teachers (150)	(72) 48%	(17) 11.3%	(61) 40.7%
		Students (60)	(32) 53.3%	(4) 6.7%	(24) 40%

Conclusions

Research finding showed that most of the participant from teachers and students groups perceived that computer-based tests was more effective as compared with the paper-pencil tests in providing immediate feedback, use of archival databank of questions, flexibility to students, no double answering, availed mock practices and saves time, making immense set of question paper, accessibility, disables students friendly, giving real time quick results, needed lesser support staff, providing extra time in examination, users adaptive. Result suggested that acceptance of computer-based tests were higher among the male respondent compare to the female participants. Result also suggested that computer efficient participants and science background teachers accepted computer-based tests more. Government should focus more on these groups of non-science female teachers and students who are not efficient in computer and arrange the training program for more exposure in computer-based tests. In addition, computer-based tests need more advanced technology for the ease of stakeholders such as screen problems, accessing the question in fixed pattern and lower classes applicability which limits its use.

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Appendices

A: Total number of Kendriya Vidyalayas in Uttar Pradesh

No. of Kendriya Vidyalayas in India	125
No. of Kendriya Vidyalayas in Uttar Pradesh	80
No. of Kendriya Vidyalayas in Prayagraj	975
No. of Kendriya Vidyalayas in Varanasi	3

B: List of PGTs in Kendriya Vidyalayas in Prayagraj and Varanasi

Districts	**Name of Kendriya Vidyalaya**	**No. of Intermediate Teachers**	**No. of Intermediate Students**
Prayagraj	KV Old Cantt	19	4
	KV New Cantt	29	62
	KV IIIT Jhalwa	7	12
	KV Naini	9	8
	KV Manauri	19	16
	KV Bamrauli	13	18
	KV Phulpur	10	10
	KV Chheoki	7	12
	KV Phaphamau	No Intermediate Classes	None
Varanasi	KV Cantt	12	10
	KV BHU	14	8
	KV DLW	14	12
		151	178

B: List of PGTs in Kendriya Vidyalayas in Prayagraj and Varanasi

Categories	**Group (s)**	**(N) Percentage**
Gender	Male / Female	(90) 60% / (60) 40%
Subject background	Science / Non-science	(71) 47.33% / (79) 52.67%
Computer efficiency level	Computer efficient / Computer non-efficient	(110) 73.33% / (40) 26.67%

D: Group-wise Percentages of Overall Sampled students

Categories	Group (s)	(N) Percentage
Gender	Male Female	(36) 60% (24) 40%
Computer efficiency level	Computer efficient / Computer non-efficient	(51) 85% (09) 15%

Research Article

Landscape of Social Networking Sites in Schools: An Administrative Perspective

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Abstract

Social Networking Sites (SNS) have become an integral part of an individual's life. Their potential is very well-acknowledged by the researchers in the field of teaching. Effective school management and administration are central to better functioning of a school, and this needs a constant and frequent communication between the authorities and staff. This research work acknowledges this fact and aimed at bringing out an administrative view on the usage of SNS in school. This study was conducted with 38 administrators (Principal, Vice-Principal, Academic coordinator, Head of the department) through river sampling (social networking sampling). It was found that SNS can help in massive communication, and sending information. The data revealed that effective coordination can be maintained and promoted in schools through SNS but this seems to be a distal dream due to privacy issues and technological challenges. So, proper working and encouragement in schools toward SNS can make it a cost-effective and accessible means for communication. This paper concludes that SNS are potential platform and its usage by the administrators can bring more accountability and transparency in public dealing.

Keywords: Administration, Administrator, Management, SNS and Transparency

Introduction

In this era of ubiquitous communication, and technological advancement we are in constant interaction with new and improved forms of technology. This world is of virtual networks and communities (Balalle, 2018). Domination of technology is being felt in all realms of life and education is not an exception to this. Over a period, social media and networking site has come into the reach of the majority of people and has led to the development of net communities. Social networking sites (SNS) have become prevalent and this is achieved because of the ease in accessibility of the Internet in the recent years that helps in easier, faster and at times cheaper communication (Kukreja & Kanvaria, 2017). Potential of SNS for communication, interaction, exchange of ideas is well acknowledged by the researchers (Jukic & Merlak, 2017). Our education system is using it as the platform for making the teaching-learning process (Ellis & Abreu-Ellis, 2015) more effective and enriching but it is central in establishing the coordination within the staff which is crucial for productive functioning of the school.

This paper attempts to look at the pattern of usage of SNS in schools among the administrators of schools. Over the years the whole landscape of schools has changed and there is great onus which lies on the people who are running them in an administrative capacity. Principal, Vice-Principal, Head of the departments, Academic coordinators, etc. are at a varied administrative position in school, and this study tries to trace their perspective about using SNS as a platform for enhanced functioning of the school. It also discusses the need, relevance and challenges these administrators face while using SNS with their staff.

Review of related literature

There are plenty of studies available concerning the changing trends of communication over the years. Communication is very central to the efficient functioning of any workplace or organisation. In this present study, an attempt was made to look at the social networking sites as a potent communication platform for effective administrative work in the schools.

Balalle (2018) in her study tried to explore the relationship between social media usage by the students and their achievement. Although there was no significant relationship between the two but it was revealed that students use social networking sites quite often and for many purposes. In their choice, the most popular site was Facebook which was being used by around 68% of the taken sample size for maintaining social contacts.

Jukic and Merlak (2017) found that Facebook as SNS in Slovene state administration organisations has great potential in ensuring increased interaction between public administration and its users, but this usage is scarce. According to them an increased usage of SNS in administrative purpose can bring transparency, and the image of an organization can be improved by this. It can also result in improved service delivery and inclusive policy processes. This potential of SNS is commendable because of the large number of users; bigger reach of information can be communicated to them. It further serves as a marketing tool in the private sector organization. They also discussed that nowadays, in case of public administrator; SNS is used in unidirectionalmanner like for making announcements or sending information only.

Stickel (2017) in his study tried to explore online harassment victimization by generational age through social networking sampling on Facebook and LinkedIn. He found a strong association between frequency of SNS usage and generational age stating that digital natives (born in the digital age, i.e. after 1980) are frequent user of SNS as compared to digital immigrants (those who were born before 1980). Also according to him, this usage was multiple times a day. SNS is a key method of distal communication among youthful population. He also highlighted that there is a permanent adoption of interactive constructs globally. For him, SNS usage is ubiquitous to online communication and hence it is in reach of a wider audience.

Powers and Green (2016) conducted a study with school principals of Texas school to bring out their perspective about the usage of social media in schools. It was observed by them that they were using SNS such as Facebook, Twitter, Instagram, Pinterest, YouTube, Blogs and Wiki etc. with stakeholders for instruction and disseminating information. Principals also acknowledged the enthusiasm amongst teacher for using SNS as an instructional

tool though it was a complex process. It was observed by them that SNS is a robust platform for communicating with parents and communities. They also discussed that SNS usage has some limitation and challenges like the majority of staff lack the skills to handle it also Principals faced resistance from teachers due to technological problems.

Rudolph (2016) in his research explored how principals use SNS (twitter) for effective personal and professional development purposes. In his study, there was a high correlation between the use of Twitter for professional purposes and the key feature of effective professional development.

Zhang and Leung (2015) in their review of the SNS research in communication journals from 2006 to 2011 found that the focus of the majority of researches, nearly 25percent from a sample of 84 researches, was on the impression management and friendship performance which is a psychological domain of SNS. They also found that other research themes were network and network structures; bridging offline and online networks and privacy. It was found that roles and impact of networking sites on the degree of its persuasiveness for the management was the most neglected part and hence need to be explored in future researches so that the true potential of SNS can be explored.

Cox and McLeod (2014) conducted detailed interviews with 12 principals who were using at least two social media platforms such as blogs, microblog (e.g. Twitter), SNS (e.g. Facebook), podcasts, and online videos with different stakeholders. The objective of the research was to bring out the communication experience of the principals on social media platforms. Researchers found that there was greater reliance on social media by school principals because it allows greater interaction with stakeholders; helps them to establish strong connections with fellow educators; and hence results in personal and professional growth; and nowadays its usage is expected from them; it is no more a discretionary aspect of their work profile.

Cox (2012) in his work on social media as a communication platform used by school principals and superintendents found out that SNS has changed and improved the way of communication in school. In his work he explored that SNS allow for greater interaction between school administrators and their stakeholders; it provides stronger connections to local stakeholders, fellow teachers, and to the world; it leads to administrators personal and professional growth; its usage is more of an expectation and not an option. Social customer responsibility management can be expanded by the usage of SNS as they can help in focusing on relationships, trust, and two-way communication.

Winn (2011) reflecting on need and relevance of digital citizenship in schools felt the requirement of separate SNS platform that has been developed exclusively for schools such as Social Engine, Edmodo, & Ning and for the particular school students to save them from cyber victimization. These SNS provide a platform for teachers to connect with their students in an appropriate manner in a safe and secure ecosystem. According to the researcher if a school is using SNS then they have an opportunity to shape students into responsible and informed digital citizens.

MMS education, edWeb.net, IESD and MCH strategic data (2010) in their research with school principals and SNS in education tried to explore this unexplored dimension of SNS in schools with educators. According to school

principals (who were understudy), SNS such as ASCD, What Works, National School Leadership Networks etc. has value in education as they can be used for sharing information and resources. They can serve as professional learning platforms and can give a boost to school-wide communication with students and staff. This study further supports the exposure of more educators to technology for effective management and coordination in school.

It is quite evident that there are very limited research works related to the usage and impacts of SNS (Zhang & Leung, 2015) in school specifically for the administrative purpose. Effective administration is one of the keys for the effective working of a school. Every administrator need to be in constant communication with all the stakeholders for the effective functioning of its organisation. SNS has been projected as efficacious platforms for communications and building contacts with a wide audience. Keeping this in mind the objectives of this research work were formulated.

Objectives of the study

The objectives of this study were:

- To look at the shift in the mode of communication in school.
- To identify various categories of SNSs used by school administrators.
- To explore the purpose and role of the usage of SNSs in school administration.
- To examine the challenges and drawbacks of using SNSs.

Rationale of the study

Social networking sites have been in use amongst people nowadays. Its usage is increasing in all spheres of life. Technological advancement in SNS has led to a reduction in its complex functionalities and has grown to engulf the globe (Sharma & Godiyal, 2016). People are aware of using these platforms for both personal and professional means. This increased audience and availability of several networking sites have transformed the way of communication. All workplaces are in some or other ways using social networking sites to connect with its workforce and in these schools are also not listed behind.

Researchers also understand the deep involvement of people with social networking site, and hence keeping this in mind the study tried to explore the usage of same in the school campuses. Teachers use SNS for gathering content and enhance their knowledge bank and this idea is reflected in a good deal of research done worldwide but administrative perspective in this regard has been neglected for quite long.

The researchers acknowledge the fact that the person who holds any administrative position in the school need to connect with several people in and around the school. Their work relies on good communication practices and effective coordination. There is a need to work and look at schools from their perspective so that we can understand schools and their functioning in a holistic manner. This need and paucity of researches about the work culture of school administrator and usage of SNSs amongst them can be an interesting area to explore.

The understanding of the role of SNS

in the school administration purpose can guide us in developing an effective communication network in schools and amongst the schools. This study can further help other stakeholders in exploring ways through which they can develop or adopt SNSs in a more efficient way. Further, this study tried to figure out the major challenges involved in communicating through SNSs so proper solution of these pit holes can result in more effective functioning.

Definition of the terms and concepts

Researchers and scholars define a term or concept according to their perceptions and understanding. Here are some definitions from some sources which reflect the same meaning in which these are being used in this research.

Social Networking Sites

SNS is a widely used term in media research and it is used interchangeably both as social networking sites or social networking services.

Hansen (2016) defines social media as a platform on the internet that connects people via social networking. According to her, social networking sites are websites and web applications to connect informally with other users, as well as finding similar interests.

SNS are technological features used in daily life and for the dynamic practice of social interaction. They provide communicative opportunities which are more synchronous with and parallel to real social life because of the features of instant updates, notifications and location specifications (Zhang & Leung, 2015).

Boyd and Ellison (2007) consider social networking sites as the services which offer mainly three features to their users. The three features are 1) development of public or partly public profile; 2) insight into the list of users with whom one is sharing the contact; and 3) monitoring their own and other users' list of connections. They further define them as a tool for electronic communication through which the users create online communities for sharing ideas, information, personal messages and other content.

SNS is not a static phenomenon or platform. They are in a state of flux and constant development not only in terms of technology but also in its usage patterns. Today, SNS are not restricted to desktop or personal computer browsing websites only. The development in mobiles/ smartphones with high-speed data transmission facilities on one go has made SNS omnipresent on all kind of devices.

This technological dynamicity of SNS can be understood with most widely used SNS such as WhatsApp. Earlier a simple application on phones now can be accessed on our personal computer through a transformed version called WhatsApp Web.

One of the objectives of the study was to explore the categories of usage of SNS amongst school administrators hence the definition of SNS was kept broad.

The present study on school administrators defines SNS as an internet-based virtual platform (web or mobile-based) used by any person to communicate or connect, share content and collaborate with others.

School administrators

In this study school administrators are defined as the people who are engaged in the administrative setup pertaining to the functioning of the school. They are the staff at any institution that has the prime responsibility and duty of students-related administrative tasks (Hansen, 2016). In the Indian school system, they are Directors, Principals, Vice-Principals, Coordinators (Academic or Co-curricular activities), Head of the departments (HoDs) and Incharges etc.

Administrative perspective

Administrative perspective is defined as the view or outlook which is presented by the people who are in the capacity of an administrative position or post. It is an ideology or vision of the administrators towards any issue. These administrative issues consist of the functioning of school affairs, day-to-day business of the school, coordination between teacher, parents and management of the school etc.

This study has tried to bring out the usage of SNS for the functioning of school from the viewpoint of these school administrators.

Delimitations of the study

The purpose of this study was to look at the role of social networking sites on the school campus. This study tries to explore SNSs from the administrative lens and hence responses from the school administrators who hold any position concerning the school functioning and activities was taken into account.

This study delimited itself to the administrators who have served at this position for at least three (03) years.

Methodology

Sample

The idea of this study was to look for an administrative perspective on the use of SNSs in the functioning of the school. Around 50 school administrators were invited by survey link but 38 received responses were analysed. The sample consisted of administrators like Principals, Vice-principals, head of the departments, Academic coordinators, etc. They are serving at their respective positions from at least three years.

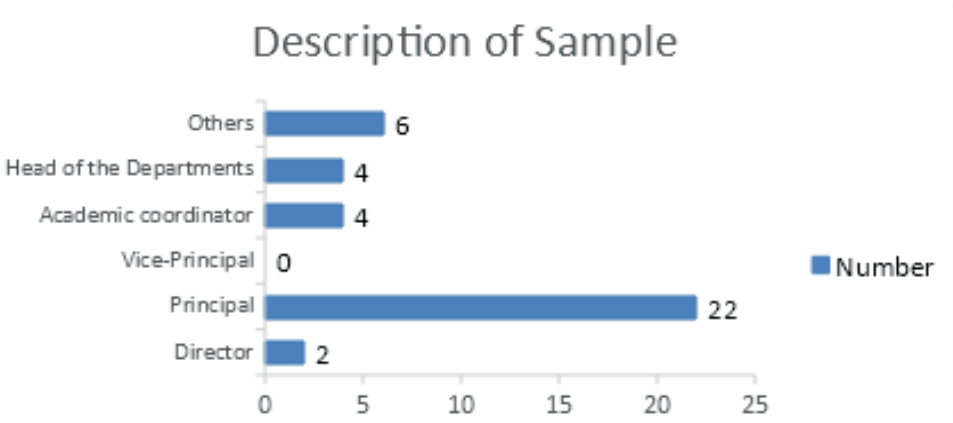

Figure- 1: Sample description

Years of experience of each sample at their current administrative position lie in the range of 3-23 years.

Sampling technique

River sampling method (Steber, 2018) was used by the researcher to gather data. In this online sampling technique, the researchers invite the respondent to take the survey via online banners, ads, promotions, and invitations placed on websites by providing links. Once the respondent clicks on the link they are routed to the survey and surveyor is clueless about who will respond (Researchspace, 2016; Calegaro et. al., 2014). It is also called social networking sampling technique (Stickel, 2017) because the data is collected with help of SNS.

In the present study, the responses were gathered through a mixed online survey made with the help of Google forms and invites were sent through LinkedIn to persons who are at administrative positions.

Description of tool

A mixed questionnaire was designed for data collection. The sample for the study was school administrators who are still working and has a busy schedule. Their busy schedule and time constraint were considered and the tool was designed accordingly. This questionnaire consisted of 16 items. First, the tool was validated by peers, and then the link of survey was circulated through LinkedIn.

Table-1: Items of the tool used for data collection

S. No.	Theme	Number of items
1	Demographic details	3
2	The trend in the present communication	2
3	Reasons for using SNS	2
4	Purpose and role of SNS in school administration	6
5	Drawback and Challenges of SNS usage	3

Out of these 16 questions, a question was kept descriptive to gather detailed feedback on drawback, issues and challenges faced while coordinating through SNSs.

Discussion and analysis

The main idea behind the study was to explore the usage of Social Networking Sites (SNSs) as a tool in the school administration and leadership. The objectives of this study were formulated so that this research work can explore any connection or relation which is possibly present between the usage of social media, and the functioning of school on a day-to-day basis.

Demographic details

It was observed that the majority of the participants under study were currently serving at an administrative position in their respective schools. They work at different levels of school in some or other administrative capacity. In this study, around 58percent are serving as the principal in the school. This number was followed by the head of the departments which constituted around 11percent of the whole sample.

Further, taking the glimpse of the range of experience of all the samples then it was from 3 years to 25 years.

Trends in the present communication

In response to the question about the shift in ways of communication over the decade, the entire group of participants agreed to the fact that there has been a shift over time. Further the ways of establishing contact with the stakeholders whether they are parents, other teachers and academicians are completely different in many aspects. According to the respondents communication through virtual media is prevalent as the teachers receive frequent messages or emails from parents rather than a visit to the school.

It was also asked whether school administrators encourage the usage of SNS in their staff members. Around 79percent of administrator agreed that they promote its usage with the staff.

Categories of SNS used by school administrators

It was observed that they are aware of the majority of online available platforms. There are multiple social media platforms and networking sites being used in schools. The SNS which are in usage are both personal gadget (Mobile phones, Ipads) and desktop supported. In the survey, it was found that WhatsApp is the most popular SNS as it was in use by 32 participants (nearly 85percent) followed by Facebook and LinkedIn by 11 users (29percent of sample size) in each case.

A faction of it also mentioned about the other sites and media in usages such as Blogs, Twitter, Google+, Instagram, Gmail, Flinnt and YouTube.
Thus it is observable from the responses that SNS is quintessential communicative tool among the administrators and other parties of school. They are using different SNS for both personal and professional exigencies.

Reasons for using SNS

When the reasons behind using the SNS at the administrative capacity was discussed with the participants, then around 60percent of the sample cited that stakeholders such as parents, teachers, and school management are the principal drive behind using SNS. Around 21percent of the sample cited administrative concerns pertaining to allotment of duties and smooth functioning of the school as the factor for active usage of SNS by the school administrators. The purpose of networking was amongst the least influential factor.

In response to the audience with whom they interact or communicate the maximum were their staffs. Around 95percent of administrators in this study agreed to the fact that they mainly communicate with the faculty or non-faculty member that constitute their staff through SNS. The second-highest choice (around 84percent) of administrators for establishing contact was their students' parents and their family members & friends. There were around 26 administrators who use SNS for establishing contact with students and school management body. Least purpose or reason for using SNS according to the participants was media coverage.

Role of SNS in school administration

Six questions were included to learn about the participants' opinions under the purview of the purpose and role of SNS. Out of these questions, five were on Likert scaling of five (1-5) from never to frequently. Based on the frequency of the discussion on SNS, amongst administrators, the five purposes on which they were asked to rate were academic concerns, students' achievement, teachers' duty, parents' events and school activities.

Table-2: The response of the sample on the purpose related to SNS usage

Theme	Never (%)	Rarely (%)	Some-times (%)	Very often (%)	Frequently (%)
Academic Concerns	5.3	5.3	10.5	26.3	52.6
Students Achievement	-	-	10.3	26.3	63.2
Teachers duty	10.5	-	5.3	26.3	57.9
Parents Events	5.3	5.3	5.3	21.1	63.2
School Activities	-	-	-	10.5	89.5

It can be seen that most of the administrators use SNS as a platform for frequent discussion about school activities which is followed by the discussion on the other events like parent-teacher meet and students' achievement. Academic concerns are the least discussed issue or matter of concern for the administrators on the SNS.

In response to the question about the role of SNS in the school administration process, it was found that the motivation and zest of being connected to other on the personal and professional front is the principal factor for being on the social networking sites. Apart from that the immediate feedback process and effective redressal mechanism are other decisive factors for using SNS in the capacity of administrators. Networking and being social was of least concern in terms of SNS usage.

Drawback and challenges of SNS usage in school

Technology is often considered as tricky by many and resistance towards its usage is conspicuous through their actions (Powers & Green, 2016). So, the need for understanding the issues and challenges related to the usage of SNS in the administration was taken into consideration by the researchers.

The data related to the drawbacks and challenges of using SNS for school administration purpose was collected through open-ended feedback question. Based on the analysis of detailed responses from the sample the following major themes emerged which are represented in table 3.

Table-3: The response of the sample to the issues faced in using SNS

S. No.	Issues	Responses (%)
1	Time	10.5
2	Accessibility with all	15.8
3	Privacy at stake	52.6
4	Teachers resistance	-
5	Technological Challenges	21.1

It is observable from the responses collected on the above themes that privacy issues were central to the use of SNS services. Many administrators consider privacy as a major challenge while using SNS (Ellis & Abreu-Ellis, 2015) for administrative purpose as their private space seems to be breached while being available to everyone. It is observed that using SNS on a professional platform leads to personal space exploitation of administrators as some of the parents demand quick responses and resolution of aroused issues. Next to it are the technological challenges that also considered being a barrier to effective SNS usage. One of the respondents believed that most of the senior teachers are digital immigrants and hence a resistance from them is observed as compared to the digital native teachers in the school (Balalle, 2018). Lack of awareness about technology was also highlighted by some of the administrators as a problem among the digital immigrant population which further gives a boost to their resilient behaviour towards SNSs usage in the school campus. Some of the administrators believed that teachers sometimes use their phones and SNS during class timing which impacts the teaching-learning process.

Contrary to the views cited above, some of the administrators in response to the open-ended question said that despite all these challenges SNS has accelerated the communication and it is cost-effective as compared to other traditional methods of establishing contact with people.

Conclusions

The study aimed at capturing the viewpoint of the people who are at an administrative position in the functioning of a school. These people incapacity of being an administrator have dynamic roles to play. Their job profile is facing challenges every day and to these, innovation at the workplace is the only way out. It was observed in the study that usage of SNS is quite popular amongst school staff and WhatsApp is at the top of this SNS list for making contact with all the stakeholders. Participants under the study appreciated the potential of SNS usage in school for many reasons. Apart from using them as massive communication platform; they are using SNS majorly for discussing school-related activities and student's achievements. Academic issues and teachers' duties allotment was amongst the least discussed issues. This shows that SNS is being used for active collaboration whether it's related to school activity organization or students' performances. It was also found that SNS has improved the grievances and redress mechanism as compared to the traditional times. It was found in the study that apart from the benefits of SNS there are some challenges like the hijacking of private space & privacy. Technological issues are major barriers in making it an effective platform for quality communication and public dealing. It is very prominent from the fact that the key to quality administration lies in the constant and timely exchange of words with all the stakeholders. SNS is helping administrators in maintaining that regularity and making it beneficent

for the functioning of the school, but SNS as a tool for the good governance of the school is far from the reality due to some of its challenges. Active cooperation and effective mechanism from these stakeholders can make it a success.

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Research Article

Paradigm Shift in Higher Education through ICT: Conventional to MOOCs -A Case Study of Dibrugarh University

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Abstract

The purpose of this paper is to examine the role of ICT services in the higher education sector both in the ODL system as well as in conventional system of education. Integration of ICT services in ODL makes it wide spread, accessible to remote, accessible to all. These are found to be useful for the distance learners of Dibrugarh University (DU). Moreover, the benefits of ICT integrated education can also be achieved by the conventional students, if convergence between the two systems is established by allowing the students to earn few credits under MOOCs in CBCS. DU has already made progress in this front and due to an awareness drive a significant number of students got enrolled to various courses under SWAYAM. The researcher studied few of these initiatives taken by DU to cope up with the global trend of ICT integrated HE. Researchers, academicians, administrators of the state and other regions of the country will be benefited from the findings.

Key Words: ICT, ODL, ODeL, Conventional on-campus System, MOOCs, CBCS.

Introduction

The global education system especially the Higher Education (HE) system has changed drastically due to the rapid growth of Information and Communication Technology (ICT). Both conventional face-to-face and distance education have witnessed these shifts from primitive to ICT enabled paradigms. ICT makes the teaching-learning process more student-centred (Amin, 2013; Saleem et.al. 2013). ICT refers to use of various technologies and scientific inventions to make the communication process faster, wide spread, accessible to remote, accessible to all. It embraces all the technologies used in the process of sending to receiving, coding to decoding the various kinds of messages. The process of telecast and broadcast audio, video or audio-visual media; communicating e-contents like texts, pictures, audio or video clips, controlling and monitoring all these through network-based management system, - all are clubbed under the blanket term of ICT. In the recent years, ICT increases the communication abilities among the mass people by using technologies like instant messaging (WhatsApp or messenger), voice chat, tele-conferencing and video-conferencing, and so on. Social networking websites like Facebook, Twitter, Instagram make

it possible to the users to remain in contact and communicate regularly worldwide. The process of interaction, the style of work, the dynamics of various industries all are influenced and changed by ICT (UNESCO, 2002a; Bhattacharya and Sharma, 2007). Thus, ICT has transformed the world into a "global village," where people can communicate across the countries just like next door neighbours.

Paradigm Shift of HE

There are mainly two mega paradigm shifts in the HE system; from traditional university (conventional on-campus education) to ODL and from ODL to E-Education (Takwale, 2003). Conventional on-campus education has been experiencing a plethora of changes over the last few centuries. It travels a lot; from annual system to semester system, from marking system to grading or credit system. Presently, with the advancements in ICT, the Choice Based Credit System (CBCS) has been growing rapidly. CBCS is accredited globally and accepted as a purely learner centric and pedagogically efficient system (CBCS-Guidelines, 2015-16). The basic idea of CBCS is to give importance on the needs and requirements of the students; it provides opportunity to the learners to choose inter-disciplinary, intra-disciplinary and skill-based courses according to their aims, interests and abilities. This demands sophisticated infrastructures, and competent, skilful, efficient and accountable teachers. It also allows mobility to the learners to learn in different institutions of the country as well as abroad with the credit transfer facility.

Distance education emerged during the middle of the nineteenth century as an alternative way of learning as there was a demand for education by a large section of population. With the development and expansion of ICT, distance education has been passing through many phases like Correspondence Education, Distance Education, Open Education, Open and Distance Education (ODL), Online Education, e-learning, Blended Learning, Hybrid Learning, and finally the Massive Online Open Courses (MOOCs). Even dominance of e-contents and e- strategies in to the Distance Learning system makes a facelift to the existing ODL system by renaming it as ODeL, Open and Distance e-Learning (Mahanta and Borkotokey, 2018). An ODL system needs dynamic and innovative developments in Information and Communication Technologies for the betterment of the system, to make it more cost-effective and accessible (Mahanta, 2014a).

E-Learning or Electronic learning is a general term used to refer to computer-enhanced learning (Mondal and Mete, 2012). E-Education is used to denote both the shifts from the traditional and open and distance education to e-content based educational system under convergence. It is assumed that this transition will be complete when broadband Internet connectivity and ICT appliances are available to Anyone, Anywhere, Anytime (Takwale, 2003).

MOOCs are a very recent and extensively researched program in E-education in particular and in ODL system in general. It is a package of learning (courses) accessible through the internet (online) by a large group of (massive) students

simultaneously without any restrictions regarding age, qualification, institutional jurisdiction (open). In 2008, a course named "Connectivism and Connectivity Knowledge" was developed by Stephen Downes of Athabasca University of Canada and George Siemens of the National Research Council of Canada. The term MOOC was used to refer this course for the first time and it was coined by Dave Cormier of the University of Prince Edward Island, Canada (Marques, 2013). Gradually MOOCs gained popularity among the learners; millions of learners enrolled to various courses offered by different MOOC-platform or company viz. Udacity, EdX, Coursera, Course Builder, Blackboard, MOODLE and so on.

Keeping the world scenario in mind, the Government of India has launched an Indian

MOOC Platform named SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) to develop and make available MOOCs to the learners throughout the country. This is an indigenous initiative taken by MHRD and All India Council for Technical Education (AICTE). It is also supported by M/s. Microsoft India (Pvt.) Ltd. to host various MOOCs so that the three cardinal principles of Education Policy viz., access, equity, and quality can be achieved (Swayam-Booklet, 2018.) This provides one integrated platform and portal for online courses covering all aspects of HE and also skill sector courses (Sahoo et. al., 2018). AICTE has issued a notification regarding credits transfer for the courses done under SWAYAM. An Institution can allow their students to earn credits up to 20percent of the total courses being offered in a programme. Thus, a student can earn 80percent credit from his parent University and 20percent from any university offering courses under SWAYAM. The vision behind this initiative is to host more than 10000 online courses and to enroll about 30 million learners.

Dibrugarh University

Dibrugarh University (DU), is a dual mode University. Being the easternmost university of the country, it has emerged as a pioneering Institution of HE providing both undergraduate and postgraduate programs in various disciplines that include Science and Technology, Engineering, Humanities and Social Sciences to name a few. It was established in 1965. It is a teaching-cum-affiliating University with limited residential facilities. The territorial jurisdiction of DU covers eight districts of Upper Assam viz, Dibrugarh, Tinsukia, Sivasagar, Charaideu, Jorhat, Golaghat, Dhemaji and Lakhimpur. Assam is a State in the North Eastern part of India. Upper Assam is a region in the State having upstream of the river Brahmaputra which flows through it. It is a dual mode university. It has 175 affiliated and permitted colleges and institutes, which include General Degree Colleges and Professional Institutions like Medical, Law, Homeopathic, Engineering, B.Ed., Music, Paramedical, Management, Media, Science and Technology etc. On the campus, the university maintains 17 full-fledged teaching departments apart from 23 Centres of Studies. With this infrastructure, the University has approximately 1 Lakh (99,710) students

in regular courses during the session, 2018-19.

Directorate of Open and Distance Learning (DODL), DU was established in 2001 to bring the HE to the doorsteps of the learners. At present it is offering 19 degree and diploma programmes, both in the undergraduate and post graduate levels in various disciplines. It has 84 study centres within DU's territorial jurisdiction. More than 30,000 learners have so far been enrolled in these programmes.

In this paper, the role of ICT in the whole educational transaction, both in the ODL system and conventional face-to-face system with special reference to Dibrugarh University was studied.

Rationale of the Study

Education is the key component for socio-economic development of a country like India. The Government of India has set the target of increasing the Gross Enrolment Ratio (GER) in the HE from 24.5 (2015-16) to 30 by 2020 (National Convention on Digital Initiatives for HE, 2017). The conventional system cannot achieve this target alone due to its limited enrolment capacity, conventional courses/programmes and limited infrastructures/resources. Distance Education as an alternative system of education concentrates on i) higher rate of enrolment, ii) conventional and non-conventional courses, iii) optimum use of the limited infrastructures/resources, iv) relaxation in terms of age, qualification, time and place of study etc., to meet the changing needs of our society (Mahanta et.al., 2009). It focusses on optimum use of ICT to reach its wide range of heterogenous learners. Moreover, it is also capable of improving the relevance and quality of education (Aristovnik, 2012; Rahman, 2014). Thus, it is a system of education which concentrates on the pedagogy, technology and instructional systems that aim to offer education to the learners who are not physically "on campus. An effective and successful ODL system needs dynamic and innovative developments in ICT services for the betterment of the system, to make it more cost-effective and accessible, in other words to bridge the gap between the learners and the campus (institution).

Also due to globalization and liberalization in education, Indian HE system faces many challenges. Agreements like GATS (General Agreement on Trade in Services) and WTO (World Trade Organization) permit foreign universities to market their education in this country (UNESCO, 2002b; Sharma, 2002). Expansion of ICT services in the field of education is eradicating concept of jurisdiction of a university. This leads to creation of ICT enabled services in the educational sector. This permits many leading universities from India and abroad, private and deemed universities and other educational institutions to offer their programs to all the students all over India. This creates competition among the colleges and universities. As a result, weak and less efficient institutions face threat for the existence and survival.

Besides, the present age is the age of Information and is also known as the Knowledge Age. One of the primary

goals of the Government of India is to make India as a Knowledge Super Power within the next one or two decades. For this, India needs to bring her citizens to the highest level of their competencies and capabilities and this can be achieved only through an ICT integrated system of education for all (Takwale, 2003).

So, it is the need of the hour to reconstruct and embrace all innovative tools provided by technology in our education system. Not only the distance learners, the conventional learners also need ICT integrated supports to cope -up with the changing society, to compete with the changing paradigm. According to All Indian Survey on Higher Education, 2015-16, in India, there are 799 Universities, 39071 colleges and 11923 Stand Alone Institutions, out of which 60percent of the Colleges are located in rural areas. In this situation, the issues of access, equity, relevance, quality, management, financing etc. can be addressed only with the expansion and application of ICT integrated supports in the HE system. Moreover, our present education system is yet to make significant contributions in developing knowledge, confidence, values and skills among the young generations (CBCS-Guidelines, 2015-16). One of the major reasons behind this could be improper synchronization among the components of teaching-learning process in the conventional education system which produces unskilled, un-employed youth as out-put. So, it is necessary to find ways to make education of good quality, accessible and affordable to all, using the latest technology available (Hattangdi and Ghosh, 2008). Innovative integration of ICT may resolve these issues tactfully. Moreover, ICT can be used as a tool to overcome the issues of cost, a smaller number of teachers, and poor quality of education as well as to overcome time and distance barriers (Mc. Gorry, 2002). In this context, convergence of CBCS with MOOCs is a right platform to effectively address these issues. The convergence of conventional and on-line education may be considered as the third paradigm shift in HE. Thus, ICT enabled teaching learning pedagogies deserve proper operational strategies for which a critical and exploratory study of the same is a must.

Objectives

The main objectives of the present study were to:

1. To identify the various ICT services provided by DODLDU to its learners.
2. To study the opinion of the learners on ICT services in connection to their learning activities.
3. To study the initiatives taken by DU for convergence of conventional education and MOOCs.
4. To find the reason for joining MOOCs by the students of DU.
5. To identify the course categories of MOOCs where the students of DU enrolled.

Methodology

Research methods

The idea of this study was to look for an administrative perspective on the use of SNSs in the functioning of the school. Around 50 school administrators were invited by survey link but 38 received responses were analysed. The sample consisted of administrators like

Principals, Vice-principals, head of the departments, Academic coordinators, etc. They are serving at their respective positions from at least three years

Population and Sample

In this study, there were three categories of population. Accordingly, three different samples were selected for the study.

1. There is a total of twenty staff members in DODLDU including officers, faculties and employees and data were collected from all from all the units of the population
2. The total number of learners enrolled in DODLDU in the academic session 2018-19 was approximately 3000. 300 units (approximately 10percent of the population) out of them were selected by purposive sampling technique as the sample.
3. During study, 1791 numbers of students of DU enrolled to MOOCs and 180 units (10percent approx.) were selected randomly.

Tools

1. An interview schedule was prepared for the faculties, officers and employees of DODL to collect various types of information.
2. Two structured questionnaires were prepared; one was for the distance learners of DU and the other was for the conventional learners of DU enrolled to MOOCs.

Data Collection and Analysis

Both primary and secondary sources of data were consulted to gather information. First, institutional documents and archival records were reviewed. Then data were collected by conducting semi-structured interviews with the staff members of DODLDU and administering the questionnaires on the distance and conventional learners of DU. Some data were also collected by direct and participant observation and analysed qualitatively. Moreover, quantitative analysis was made with the help of percentage and graphical presentation where ever necessary.

Results and Discussions

ICT integrated services of DODLDU

A detailed discussion regarding the ICT services provided by DODLDU as its supports is presented below:

1. Web-site: http://dodl.dibru.ac.in: All of its information like- a brief description of the academic and administrative staff, the various support services provided by the Directorate, list of programmes offered, admission procedure, examination and evaluation process, examination centre, assignment questions, important dates, examination schedule and results etc. are being uploaded.
2. 20 computers with internet connectivity for development and maintenance of databases of the Directorate. Also, a Computer Laboratory for the learners of PGDCA and BCA programmes.
3. Multimedia CD/DVDs for the learners of MA/BA programmes.
4. A laboratory for developing e-content.

5. Radio counselling for the learners of MA/BA programmes. These programmes are not only subject specific but also informative.
6. Personal Mobile-phones of the Officials and Programme coordinators; especially frequent and flaw-less interaction is conducted between the programme coordinators and their respective learners through what's app messaging.
7. Bulk SMS
8. OHP, LCD, DVD player, Television with dish connection, Still and Video Camera: for the learners, especially for the learners of PGDJMC programme.
9. Video conferencing facility.
10. A community Radio Station named Gyanmalinee
11. A bill-board in the entrance of the head office.

The opinion of the learners on ICT services in connection to their learning activities

The learners were asked to provide their responses regarding influence of various ICT services on their learning. The results are shown by the following bar diagram (Fig-1). Fig-1 reveals that according to most (93.3percent, 85.3percent and 75.3percent) of the learners, personal mobile numbers, web-site and bulk SMS were the most useful ICT services for them. They were able to get all the necessary information regarding admission process, academic counselling, evaluation process (internal as well as external assessment) etc. through these ICT services. All the learners found the counselling (both academic and non-academic) conducted by the faculties through their personal mobile numbers (especially through the WhatsApp groups with the learners) were very motivating and effective. Only a few (10percent) counselling sessions were conducted using ICT; however, all the learners found those classes more effective compared to traditional classes. Moreover, a significant number of learners also expressed their dissatisfaction about not receiving the bulk SMS (35percent), not picking up the land line phone connection by the employees (69.3percent), boring content of CD/DVD and Radio programmes (83.3percent), not adequate ICT support for PGDCA programme (70.7percent). Results related to e-content laboratory could not be found as it was established in the directorate after completion of data collection.

Initiatives taken by DU for Convergence

Dibrugarh University has already implemented the CBCS in its post graduate programs in 2012 and also initiated to introduce the CBCS in the undergraduate programmes since 2016. However, due to different issues viz., inadequate infrastructure, insufficient faculty, lack of proper coordination among different academic departments, it is yet to be implemented. So, it has been trying to overcome these issues by convergence of MOOCs with the conventional education; accordingly, from the session, 2017-18, it has initiated some steps for awareness generation

and enrolment of its students in the SWAYAM platform as directed by MHRD and UGC. A detailed discussion is presented in the following headings:

1. Steps taken within the University Campus.
2. Steps taken for the affiliated Colleges.
3. Steps taken through EMRC, DU.

1. Steps taken within the University Campus

1. The College Development Council (CDC) of DU has organized four one-day orientation programmes on CBCS and SWAYAM for all the Principals of the Colleges affiliated to DU. In these workshops, focus was given on how the choice of courses under SWAYAM can be helpful as Generic Electives in the under graduate programmes of CBCS. Around 250 principals and representatives from various affiliated colleges of DU participated in these orientation programmes.
2. DU also has constituted a SWAYAM committee to acclimatize and enroll its faculties and students in suitable courses in the SWAYAM platform. This committee has made several awareness drives to each of the in-house Departments and Centre of Studies of DU. As a result, a remarkable number of students (1208) enrolled to SWAYAM courses.

2. Steps taken for the affiliated Colleges

The CDC of DU has suggested the affiliated colleges to organize orientation and workshops on CBCS and SWAYAM so that, the college teachers and students can appreciate the significance of SWAYAM courses in CBCS. Till July 2019, a total of 12 colleges have organized such workshops for their faculty members and students. Moreover, members of the committee guided the college teachers and students through e-mail and telephone in this context. A total number of 583 students enrolled to various courses under SWAYAM.

3. Steps taken through EMRC, DU

The Educational and Multimedia Research Centre (EMRC) of Dibrugarh University has taken some steps as part of its digital initiatives:

1. It developed 24 e-Contents for the undergraduate programs of Physical Education under the Consortium of Educational Communication (CEC), New Delhi.
2. 13 MOOCs proposals were prepared by some of the faculty members of DU and submitted to CEC, New Delhi for approval. Upon approval, these courses will be offered under the SWAYAM platform globally.

The questionnaire for the learners enrolled into various MOOCs was analysed both qualitatively and quantitatively. The following results were revealed:

1. Learners Profile:

- There is no gender disparity among the learners enrolled to MOOCs as 50.6percent of the learners are male and 49.4percent are female.

- Most (59.4percent) of the learners were from semi urban locality, 28.6percent are from rural and the remaining (12percent) are from urban locality.
- Among the MOOCs learners most (82.8percent) of the learners are from PG level.

2. The following figure (Fig-2) shows the percentage of learners regarding their reason for joining MOOCs.

Majority (44.4percent) of the learners opined that they joined MOOCs to get benefit in their current studies and they joined courses related to their primary discipline. Another significant number (30percent) of the learners joined MOOCs to update themselves with the global scenario, while a few (17.2percent) opined that they joined MOOCs to get benefit in their future professional life. 2.7percent joined MOOCs due to curiosity, and the other 5.7percent joined due to teacher and peer pressure

3. In SWAYAM platform, during study there were four course categories viz. Post - Graduation, Under-Graduation, Diploma and Certificate courses where the learners can enrol on their own. The pie diagram (Fig-3) shows the learners' preferences for course category

Most (57percent) of the learners were enrolled under post-graduate category while a few (23percent) were enrolled in undergraduate courses. It is also found that certificate and diploma courses are less popular among the students. It resonates the finding that 44.4percent of the learners joined MOOCs to get help in their studies. Moreover, it can be inferred that students prefer to join MOOCs according to their levels of studies. This is substantiated by our finding which states that 82.8percent of the learners are from PG level.

Conclusions and Recommendations

New developments and trends in ICT have transformed the world into a global village. Accordingly, with the integration of ICT services, two great paradigm shifts take place in the HE-conventional to distance education and distance education to on-line or E-education, finally to MOOCs. To cope up with this, MHRD has launched indigenous MOOCs platform SWAYAM.

DODLDU adopted several ICT services to provide support to its learners. Dynamic and innovative developments in ICT are a must for the betterment of the system, to make it more cost-effective and accessible (Mahanta, 2014b). Although, personal mobile phones (messaging through WhatsApp), web-site and bulk SMS were found to be very effective on the learning activities of the learners, other services were not properly used or not supplied properly to the learners. It follows that DODLDU needs to improve its ICT services to reach the mass.

Moreover, a successful implementation of CBCS in DU is possible if CBCS is made convergent with the SWAYAM. Although a whooping number, a total of 1791 (1208 from PG + 583 from UG classes) of students enrolled in the various SWAYAM courses, no teachers had enrolled to this platform during that session. It is necessary for the

teachers to take a course under MOOCs to understand the system and to guide the learners properly. In addition to that, the teachers can enhance their career by joining the Refresher Courses available on SWAYAM Platform. Moreover, teachers and administrators need to support and monitor the students as dropout rate of MOOCs is very high. This study is expected to help the other HE institutions in general and the DU in particular in many ways. Even if, it is a limited study, on the basis of the results of this study the academic and administrative aspects of DODL can be reviewed and enhanced. Moreover, it would help administrator of DU for preparing future planning and their executions.

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Appendices

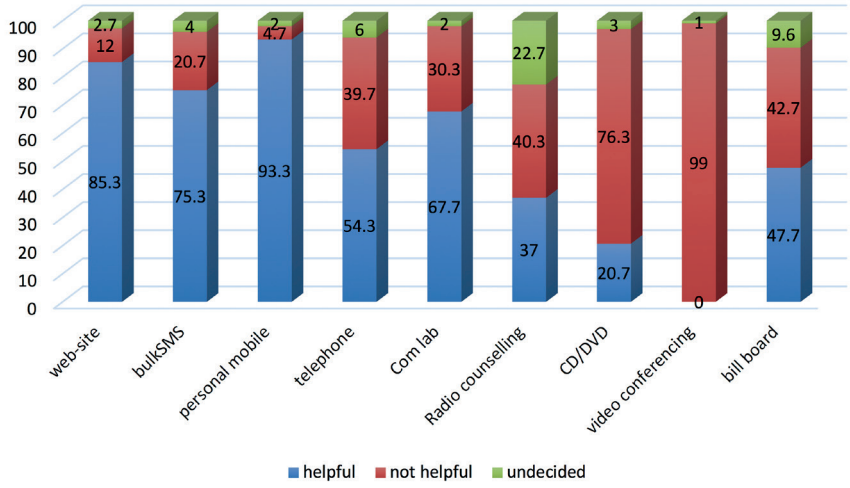

Figure – 1: Opinion of the learners on ICT services

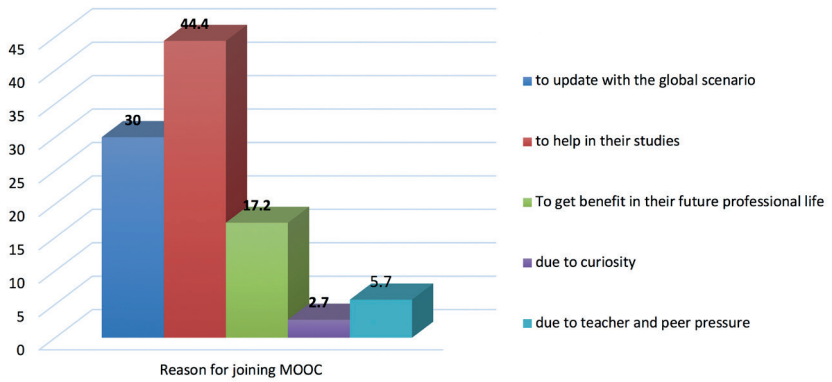

Figure – 2: Reason for Joining MOOCs

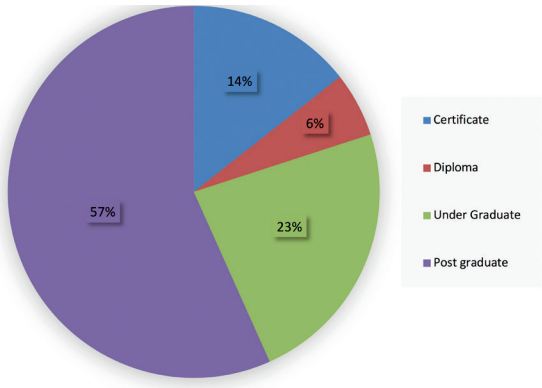

Figure – 2: Learners Preferences for Course Category

Research Article

Cyber Stalking Among Higher Secondary School Students in Kerala

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Abstract

Social Medias like Facebook, YouTube and Twitter have turned our life online and offline. Younger generations, particularly students are the predominant users of social networks. People can easily access the internet and social media applications from many different doorways. Social networking has become a salient feature of social life. Social networking sites are one of the most important means of communication among students. Most of them are not aware of the fact that how posting something improper can harm their security. The present study investigates the victimising cyber stalking of higher secondary school students and its relation with gender, frequency of login into cyber media and period of using social media. Data collected from 160 higher secondary school students using social media have been analysed with the help of the cyber stalking scale. Independent sample t-test, ANOVA and Chi-square tests were used to test the significance of difference. Study reveals that cyber stalking among higher secondary school students is high and there is no significant difference in the cyber stalking based on the frequency of login cyber media and duration of using social media, but difference is seen based on gender.

Key Words: cyber stalking, social media, Social Networks

Introduction

It is almost impossible to see a single individual without a mobile phone in any part of the world now. It became a life partner of every individual. The smart phone has turned our life knowledgeable and information friendly. The various applications in the smartphone lead us, guide us and motivate us. Social Medias like Face book, YouTube and Twitter have turned our life online and offline. This online technology including internet helped people far and near to connect together. It enables us to build relationships among people and has paved way for speedy communication with each other even in different continents. It helps us to listen to our lovable music, read our favourite books, look at the photos of our dear and near and much more. During the time spent on sites we go into connections and get the chance to speak with a number of individuals especially the youngsters. Younger generations are the predominant users of social networks.

East (2016) is of the opinion that social networks have negative impact especially on the teenagers, as they often build the impression that love

and friendship can easily be built and destroyed. Many educational institutions restrict students to access social networks within the campus in order to help them concentrate on studies. These restrictions actually hinder students from accessing resource materials for their academic purpose.

Social networking has become a salient feature of student's social life. They can access the internet and social media applications from many different entry points. It is true that social networking sites enrich the platforms of learning of any individual. In the early development of childhood children learn by observing others and through social interaction. Some socio-cultural theories suggest that children learn in the context of their social and cultural environment (Green Field, 2009). Social media has, in fact, an influence on the learning environment of children. Social media also performs an important developmental task for adolescents by opening avenues for social learning and identity formation. Social media has redefined the ways through which social ties are created among individuals and between individuals and the organisations that serve them.

Stalking has been differently defined by researchers and legal systems around the world. Both of them accept the elements of stalking as repetitive conduct by the perpetrator that induces a concern to harm to the victim. The behaviour of the perpetrator can involve different tactics and patterns of use. These include, surveillance (follow, watch and wait, etc.), life invasion (calling up, messaging, entering premises, bothering acquaintance of victim, etc.), intimidation (implicit or explicit threats to victim and their close ones and damage to property, etc.), and attack (running reputation, road rage and sexual assault etc.). The pattern of stalking depends on the duration, intensity and its frequency. The awareness of surveillance generates anxiety in the victim.

Cyber stalking, sometimes referred to as Internet stalking, e-stalking or online stalking is a criminal practice where an individual uses the Internet to systematically harass or threaten someone. It can be perpetrated through email, social media, chat rooms, instant messaging clients and any other online medium. Cyber stalking can also occur in conjunction with the more traditional form of stalking, where the offender harasses the victim offline. There is no unified legal approach to cyber stalking, but many governments have moved toward making these practices punishable by law.

The internet usage provides new avenues for self-disclosure. It helps to develop relationships based on common interests and values. Internet allows anonymity which can be used for bullying, sexual exploitation, and spreading unverified information. Thus stalking behaviour is now moved to virtual space. Cyber stalking is different from offline stalking because of anonymity maintained by the stalker until cyber experts and legal agencies get involved. Physical proximity between the victim and stalker is not necessary in cyber stalking. The victim may not be aware of the surveillance.

Based on the severity cyber stalking has been classified into hyper intimacy, threat, sabotage, and invasion. Hyper-intimacy type involves affection, expression, ingratiation and hyper-sexual communications. Threats include implicit or explicit harm intended on person's reputation by real or falsified information, and also threats of physical harm to the person, their close ones, or their property. Sabotage involves attack on the person's character by spreading rumours or gossips to their colleagues, friends, or family. Invasion involves access to victims' device via spyware or other means, which enables stalkers' complete access to the victims' digital activities.The stress and anxiety perceived by victims of cyber stalking is similar to that experienced by those from physical stalking. These include social withdrawal, disturbances in sleep pattern, and changes in social habits. Apart from that, cyber stalker perceives them to be emotionally closer to their victims than that would be expected from the physical stalker.

Social networking sites are one of the most important means of communication among students. Most of them are not aware of the fact that how posting something improper can harm their security. The boom in mobile technology paved the way to easy access to smart phones. There is incessant growth of technologies which attracts students to Instagram, Pinterest and 9gag, etc. which caught the fancy of adolescents. Adolescents are keen to try out new social networking methods. These apps have given them the right tools to enter into new social networks with both existing friends and new virtual friends

Theoretically stalking is conceptualised from symbolic interactionism. Major proponents of this theory are Blumer (1969), Charon (2001) and Hewitt and Shulman (2011). Blumer states that Symbolic Interactionism is built upon the premises that:

1. humans act towards objects, including people, situations and whatever they have to deal within their world, on the basis of the meanings such objects have for them;
2. these meanings arise out of social interactions and
3. The meanings are conveyed through the interactive process adopted in dealing with the objects encountered by the actors.

According to Charon (2001), how people interpret a situation affects and guides their action in that situation and although there may actually be a reality out there, their definition is far more important for what they do.

Thus from a symbolic interactionist perspective, the way in which students interpret and explain social interaction patterns have been conceptualised as stalking and how they encounter such situations.

As per the new Sociology of childhood, children and adolescents are not passive recipients but active agents in their socialisation process. They are moulded by structure and at the same time act as agents acting in and upon structure. They are not simply internalising the world but strive to make sense of their culture and to participate in it.

According to Corsaro (2005) children create and participate in their own unique peer cultures by creatively taking or appropriating information from the adult world to address their own peer concerns. Therefore, it is necessary to investigate how they make sense of social situations, phenomena as well as how these understandings or perspectives are related to societal norms and discourses in order to understand their actions and interaction pattern.

Social networking through online media is nowadays very common and deep-seated among the youth worldwide, and majority of the users are students. Outside straightforward communication, many students occupy in highly creative activities on social networking sites. Through words, simile, music, photos and videos students are expressing themselves by creating, and sharing content online. In addition to these some uses the Internet to systematically harass or threaten someone. The present study is an attempt to understand the level of use of online social networking services and cyber stalking among the higher secondary students in Kerala.

Objectives of the study

1. To know the extent of cyber stalking among higher secondary school students in Kerala.
2. To find out the significance of difference in cyber stalking based on duration of usage, frequency of login and gender of the respondents.

Hypotheses formulated

1. There is no significant difference in the victimising of cyber stalking of higher secondary school students based on gender.
2. There is no significant difference in the victimising of cyber stalking of higher secondary school students based on frequency of login per day.
3. There is no significant difference in the victimising of cyber stalking of higher secondary school students based on duration of usage.

Method of study

As we penetrate our inquiry towards the frequency of victimising cyber stalking, the subject under study is a survey type of research, because it is concerned with the collection of data for describing and interpreting existing conditions of victimising cyber stalking. Cyber stalking is most convincingly related with the adolescent population. Hence the population selected – the higher secondary students of Kerala, is the most suitable population. A total of 160 higher secondary school students from two schools in Thiruvananthapuram District, Kerala have been selected as the sample. For which two batches consisting of 40 students were randomly selected from each school. To measure the level of cyber stalking among higher secondary school students, likert-type scale consisting of 10 statements were used as a tool for data collection. The tool was experimented to a small group of 30 students from another school as a trial and corrective measures of modifying statements was done. Inferential statistics was used

for summarizing the properties of a population from the known properties of the sample of the population.

Analysis

Preliminary analysis was carried out to identify cyber stalking and to determine the association of cyber stalking with gender and frequency of use of cyber media. Data were collected from the 160 higher secondary school students. The socio-demographic profile of the students is given in Table 1.

Table - 1 Profile of the respondents

Variable	Group	N	%
Gender	Male	57	35.6
	Female	103	64.4
Class	+1	80	50.0
	+2	80	50.0
Locality of the school	Rural	80	50.0
	Urban	80	50.0
Income of the family (yearly)	Below Rs-20000	54	33.8
	Rs 20001-30000	47	29.4
	Rs 30001-40000	41	25.6
	Above Rs-40000	18	11.3
family Type	Nuclear	129	80.6
	Joint	31	19.4
Total		**160**	**100.0**

It is evident from the above table that 35.6 percent of the students belong to male and the majority (64percent) of the respondents belong to the female categories; 50percent each of the respondents fall in plus one and plus two and rural and urban categories; 33.8percent students belong to the family income category below Rs. 20000, 29.4percent students between Rs. 20001-30000, 25.6percent student come under Rs. 30001-40000 income group and 11.3percent fall in above Rs. – 40000 annual income of the family. Based on the family type, 80.6percent come from nuclear families and 19.4percent from joint families.

Frequency of login Cyber media

Frequency of login cyber media refers to the number of times login was done per day or per week. The respondents were asked to mark one of the choices depending on their frequency of login cyber media as -many times in a day, once in a day, few times in a week, once in a week and rarely. The number of respondents that marked each frequency and their percentage based on gender is presented in Table 2.

Table – 2: Frequency of login Cyber media

Frequency	Male	Female	Total
Many times in a day	26 (45.6%)	24 (23.3%)	50 (31.2%)
Once in a day	10 (17.5%)	22 (21.4%)	32 (20.0%)
Few times in a week	9 (15.8%)	13 (12.6%)	22 (13.8%)
Once in a week	6 (10.5%)	9 (8.7%)	15 (9.4%)
Rarely	6 (10.5%)	35 (34.0%)	41 (25.6%)
Total	57 (100.0%)	103 (100.0%)	160 (100.0%)
Pearson Chi-Square = 14.38; df = 4; p = 0.006			

The above table presents distribution of respondents in the selected schools according to the frequency of login cyber media. The highest proportion of higher secondary school students (31.2percent) usually login cyber media many times in a day. Frequency of login many times in a day is more in males (45.6 percent) than in females (23.3 percent). Twenty percent of students login once in a day. Here the percentage of female is more than male. One fourth of the students (25percent) rarely login cyber media. From the table it is clear that the number of female students (34percent) is more than the number of male students (10.5percent). Students log in cyber media few times in a week or once a week are 13.85percent and 9.4percent, respectively.

The data highlights that majority of the higher secondary school students log in cyber media many times a day or at least once in a day. The number of male students logging in many times in a day is more than female students. A marginal proportion comes under once in a week to login cyber media. Pearson Chi-Square test score is 14.38. It shows that there exists significant difference in the frequency of login based on the gender, since the p-value (0.006) is less than 0.05. It is clear from the table that the frequency of login cyber media is high among the male students than the female students.

Duration of Cyber media usage

Duration of cyber media usage refers to how long the respondents are using the cyber media. The respondents were asked to mark one of the choices depending on the duration of login cyber media as - below one year, 1-2 years, 2-3 years, 3-4 years and above 4 years. The number of respondents that marked each frequency and their percentage based on gender is presented in Table 3.

Table - 3: Period of using cyber media

Period	Male	Female	Total
Below one year	3 (5.3%)	19 (18.4%)	22 (13.8%)
1 – 2 year	6 (10.5%)	51 (49.5%)	57 (35.6%)
2 – 3 years	20 (35.1%)	26 (25.2%)	46 (28.8%)

3 – 4 years	12 (21.1%)	5 (4.9%)	17 (10.6%)
Above 4 years	16 (28.1%)	2 (1.9%)	18 (11.2%)
Total	57 (100.0%)	103 (100.0%)	160 (100.0%)
Pearson Chi-Square = 52.86; df = 4; p = 0.000			

When the data was analysed on the basis of duration of usage of Cyber media, it is found that 35.6 per cent of higher secondary school students have been using the social media for 1-2 years. Among this group the percentage of female students using cyber media (49.5percent) is much greater than the percentage of male students (10.5percent) using it. 28.8percent of students are being used Cyber media for two to three years in which the male students dominate the female students. The percentage of students using Cyber media for three to four years is 10.6 and 11.3percent students are using for more than four years. Apart from this only 13.8percent of higher secondary school students are using cyber media within one year only. Here the female dominate the male students. Pearson Chi-Square test shows that the calculated chi-square value (52.86; p = 0.000) is greater than table value. Hence, there exists significant difference in the duration of usage of cyber media based on the gender

Victimising cyber stalking

Victimisation of cyber stalking takes place when there is acceptance of communication from anonymous persons. Various ways of victimising cyber stalking of higher secondary students are presented in Table 4.

Table - 4: Frequency of victimising cyber stalking of higher secondary students

Statement	Gender	Never	Rarely	Some times	Often	Total
Accept unknown friend request	M	24 (42.1)	16 (28.1)	13 (22.8)	4 (7.0)	57 (100.0)
	F	79 (76.7)	15 (14.6)	9 (8.7)	0 (0.0)	103 (100.0)
	Total	103 (64.4)	31 (19.4)	22 (13.8)	4 (2.5)	160 (100.0)
Initiate online conversation with unknown friends	M	20 (35.1)	16 (28.1)	18 (31.6)	3 (5.3)	57 (100.0)
	F	67 (65.0)	21 (20.4)	11 (10.7)	4 (3.9)	103 (100.0)
	Total	87 (54.4)	37 (23.1)	29 (18.1)	7 (4.4)	160 (100.0)
Communicate online friends against your will	M	37 (64.9)	12 (21.1)	6 (10.5)	2 (3.5)	57 (100.0)
	F	74 (71.8)	17 (16.5)	10 (9.7)	2 (1.9)	103 (100.0)
	Total	111 (69.4)	29 (18.1)	16 (10.0)	4 (2.5)	160 (100.0)
Enable security / privacy setting of the account	M	16 (28.1)	16 (28.1)	12 (21.1)	13 (22.8)	57 (100.0)
	F	35 (34.0)	16 (15.5)	26 (25.2)	26 (25.2)	103 (100.0)
	Total	51 (31.9)	32 (20.0)	38 (23.8)	39 (24.4)	160 (100.0)

Change passwords of cyber media	M	17 (29.8)	16 (28.1)	15 (26.3)	9 (15.8)	57 (100.0)
	F	31 (30.1)	30 (29.1)	34 (33.0)	8 (7.8)	103 (100.0)
	Total	48 (30.0)	46 (28.8)	49 (30.6)	17 (10.6)	160 (100.0)
Feel uncomfortable with online conversation	M	23 (40.4)	14 (24.6)	11 (19.3)	9 (15.8)	57 (100.0)
	F	43 (41.7)	32 (31.1)	23 (22.3)	5 (4.9)	103 (100.0)
	Total	66 (41.2)	46 (28.8)	34 (21.2)	14 (8.8)	160 (100.0)
Feel frightened in online conversation	M	26 (45.6)	13 (22.8)	10 (17.5)	8 (14.0)	57 (100.0)
	F	53 (51.5)	19 (18.4)	25 (24.3)	6 (5.8)	103 (100.0)
	Total	79 (49.4)	32 (20.0)	35 (21.9)	14 (8.8)	160 (100.0)
Receive porn photographs or texts from cyber friends	M	37 (64.9)	13 (22.8)	2 (3.5)	5 (8.8)	57 (100.0)
	F	84 (81.6)	5 (4.9)	7 (6.8)	7 (6.8)	103 (100.0)
	Total	121 (75.6)	18 (11.2)	9 (5.6)	12 (7.5)	160 (100.0)
Receive late night texts	M	24 (42.1)	14 (24.6)	13 (22.8)	6 (10.5)	57 (100.0)
	F	74 (71.8)	15 (14.6)	12 (11.7)	2 (1.9)	103 (100.0)
	Total	98 (61.2)	29 (18.1)	25 (15.6)	8 (5.0)	160 (100.0)
Experience problem due to online relationship	M	32 (56.1)	11 (19.3)	12 (21.1)	2 (3.5)	57 (100.0)
	F	75 (72.8)	12 (11.7)	14 (13.6)	2 (1.9)	103 (100.0)
	Total	107 (66.9)	23 (14.4)	26 (16.2)	4 (2.5)	160 (100.0)

(Values in parentheses are percentages)

The analysis of victimising cyber stalking of higher secondary students was done on the basis of the primary data. The table shows that 64.40percent of the higher secondary school students never accept unknown friend requests. The female students are ahead in not accepting (76.7percent) unknown friend requests than the male students (42.1percent) 54.40percent higher secondary school students never initiate online conversation with unknown friends. Here also, the girls are ahead in not initiating online conversation. 69.40percent of students never communicate with online friends against their will. 41.30percent of Higher Secondary students never feel uncomfortable with online conversations. Another 49.4percent feel frightened of online conversations. 75.60percent never receive porn photographs or texts from cyber friends. 61.3percent never receive late night texts and 66.90percent never experienced problems due to online relationships. In all these case the girls were found to be ahead in not responding than boys. Table reveals that sometimes the higher secondary school students are being victimized of cyber stalking incidents.

Comparison of Victimizing cyber stalking based on Gender

Gender difference in victimizing the cyber stalking incidents and frequencies is compared using the independent sample t-test and it is presented in Table 5.

Table - 5: Comparison of victimizing Cyber stalking based on gender

Gender	N	Mean	SD	t-value	p-value
Male	57	19.61	4.97	3.595	.000*
Female	103	16.89	4.35		

** p < 0.05, significant at 0.05 level.*

The analysis on the basis of gender indicate that there is significant difference between the mean scores of victimizing cyber stalking of higher secondary school students based on Gender (t = 3.595, p <0.01). Thus it can be inferred that there is significant difference between the mean score of higher secondary school students based on gender. Since the mean score of the male students (M= 19.61) is greater than that of the female students (M = 16.89), it can be concluded that higher secondary school male students are more victimized for cyber stalking compared to female students.

Comparison of victimizing cyber stalking based on frequency of login per day

Comparison of victimizing Cyber stalking based on frequency of login per day by the secondary school students is done using analysis of variance and it is presented in Table 6.

Table - 6: Victimizing Cyber stalking based on frequency of login per day

Frequency	N	Mean	SD	F-value	p-value
Many times a day	50	18.7800	4.79494	1.635	.168
Once a day	32	17.7813	3.89983		
Few times a week	22	17.8636	5.01707		
Once a week	15	18.9333	4.84719		
Rarely	41	16.4146	4.97984		
Total	160	17.8625	4.75366		

Analysis of variance (F-value = 1.635, p = 0.168) presented in the table 6 reveals that there is no significant difference among higher secondary school students in victimizing cyber stalking based on frequency of login per day at 0.05 level of significance. Cyber stalking did not influence the frequency of using social media by the students.

Comparison of Victimizing Cyber stalking based on duration using social media

Victimizing of Cyber stalking based on duration of using social media by higher secondary school students is presented in Table 7

Table - 7: Victimizing Cyber stalking based on duration using social media

Duration	N	Mean	SD	F-value	p-value
6 months	22	17.5000	4.50132	0.606	.659
1 year	57	17.3509	4.40167		
2-3 years	46	18.0870	4.64196		
4-5 years	17	19.2941	6.76170		
Above 5 years	18	18.0000	4.37909		
Total	160	17.8625	4.75366		

The table (7) discloses that, as per the F value obtained from the analysis of variance (F = 0.606; p = 0.659) there is no significant difference among higher secondary school students of being victimized of cyber stalking based on duration of using social media at 0.05 level of significance. Duration of using social media has no significant role in victimizing cyber stalking among higher secondary school students.

Findings of the study

In this study - Cyber stalking among higher secondary school students in Kerala - an attempt was made to investigate to find out the frequency of login, Duration of using social media and level of cyber stalking. Study reveals that there exist significant difference in the frequency of login and Duration of using social media based on gender. Mean cyber stalking score of the male students (19.61) is significantly greater ($t = 3.595$, $p < 0.01$) than that of the female students (16.89) and it can be concluded that higher secondary school male students are more victimized of cyber stalking compared to the female students. Analysis of variance (F-value = 1.635, p = 0.168) reveals that there is no significant difference among higher secondary school students in being victimized of cyber stalking based on frequency of login per day. Duration of using social media has no significant role in higher secondary school students being victimized of cyber stalking.

Conclusions

The study investigates the victimisation in cyber stalking of higher secondary school students and its relation with gender, frequency of login cyber media and period of using social media. Study reveals that majority of higher secondary school students have login cyber media many times a day or once a day. Half of the higher secondary students are using cyber media for more than two years. Study reveals that there exist significant difference in the frequency of login and Gender wise difference is seen in the duration of using social media and frequency of login per day. Study discloses that sometimes the higher secondary school students victimizing the cyber stalking incidents and male students have more victimizing cyber stalking compared to the female students. Duration of using social media and frequency of login per day has no significant effect on the victimizing cyber stalking.

Suggestions

It is essential to give proper awareness to the higher secondary school students regarding the cyber stalking and apt way of practice in the cyber world. Necessary guidelines may be provided to make use of cyber media for regular learning. Students may be made aware about the cybercrimes and cyber misuses and immediate action need to be taken to rescue from such situations.

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Research Article

Availability and Usability of Screen Reading Software by Students with Visual Impairment – Current Scenario

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Abstract

Assistive technology plays a vital role in the education of students with disabilities and it also paves way for their independent living. Students with visual impairment have difficulty in accessing visual materials. Assistive technology helps students with visual impairment to access the general curriculum and improve their academic performance. The Optical Braille Recognition (OBR) software, Job Access with Speech (JAWS) software, Non Visual Desktop Access (NVDA) software are available and they help the students with visual impairment to read Braille documents, scan the Braille documents, translate the text to Braille and read text materials on the computer screen. The objective of this study is to find out the availability and usability of screen reading software by students with visual impairment. Totally 30 students with visual impairment from integrated and inclusive schools from Coimbatore District were selected as a samples. The result shows that availability and usability of software by students with visual impairment is very low. It may be because of the non-availability of screen reading software in the schools. It also shows that the special educators and general educators lack knowledge in using screen reading software to teach students with visual impairment.

Keywords: Assistive Technology, Screen Reading Software, Students with Visual Impairment.

Introduction

Individuals with disabilities (IwD) have unique needs and challenges. Assistive devices are designed or adopted to support IwD for their development in terms of mobility, education and employment. Govt. of India provides assistive devices to IwD at free of cost through Assistance to Disabled persons for purchasing / fitting of aids / appliances (ADIP) scheme. The main objective of this scheme is to assist the needy disabled persons in procuring durable, sophisticated and scientifically manufactured, modern, standard aids and appliances that can promote their physical, social and psychological rehabilitation by reducing the effects of disabilities and enhance their economic potential which improves their independent functioning. Traditionally students with visual impairment use Braille, Abacus and Taylor Frame for reading, writing and doing arithmetic calculations.

In this scientific era, many devices have emerged to help students with visual impairment for their education and mobility purpose. Assistive technology helps students with visual impairment to access the general curriculum and improve their academic performance. The most important assistive device is screen reading software. The Optical Braille Recognition (OBR) software, Job Access with Speech (JAWS) software, Non Visual Desktop Access (NVDA) software are available to read Braille documents, scan the Braille documents, translate the text to Braille and read text materials on the computer screen. These softwares are helpful for the students with visual impairment to read and study the print version into Braille version and vice versa.

Educational institutions such as schools and colleges should have the facilities including assistive devices, software and infrastructure to provide necessary concepts and skills among visually impaired students for academic, social and emotional development. This widens the scope to access the same opportunities and educational experiences for students with visual impairment like their peers. So, this study intended to know the availability and usability of the screen reading softwares by students with visual impairment studying at integrated and inclusive schools in Coimbatore District, Tamil Nadu.

Review of Literature

International

Kelly (2009) conducted a study on Use of Assistive Technology by Students with Visual Impairment: Findings from a National Survey. This study investigated the use of assistive technology by students in the United States who are visually impaired through a secondary analysis of a nationally representative database. It found that the majority of students were not using assistive technology.

The study done by Stoop et al (2013) on Reading and Learning from Screens versus Print: a study in changing habits recommended that electronic screens are more appropriate for communication, information gathering and navigation. These electronic devices provide more fast and comprehensive delivery of learning materials and also encourage for learning among students with visual impairment.

Osiceanu & Popa (2015) studied on Access Technologies for Students with Visual Impairments. The aim of this study is to highlight the benefit of studying the optional Information Technology (ICT) discipline, using access technologies (AT), for children with visual impairments. The result shows that students with visual impairments are attracted to new technologies and it helpful for personal and interpersonal development.

National

Verma et al (2012) mentioned that JAWS is a popular state-of-art screen reader developed by Freedom Scientific. Besides sequential access of web content, it has rich set of key shortcuts that can be used by visually impaired users to access the web. To use these shortcuts effectively, visually impaired user has to be trained properly. JAWS is

not freeware and user has to purchase and install on a local computer. Its cost may not be affordable for an average Indian user.

Bhatt & Kumari (2015) stated in their study that assistive technologies improved the educational outcome of the visually impaired children and for some children it is the sole means of independent living. They also mentioned the various barriers which likely to affect the adoption of the assistive technologies, such as high cost, reluctance of users, low availability.

Kurangi & Jayakumar (2017) elucidated that education is a serious problem for persons with visual impairment. They also face difficult situations for accessing information. The application software transforms the information which accessible them.

Jindal et al (2019) stated that the screen reader is a type of assistive technology and it is useful to people who are visually impaired, learning disabled and illiterate by merging other assistive technology such as screen magnifiers.

Sadh (2020) explained that the screen reader is application software which is useful for persons with visual impairment to use computer without the help of sighted person. It provides detailed information which is presented in the screen to the persons with visual impairment.

Need and Significance of this Study

Many assistive devices such as Braille, Abacus, Taylor Frame, Geo Kit are available for students with visual impairment for learning. Screen reading software is the technology based application that provides access to information on a computer for students with visual impairment and converts the information from the computer screen into speech and it enhance the accessibility among them. The students can search the characters, words and choose to repeat a given word and passage with their own speed control options. Screen reading softwares help them to get more information and can develop the knowledge related to their content.

Educational institutions should ensure the accessibility to provide quality education for all students including those with visual impairment to meet their diverse needs by using the assistive devices and software. Student's participation and involvement in the education program is important to develop their knowledge and skills. Many of the educational bodies like schools, colleges and universities do not have these facilities such as assistive devices and learning materials to ensure accessibility for students with visual impairment (Sadh, 2020). Hence the researcher intended to know the availability and usability of these screen reading software by students with visual impairment.

Methodology

Objective of the Study

- To find out the availability of screen reading software to students with visual impairment
- To find out the usability of screen reading software by students with visual impairment.

Research Design: Survey method under descriptive research design was adopted for this present study.

Sample: 30 students with visual impairment from ten schools (five integrated and five inclusive) situated in and around Coimbatore District, Tamil Nadu State were selected as sample for this present study through purposive sampling method.

S. No.	Item			Number of SwVI
1	Type of School	Integrated School	5	24
		Inclusive School	5	6
Total			**10**	**30**

Variable

- Type of School – Inclusive/ Integrated

Research Tool: A questionnaire on the various aspects of availability and usability of screen reading software was prepared by the researcher to collect the data. It consists of 15 questions with yes or no options.

Data Collection Procedure: The researcher obtained prior permission from the Heads of the institutions before data collection. Before collecting the responses, the objectives of this study and the instructions about the questionnaire were clearly explained to the samples. The questions in the questionnaire were asked by the researcher to the samples on face to face mode. The responses of samples were noted by the researcher. The collected data was then analyzed for further interpretation.

Findings and Discussion

The findings and discussion of this study were mentioned based on the objective such as availability and usability of screen reading software by the students with visual impairment.

Availability of Screen Reading Software:

Table - 1: Availability of screen reading software in selected schools

S. No.	Type of School	Availability of Screen Reading Software				
		School 1	School 2	School 3	School 4	School 5
1	Integrated	Yes	No	Yes	Yes	No
2	Inclusive	No	Yes	No	No	No

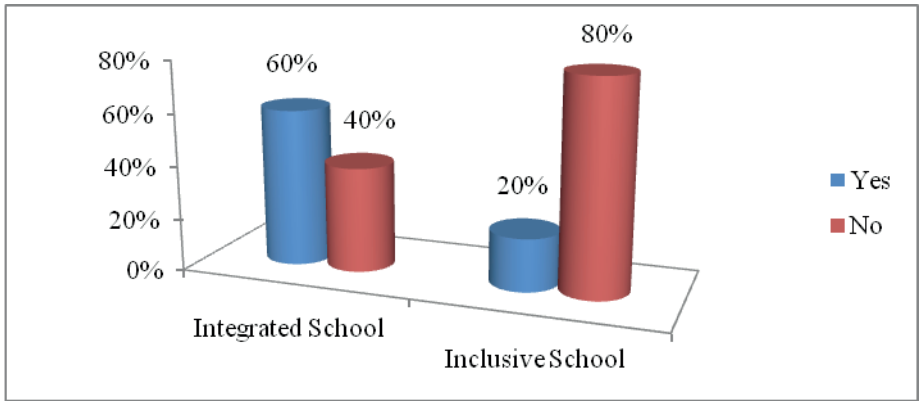

Figure – 1: The percentage of availability of screen reading software in selected schools

Schools are the responsible authority for providing appropriate and accessible facilities to students with visual impairment. These students can make use of these materials to compete with their peer groups. Most of the schools have the traditional learning materials such as Braille slate, Brailler, Abacus, Geo Kit etc. The result shows that 3 integrated schools (60percent) and 1 inclusive school (20percent) have screen reading software – NVDA (Non Visual Desktop Access) for the use of their students.

Usability of Screen Reading Software

Usability can be assessed based on the availability. The study results show that, out of ten schools only four schools (3 integrated and 1 inclusive) have the screen reading software facility. Totally 30 students with visual impairment were selected for this study. Among them, twenty four students study in the integrated setup and the remaining six students were enrolled in inclusive setup.

Table- 2: Usability of screen reading software in selected integrated schools

S. No.	Integrated School	Number of SwVI	Availability	Usability
1	School 1	7	Yes	3
2	School 2	3	-	-
3	School 3	8	Yes	4
4	School 4	4	Yes	-
5	School 5	2	-	-
Total		**24**	**-**	**7**

Table- 3: Usability of screen reading software in selected inclusive schools

S. No.	Inclusive School	Number of SwVI	Availability	Usability
1	School 1	1	-	-
2	School 2	2	Yes	2
3	School 3	1	-	-
4	School 4	1	-	-
5	School 5	1	-	-
Total		**6**	**-**	**2**

From table- 2 and 3, it is evident that the integrated school number two, and five do not have the screen reading software and inclusive school number one, three, four and five also do not have screen reading software. The data shows that the 70percent of (21 students) students with visual impairment have the facility of screen reading software in their respective schools. Remaining 30percent (9 students) of the students are not having this facility in their school.

Usability of screen reading software by students with visual impairment was calculated with these 70percent (21 students) of students. These 70percent of students with visual impairment have the opportunity to access the screen reading software. The result shows that only nine students with visual impairment are using screen reading software for their education purpose. The remaining twelve students are not using screen reading software though they have the availability. The reasons behind are:

- The students those who are studying in primary class do not utilize the service.
- Few students are not interested to use screen reading software, because of the problem in understanding the pronunciation of the language which is supported by the study Jindal et al (2016) in which it is mentioned that many of the screen readers do not have any option of speaking in Indian languages. The fluency of speaking words needs improvement, so that it will be easy for a student with visual impairment to hear the words spoken by screen reading software.
- Teachers who are handling class for students with visual impairment are not practically sound in teaching with screen reading software. This result supported by the following study Zhou et al (2011) reported based on their survey of 165 teachers of students with visual impairments in Texas to examine their perceptions of their knowledge of assistive technology. The results showed that they lacked adequate confidence about teaching assistive technology to students.

Educational Implications

Assistive technology is gaining a momentum in the field of education.

The impact of Assistive technology on students with disabilities particularly on visually impaired is noteworthy. The present study attempted to find out the availability and usability of screen reading software by students with visual impairment. The following are some of the implications of this present study.

- Teaching learning process: Screen reading softwares are helpful for the teachers and students with visual impairment in the teaching learning process. It enhances the skills such as listening, reading and comprehension skills among the learners.
- Self-pacing learning: Screen reading software provides the opportunity to the students with visual impairment to read and develop knowledge according to their own pace.
- Accessible to the learning materials: This software helps the students to access the e-materials into speech and Braille format.
- Equal opportunities: Students with visual impairment can learn the content like their peer group.

Recommendations of the Study

Assistive technology is the key element in educational rehabilitation of students with visual impairment. The following recommendations are pointed based on the findings of the study.

- Each and every school should have the educational facilities such as assistive devices and software and infrastructure for students with visual impairment.
- Teacher should undergo training programmes on educating students with visual impairment with assistive technological devices, tools and software

Conclusions

Assistive devices play a major role in the life of individuals with disabilities. It helps them to be independent in education, mobility and employment. It is important to select what devices, tools and technologies will be appropriate to meet the student's individual learning needs. Screen reading software is the tool to help students with visual impairment to develop their knowledge. The availability of the screen reading software in their school environment itself is the big question mark to them. Even if it is available, then the usability of the same is noticed as very nominal. So it is the responsibility of the school authority/ government to provide adequate facilities to meet their basic needs. It is also important that the teacher should update their knowledge based the up gradation of technology. When provided with adequate facilities and qualified professionals, the students with visual impairment will be able to use the assistive devices effectively and efficiently. This is in line with the recommendations of the study done by Senjam et al (2019) that teachers should be trained in the use of various assistive technologies for reading, writing, maths, sciences, sports, mobility and activities of daily living

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Research Article

Gratification of Film Viewing in Children

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Abstract

The present study was conducted to understand children's gratification of the English films 1. Saving Private Ryan (SPR) and 2. E.T.: The Extra Terrestrial (ET). The study consisted of a sample of 93 school children of grade XI aged between 15-17 years. A film gratification instrument was designed drawing insights from the research studies conducted by Oliver and Bartsch (2010) and Teasley and Wilder (1997). The sample selected for pilot study was 40 school children taken from a government school of Shamshabad district, Telangana. For the film ET the statistical exploration showed that the mean score was 42 and the standard deviation was 2.2 during the first pilot testing. In the second phase of pilot test the values are: mean score 43 and standard deviation 2.1. The reliability coefficient (r) was found to be 0.74. Since the reliability coefficient (r) was found to be significant the test was finalized for the main study. For the film SPR during the first pilot testing the statistics calculated are: mean score 45 and standard deviation 2.7. In the second phase of pilot test the mean score was 47 and the standard deviation was 2.5. The reliability coefficient (r) was found to be 0.77. Since the reliability coefficient (r) was found to be significant the test was identified for the main study. The research study was quantitative in nature. It was found that the percentage of boys is more in the gratification of films SPR and ET in comparison to girls. The reason as to why the boys experienced high gratification in comparison to girls may be, both the films are male centric and not much of women and gender roles presented.

Keywords: film gratification, film interpretation, emotions, aesthetics, and film education

Introduction

Emotions play a major role in cognizing and interpreting the world. Their role in understanding and interpreting films is mostly disputing and contesting. Children express emotions in response to various forms of films, novels, television programmes, music videos or computer games. In recent times, media and media entertainment has become a significant part of one's life. The interface of media and children has captured the attention of media researchers. Abundant documentations have been found in the area of media psychology and not only that, it also assists the principal function of influence in media enjoyment. In

addition, it offers logical clarifications as to why emotional encounters can be worthwhile and fruitful for the consumers of media (Bartsch, 2012). How do children enjoy and experience films? And what substance of films delights and gratifies children? These are some of the fascinating questions in the contemporary film education discourse.

Gratification is an emotional state experienced by people when their wishes and desires get fulfilled. It is a pleasurable, enjoyable and satisfying response. It is very challenging to cognize the manifestation of gratification in all pervading human existence and complex life forms. People's behaviour is determined by neurobiological, social, cultural, spiritual, political and psychological factors and these factors play a critical role in constructing and development of human behaviour. Therefore, the behaviour of gratification gets reflected in all such dimensions of human existence and life. Gratification of sexual, social, cultural, aesthetic, moral and emotional needs motivate and create space for the growth and development of human beings. In the entire journey, from birth to death, humans struggle for experiencing gratification.

Gratification is the essence of human development. People differ and choose different paths to gratify their needs, desires and wishes. Delay in gratification leads to frustration and abnormality. The need for gratification of needs, desires and wishes make human actions very complex and multidimensional. People search, explore and create new opportunities for gratifying their cognitive needs, affective needs, personal integrative needs, social integrative needs and tension free needs and desires. People involve and participate in various activities to fulfil their needs and desires. Watching and interpreting films are such activities for gratification. In other words people use films as the medium for their own need and get satisfied when their needs are fulfilled.

Gratification theories argue that people use films and media to fulfil their needs and desires. This is very clearly evident in our everyday communication, routine and normal discourses, peer gossiping, considering characters in films as role models and symbols of modernity and fashion. Involvement of youth in damaging the images of actors and celebrities, including living in fantasy and imagination represents their gratification levels of film viewing. Films are used for communication and consumption. People interpret film images, symbols, meanings and content and also integrate them into their lives. According to the gratification theories individuals use films to fulfil other gratifications whether it's to escape or divert from everyday life, relaxation and social interactions although this will also help increase knowledge.

Cupchik (1994) stated that gratification from movies could be of two classes, which are responsive and insightful. The gratification which is responsive takes place when one watches movie for instance for the impression of recreation or nostalgia throughout the experience of media (Oliver 1993, Zillmann 1998). The insightful level of gratification can be gained by the spectators through

the process of introspection or from the opinions of creative worth (Oliver 2007). The insightful level of gratification may be stimulated through development of movie appreciation (Lee, Cha & Nam, 2015).

Cupchik and Winston's (1992) reactive processing illuminates an addition of the composition-reaction pattern. For them it administers finest if the intention of a receiver in an artistic occurrence is to encounter enjoyment or fulfilment. The acquirer will concentrate on motivation aspects that produce enjoyment or stimulation. The receiver or recipient may choose precise linguistic patterns, which might be based on the past experiences, or on the other hand the receiver might observe properties, which collate for instance familiarity. The receivers combine stimulus configurations with pleasure and excitement through a learning process (Cupchik, 1994).

In this context Cupchik (1994) says "stimulus configurations are closely linked to bodily reactions lying along pain-pleasure and arousal dimensions. Since linkage implies association, this in turns opens the door to other learning mechanisms such as conditioning, habituation, and stimulus generalizations. Thus, if conditioning serves to make a particular stimulus feature familiar and pleasurable, then repeated exposure to the stimulus should reduce its reward value through habituation. In this manner, bodily mechanisms can modulate both every day and aesthetic experiences" (p. 184, 185). Cupchik and Winston (1992) with regard to insightful handling assume the appropriate significance-emotional aspects of artistic exercise. The diversified landscape of the artistic labour is of vital significance. As a result, meaning is dependent on the harmony or associations among the diverse stages of bodies in the work.

Oliver and Bartsch (2010) state that the on-going work from the viewpoints of functions and fulfilments has stressed a major devotion to the intricate fulfillments that are linked through the usage of media (considering impressions, grasp Katz, Blumler, & Gurevitch, 1973; Rubin, 2008; Ruggiero, 2000). The authors further go on to say that gratifications are studied in view of the pleasure-seeking wish and consideration like the usage of recreation for the objective of conquering isolation (e.g., Perse & Rubin, 1990), for breaking away with problems (e.g., Herzog, 1944), or purely frittering time away (Rubin, 1983). Nevertheless, additional fulfilments like viewing films for the objective of gaining particulars, enhancing the reputation, or civil relations (Rubin, 1983) are no more easily elucidated in pleasure-seeking agreements and are thus deliberated to decrease outside the pleasure dimension.

Oliver and Hartmann, (2010), Knobloch-Westerwick et al., (2012), Bartsch, Kalch, & Oliver, (2014), Eden, Hartmann and Reinecke (2014), studies support the view that the audience may engage with the challenges presented by the media content emotionally and cognitively. Such self-reflective experiences enable viewers to explore their own self and the world around. Unlike the hedonic perspective that concern to pleasurable media experiences, the eudaimonic

perspective focuses on very serious and heavy content. Nevertheless, the welfare perspective on media enjoyment is different from the perspective of self-indulgent hedonism, which shows the engaged role of spectators in pursuing battles for the aim of self-improvement.

The reactive type of gratification takes place when watching films for a thought of delight, enthusiasm, or melodrama in time of introduction to media (Oliver 1993, Zillmann, 1988). The audience can achieve the reasoning achievement of fulfilment through introspection or the opinions of aesthetic importance (Oliver, 2007). The insightful achievement of fulfilment can be encouraged chiefly by growth of film acknowledgement (Lee, Cha & Nam, 2015, p.87). Therefore, it can be said that the film gratification can be referred as the insightful achievement of fulfilment through introspection or the notions of aesthetic importance, which takes place through the process of film appreciation. For the reflective gratification to take place the researcher chose two films E.T.: The Extra Terrestrial (ET) and Saving Private Ryan (SPR). The researcher chose these two films as the researcher wanted to explore whether these two films gratify children or not.

The plot of the film E.T.: The Extra Terrestrial (ET)

The story is about the friendship of two people ET and Elliott. Elliott is 10 years old and is spending time with his brother, and his friends. A group of aliens visit the earth and one of them is left behind on planet earth. Elliott finds the alien and soon they begin to communicate and Elliott learns about the values of a true friendship whereas the alien learns about the life on earth. E.T. wants to go home but if he goes Elliott will lose a friend (Lakra and Sudhakar, 2019, p. 64).

The plot of the film Saving Private Ryan (SPR)

The film is based on World War II, June 1944. A mission is ordered to Captain Miller to find Private James Ryan and bring him back home as he has lost all his siblings in the war. Captain Miller and his company are given the task to get him from the war zone and bring him home (Lakra and Sudhakar, 2019, p. 64).

Objective of the Study

The objective of this study is to investigate children's gratification of viewing the English films E.T.: The Extra Terrestrial (ET) and Saving Private Ryan (SPR).

Methodology

The study is carried out in Shamshabad district of Telangana. The sample comprised of 93 children aged between 15-17 years of age from standard XI. Purposive sampling method was adopted to select the sample of the study. The approach of this study is based on a descriptive research design to obtain information about children's film gratification. The film gratification instrument is designed drawing insights from Oliver and Bartsch (2010) and Teasley and Wilder (1997) studies. Children are shown the films E.T.: The Extra Terrestrial (ET) and Saving Private Ryan (SPR) and their responses are collected on a five-point scale. The

score 5 indicates “very highly agree”, 4 indicates “highly agree”, 3 indicates “moderately agree”, 2 indicates “less agree”, and 1 indicates “do not agree” on the scale. The minimum score is 32 and the maximum score is 160. The sample selected for pilot study was 40 school children taken from a government school of Shamshabad district, Telangana. The films ET and SPR were pilot tested.

Data Presentation and Interpretation

For the film ET the statistical analysis showed that the mean score was 42 and the standard deviation was 2.2 during the first pilot testing. In the second time of pilot test mean score was 43 and standard deviation was 2.1. The reliability coefficient (r) was found to be 0.74. Since the reliability coefficient (r) was found to be significant the test was kept aside for the main study. For the film SPR the statistical exploration showed that the mean score was 45 and the standard deviation was 2.7 during the first pilot testing. In the second time of pilot test mean score was 47 and the standard deviation was 2.5. The reliability coefficient (r) was found to be 0.77. Since the reliability coefficient (r) was found to be significant the test was set aside for the main study.

Table- 1: Distribution of children with respect to their gratification of films SPR and ET

Gratification of films for SPR and ET									
Gender		Gratification of films for SPR and ET				Gratification of the film ET			
		Low	Moderate	High	Total	Low	Moderate	High	Total
Boys	Count	5	17	24	46	5	18	23	46
	% within Gender	10.9%	37.0%	52.2%	100.0%	10.9%	39.1%	50.0%	100.0%
Girls	Count	6	28	13	47	6	30	11	47
	% within Gender	12.8%	59.6%	27.7%	100.0%	12.8%	63.8%	23.4%	100.0%
Total	Count	11	45	37	93	11	48	34	93
	% within Gende	11.8%	48.4%	39.8%	100.0%	11.8%	51.6%	36.6%	100.0%

From the table 1 it is observed that 11.8 percent of children expressed low level of gratification in the film SPR, 48.4percent of children expressed moderate level and 39.8percent of children expressed high level of gratification of the film SPR. For the film ET, the data reveals that 11.8percent of children expressed low level of gratification in the film ET, 51.6percent of children expressed moderate level of gratification, and 36.6percent of children expressed high level of gratification of the film ET.

The gender wise analysis of data in relation to the levels of gratification of the films SPR and ET is as follows:

Among boys 10.9percent of them expressed low level of gratification in the film SPR, 37percent of them expressed moderate level and 52.2percent of them expressed high level of gratification in the film SPR. Among the girls 12.8percent who expressed low level of gratification in the film SPR, 59.6percent expressed moderate level and 27.7percent of them expressed high level of gratification in the film SPR. With respect to the film ET 10.9percent of boys expressed low level of gratification, 39.1percent of expressed moderate level of gratification and 50percent of them expressed high level of gratification. Whereas 12.8percent of girls expressed low level of gratification, 63.8percent expressed moderate level of gratification and 23.4percent of them expressed high level of gratification of the film ET.

The above table indicates that there are differences between the responses of boys and girls with respect to their gratification of the films SPR& ET. In order to know whether boys and girls differ statistically with respect to their levels of gratification of the films SPR & ET, it was felt desirable to examine the difference between boys and girls by applying appropriate statistical test. For this purpose, the following hypothesis is formulated.

H1: Boys and girls differ significantly with respect to their levels of gratification of the films E.T.: The Extra Terrestrial (ET) and Saving Private Ryan (SPR).
To test this hypothesis the following null hypothesis is formulated.

HO: Boys and girls do not differ significantly with respect to their levels of gratification of films E.T.: The Extra Terrestrial (ET) and Saving Private Ryan (SPR).

The above null hypothesis was tested with Mann-Whitney non-parametric statistical test. The results are furnished below.

Table- 2: Distribution of Children's Mean Ranks & Mann-Whitney U with respect to Gratification of the films SPR & ET

Distribution of Mean Ranks & Mann-Whitney U of SPR & ET					
Gender	N	G-SPR Mean Rank	G-SPR Sum of Ranks	G-ET Mean Ranks	G-ET Sum of Ranks
Boys	46	52.35	2408.00	52.79	2428.50
Girls	47	41.77	1963.00	41.33	1942.50

	G-SPR	G-ET
Mann-Whitney U	835.000	814.500
Wilcoxon W	1963.000	1942.500
Z	-2.085	-2.272
Asymp. Sig. (2-tailed)	.037	.023

G-SPR: Gratification of film SPR
G-ET: Gratification of film ET

From table-2, it is observed that the mean ranks of boys for the films SPR and ET 52.35 and 52.79, respectively. The mean rank of girls for the film SPR is 41.77 and for the film ET is 41.33. From the Mann-Whitney statistical test it is found that the U values for the films SPR and ET are 835 and 814.500 respectively. The Z score is -2.085 for the film SPR and -2.272 for the film ET. The p value is 0.037 for the film SPR and 0.023 for the film ET. The p value is a measure of the strength of the evidence of data against the null hypothesis. The smaller the p value the stronger the sample evidence for rejecting null hypothesis. The p value indicates that there are only 3.7percent and 2.3percent of chances that the null hypothesis is correct. Hence, the results of the sample are not consistent with the null hypothesis. Since the p value is small enough it is concluded that the sample is so incompatible with the null hypothesis that one can reject the null for the entire population. Hence, it can be inferred that boys and girls differ significantly with respect to their gratification of films of SPR& ET. In other words on the basis of the strong evidence (p value <0.05 i.e. .0.037, 0.023) the null hypothesis is rejected and alternative hypothesis is accepted therefore, it is concluded that the difference between boys and girls with respect to the gratification of films SPR & ET is statistically significant.

Katz, Blumler, and Gurevitch (1973) in their study initiated that in extension to consuming media for the purpose of enjoyment and leisure, people further expressed consuming media as a process of encountering inspiration and establishing self-confidence. In the same way Tesser, Millar, and Wu (1988) researched on movie gratifications, they pinpointed motivations similar to pleasure-seeking involvement (e.g., break free, enjoyment) and further found a supplementary inspiration, which they described as personal growth. It is evident in this study the boys expressed high levels of gratification in viewing both SPR & ET films in comparison to girls .

Conclusions

This study shows that compared to girls the boys expressed high gratification in viewing SPR and ET films. Why the boys expressed high levels gratification in comparison to girls may be attributed to the reason that both because both the films were male centric and there is no much representations of women. Boys enjoy and experience happiness when they watch adventurous, risk-taking, and exploratory films. By watching such films they gratify their hidden desires and masculine power. Since these two films are of explorative type, boys might have showed relatively higher levels of gratification compared to girls.

As discussed above the focus of this study is not on the pleasure-seeking needs and concerns of children. Its focus is not on the use of entertainment for the drive of overcoming loneliness for escape from difficulties or for just for the sake of passing time or for the purpose of information, status enhancement, or social interaction. The primary concern of this research study is on children's film gratification experiences and measurement of it. Future research

may focus on pleasure seeking needs and concerns of children and with more attention on the drives of overcoming loneliness, status enhancement and social interaction. The current limitation in this study is that it did not embrace college students, university students, diverse sample of cultures and age ranges. Future research studies may focus on such dimensions in designing

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Research Article

Cyber security Awareness among In-service secondary school teachers of Karnataka

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Abstract

Teaching cyber security to students in schools is necessary to assist students to stay safe while using technology. Recently, a good amount of interest has been drawn towards understanding the concepts of cyber security and effort has been made by institutions to help introduce the concepts of cyber safety to the teachers. Guidelines were developed and disseminated and trainings were conducted for creating awareness about cyber security by various academic bodies like NCERT. In the present study an online survey was conducted with an objective to study the awareness levels of teachers on cyber security where in 92 secondary school teachers of Karnataka, India have participated. The findings indicate that the teachers were found to have medium level of awareness on cyber security and there is no significant difference in the cyber security awareness among the teachers with respect to gender& stream they belong to. It was found that the awareness levels on cyber security differ with respect to the age of the teachers. This study aims to open the possibilities for more research in this area in order to expand the arena for understanding the importance and usage of cyber security and how it could be implemented in the teaching environment.

Introduction

With the everyday increased usage of technology and internet in education in the form of e-learning platforms, videos and in general the changes in the society with response to online payments, applications, e-content, internet, etc., the need to protect our private data becomes a matter of concern. The manner in which we utilize the web has changed a lot in recent times. Entering our own information online to join a learning site, pursue pamphlets, web based life records, or sell utilized furniture has become the standard. Similarly, for teachers entering the data of students to calculate results or to assign tasks online on e-learning platforms has grown, along with the students' usage in general. The information created accordingly is bewildering, and expected to twofold at regular intervals. This presents as an enticing monetary benefit for programmers who can bring in cash off individuals' very own information. It has prompted numerous information penetrations as of now and there will be some more. Understanding why organizations need our information, what they do with it and the suggestions for us is new fundamental information everybody needs.

According to Data Security Council of India, India is the second most cyber attacked country in the world after

US. There are hundreds of cybercrimes that are reported on privacy invasion and data misuse, students getting on unsafe sites, etc. As a result the role of understanding how to use the internet safely is essential, thus cyber security needs to be understood and practiced to secure privacy of our own data and of the teachers as well as of the students in an educational setting. The awareness of children on using it is observed to be not adequate. As reported in a research study by Tirumala et. al (2016), a survey was conducted on students of the age group 8-12 years which consisted of questions related to the students' understanding and awareness of cyber security along with information on their internet usage. The outcome of the study indicated that cyber security awareness among the students was commonly low with the most reduced level in the 8-12 year age gathering. The students of 8-12 years age group had the option to answer just 19% of review questions. Moreover, the greater part of the students was inexperienced with basic cyber security terms and did not exhibit enough familiarity with normal cyber threats, for example, phishing. The outcome further show that most of the students didn't know about cyber security apparatuses for tablets and cell phones, which are much of the time utilized gadgets for e-learning resources.

Importance of Cyber Security

We are depending on innovations and thus creation of e material or content is being rapidly increasing. With the initiative of Digital India, today, a lot of organizations and governments store this material or content or data on Personal Computers(PCs) and transmit it across systems to different PCs. Institutions have introduced multiple e-learning resources that require the teachers and students to enter their personal information on online platforms which are prone to be hacked. Students have increased their usage of the internet, online videos and games, etc. The Internet capable technology, with its gift of resources for learning, communication, and collaboration comes with dangers of physical and emotional harm to its users, their data, and the organizations where they work and learn (Berkman Center for Internet & Society at Harvard University, 2008; National Center for Missing & Exploited Children & Cox Communications, 2006; National Cyber Security Alliance & Norton by Symantec, 2010).Information penetration has a great scope of destroying ramifications for any business. It can lead to loss of organization data and in turn the trust laid on the organization. The loss of data can cost an organization higher, especially when students are involved, it becomes all the more a sensitive deal. Going further, an information penetrate can affect corporate incomes due to resistance with information security guidelines.

Concept of Cyber Security

Cyber ethics, cyber safety, and cyber security, also known as C3, are three overlapping domains of knowledge (Pruit Mentle, 2001). Cyber ethics are the moral choices individuals make when using Internet-capable technologies and digital media; which include copyright, online etiquettes, hacking, and online

addiction(s). Cyber safety consists of the actions individuals take to minimize the dangers they could encounter when using Internet-capable technology; which include online predators and unwanted communications, viruses, and spyware. This domain also involves building an awareness of how a person's behaviour can contribute to the spread of malware and ways individuals are tricked while using Internet-capable technologies (e.g., phishing, pharming, and spoofing). Cyber security involves the technical interventions that protect data, identity information, and hardware from unauthorized access or harm. Cyber Security includes antivirus software, Internet content filters, firewalls, and password protection. Pruitt-Mentle (2008) found that cyber ethics is often seen as the responsibility of parents, whereas cyber security is the responsibility of the information technology (IT) department.

Cyber security refers to the act of guaranteeing the honesty, classification, and accessibility of data. Cyber security also includes network security, prevention of information loss, cloud security, intrusion prevention which would help in smooth digital movement. This also includes use of verification mechanisms, encryption, antivirus or malware arrangement, etc. to prevent people from cyber threats or dangers. The digital dangers include malwares, ransom ware, phishing attacks, social building, and progressed persistent threats.

In teacher education programs, pre-service teachers learn about methods to integrate technologies with content and pedagogy to improve student learning. Many presume that pre-service teachers have adequate knowledge to competently model and teach issues of safety when working with these devices as well. Pusey, P. & Sadera, A. W. (2011) investigated the current knowledge and understandings pre-service teachers have about cyber ethics, cyber safety, and cyber security topics (C3 topics) and their beliefs about their ability to teach them. The pre-service teachers were asked to rate their ability to model or teach C3 topics. The results indicated that the respondents were not prepared to model or to teach. It is reminded appropriately here that "with its gift of greater resources for learning, communication, and collaboration comes its dangers of physical and emotional harm to its users, their data, and the organizations where they work and learn Although learning institutions have been quick to profit from the Internet's gifts, they have been slow to recognize their responsibility to educate their communities about cyber ethics, cyber safety, and cyber security. This paper reports the results of a survey-based study designed to collect data regarding pre-service teacher knowledge about, and preparedness to teach, the C3 content in their future teaching. The results of this study will be the first to provide information about pre-service teacher knowledge of C3 topics and an understanding about where pre-service teachers stand in regard to teaching and modeling these topics in their own instruction. The results of this research will help teacher preparation programs to develop strategies for addressing these topics in their curriculum to better prepare pre-service teachers to integrate C3 in their

future teaching.

Pruitt-Mentle (2008) argue that C3 should be the responsibility of all, and addressing the dearth of knowledge and developing a sense of responsibility can start with teachers and teacher educators. In the past 10 years, many federal laws/Acts have been passed (in United States) that affect K-12 education.

- The Children's Internet Protection Act (CIPA) requires schools to have a clear Internet safety policy and to protect students from contact with objectionable content through the use of Internet filters.
- The Broadband Data Improvement Act (2008) requires appropriate online behaviour to be taught in schools.
- The National Educational Technology Standards (NETS) also require that C3 content be taught in schools (International Society for Technology Education, 2008).

However, these requirements are general and vague in their design and recommendations. The most significant research in this field to date is the C3 Baseline study conducted with in-service teachers (Pruitt-Mentle, 2008). This large-scale study suggests that many schools, school systems, and districts across the laws and standards ensuring covering C3 content by addressing only plagiarism and cyber bullying (Pruitt-Mentle, 2008). The C3 Baseline Study provides researchers a glimpse at C3 content integration that can be used for future comparisons with in-service teachers (Pruitt-Mentle, 2008). However, at the moment, we know very little about how colleges of education are preparing pre-service teachers to fill their obligations to professional standards and legal requirements related to the C3.

Research studies indicate that malware, plagiarism, privacy, and the protection of identity data are some of the many issues confronted be school children (Berkman Center for Internet & Society at Harvard University, 2008; Lenhart, 2010; Lenhart, Ling, & Campbell, 2010; West, 2009). In a recent study, Cranmer and Selwyn (2009) evidenced that, children in the age group of 7-11years lack a fundamental understanding of the risks to their personal safety and data. Further many researchers (Cranmer & Selwyn, 2009;LaRose, Rifon, & Enbody, 2008; Sharpies, Graber, Harrison, & Logan, 2009), express an urgent need to help build student's ability to use Internet-capable technology in a more safe, secure, and ethical way. According to Pruitt-Mentle (2008), this cannot be done with the current C3 knowledge and confidence level of many in-service teachers.

In the similar lines, in India, The National Cyber Security Policy was developed in 2013, which is a policy framework by Ministry of Electronics and Information Technology (MeitY) which aims to protect the public and private infrastructure from cyber-attacks, and safeguard "information, such as personal information (of web users), financial and banking information and sovereign data". This is basically to protect information and information infrastructure in cyberspace, build capabilities to prevent and respond to cyber threats, reduce vulnerabilities and

minimize damage from cyber incidents through a combination of institutional structures, people, processes, technology and cooperation. Various organizations like National Cyber security Association of India, CDAC, Cyber Peace Foundation, Data Security Council of India, etc. have been working in creating awareness on cyber security for various stake holders at various levels. In the field of Education, Ministry of Home Affairs (MHA) developed a Handbook for Adolescents/Students on Cyber Security, and recently NCERT (2018) came out with Cyber safety guidelines for schools. These guidelines were disseminated and were used in their in-service training programmes.

Role of Teachers

The COVID-19 lockdown has forced the schools and universities to close and had to go for remote or online learning. The closure has placed unprecedented challenges on governments, institutions, teachers, parents and care givers around the world. With the development of ICT in education, online video-based courses, e-books, simulations, models, graphics, animations, quizzes, games, and e-notes are making learning more accessible, engaging, and contextualized.

In the information technology era in general and in this lockdown context in specific, teachers' use of cyber tools and need to be aware of cyber safety and security is necessary for educational institutions. The students are more tech-savvy than the teachers envision. While numerous grown-ups depend on the periodic instructional exercise to figure out how to utilize another program or application, students are computerized locals. They naturally realize how to utilize applications, cell phones, and online stages, since they've been utilizing them their entire lives. This implies, with the correct inspiration, the students could most likely make sense of how to hack into others records, which may include teachers also. For instance, if a student wasn't happy with the teacher's evaluation, he/she may have the option to make sense of the secret key and change an evaluation or two. Thus, the teachers need to be empowered to shield both themselves and their understudies from digital assaults.

Sometimes, students may be the offenders of cyber security issues in the classroom, however in others; they may be the people in question. While numerous youngsters can without much of a stretch learn computerized programs and may even hack data. They may not be sufficiently sharp to detect each cyber security chance that they experience. As a teacher, it is possible to legitimately secure students and encourage them about cyber security so they can all the more likely to defend themselves on the web.

Regardless of whether the students intend to or not, the students could put teachers, the school, and their other students in danger with their computerized propensities. The students are regularly getting more educated than the teachers when it comes to internet usage. They likely have the ability to utilize each element of the most mainstream online projects and advanced gadgets. This could give them a huge favourable position over the teacher in the event that they needed to hack into the records. As an

instructor, one most likely has various online records. Today, the student's marks, memos, progress reports, contacts, personal details, and another identifying information is all at risk of being exposed. The poor and disruptive network security poses a major threat to parents of school children whose personal records contain personal and sensitive information. The practical effects of these attacks require intervention or remedy to increase cyber security. The teacher has to be prepared and rather take all precautions by following security measures if the students approach all the data put away on those records. They need to be alert and prevent the misuse by students. Thus it is very essential to study in-service teachers' awareness on cyber security at secondary schools.

Objectives of the study

1. To determine the awareness levels of teachers with regard to cyber security at secondary schools
2. To study the difference in the awareness of secondary school teachers on cyber security with respect to their
    - Gender - male and female teachers
    - Teaching Experience - novice and experienced teachers
    - Streams – subjects taught
    - Age

Research Questions

1. What are the levels of awareness on Cyber Security among secondary school teachers?
2. How do gender, teaching experience, streams and age account for differences in the awareness on Cyber Security among the secondary school teachers?

Methodology

The design of the study was descriptive. A normative survey was carried out to explore the awareness of teachers on cyber security at schools. A questionnaire was formulated which consisted of multiple choice questions focussing on passwords, internet safety, cyber-attack, antivirus, threats to privacy in schools and on frequency of use, safety practices and management with the threats to cyber security at schools. Data Collection was carried out by administering the questionnaire online.

Description of the sample

92 teachers from Karnataka have participated in the survey, out of which 39 teachers were from Science stream (Science and Mathematics), 40 teachers from Arts stream (Social sciences and Languages) and 13 others (Physical education, Art). Sample comprises of 66 male teachers and 26 female teachers. Teachers of different age groups were found in the sample – 4teachers with less than 25 years; 26teachers with age in the range of 25 to 35 years; 40teachers between 35 to 45 years; and 22teachers in the range of 45 years and above.

Tools used

A questionnaire comprising of 26

multiple choice questions designed and developed by the researcher after the review of the existing guidelines on cyber safety and security prepared by various organisations. Thus prepared questionnaire was given for review to experts and tried out on a small sample of teachers. The finalised tool was administered through online mode. All the questions have only one correct answer; for each correct answer, one mark is given and for a wrong answer, zero is given. Total score for each student is calculated and set for analysis.

Findings on Awareness of teachers on Cyber security

Total score obtained by each teacher on awareness test on cyber security was tabulated. Then the average performance of the group i.e. Mean (11.73) and Standard deviation (3.13) were calculated. Based on the mean and standard deviation, the levels are fixed as Mean + SD i.e. above 14.86 as high, Mean-SD i.e. below 8.60 as low and the between range i.e. 8.60 to14.86 as Medium level of awareness.

Following the norms for the levels of awareness given above, it was found that 11(12%), 70(76.1%) and 11(12%) teachers were found to be with possess low, medium and high awareness of cyber security respectively. Majority of the male (75.8%) and female teachers (76.92%) were found to have medium level of awareness and very few male (12.1%) and female teachers (11.54%) were found to have higher level of awareness.

Table- 1: Awareness of teachers on cybersecurity – Gender wise

Gender	Levels of Awareness of Cybersecurity			
	Low	Medium	High	Total
Female Teachers	3(11.54%)	20(76.92%)	3(11.54%)	26
Male Teachers	8(12.1%)	50(75.8%)	8(12.1%)	66
Total	**11**	**70**	**11**	**92**

With respect to gender, there is no significant difference between the awareness of Male and Female teachers on cyber security, as the following table shows that t value (0.005) is not significant at 0.05 level, thus we can say that both male and female teachers do not differ in their awareness on cyber security issues.

Table- 2: t value for difference in the awareness of Male and Female teachers on cyber security

Gender	N	Mean	t-value	Significance
Female Teachers	26	11.73	0.005	0.996
Male Teachers	66	11.72		

Further it was also found that irrespective of the stream the teachers belong to, majority of them were found to possess medium level of awareness.

Table- 3: Awareness of teachers on cybersecurity – Stream wise

Streams	N	Mean	t-value	Significance
	Low	Medium	High	Total
Science & Mathematics	4(10.26%)	32(82.05%)	3(7.69%)	39
Social Science & Languages	4(10.00%)	31(77.5%)	5(12.5%)	40
Others (Physical Education, Art Education, etc.)	3(27.27%)	7(63.63%)	3(27.27%)	11
Total	**11**	**70**	**11**	**92**

In order to understand the significance of difference in the awareness of teachers with respect to stream the teachers belong to, one way Analysis of variance is carried out and the results are presented in table-4.

Table- 4: Results of ANOVA for awareness of teachers w.r.t. Stream

Categories	Sum of Squares	df	Mean Square	F	Sig.
Between groups	13.078	2	6.539	.660	.519
Within groups	881.128	89	9.900		
Total	894.207	91			

Teachers belonging to streams do not differ significantly with respect to cyber security ($F=0.660$, $p>0.05$) at 5% level of significance. Hence, the null hypothesis "There is no significant difference in the awareness of teachers on cyber security with respect to the stream they belong to" is accepted. It means that, the teachers do not differ in their cybersecurity awareness irrespective of the stream they belong to.

In order to find out whether the teachers differ in their awareness on cyber security with respect to their age, frequencies and percentages are calculated and presented in table-5.

Table- 5: Awareness of teachers w.r.t. Age

Age group of teachers	Levels of Awareness on Cyber security			Total
	Low	Medium	High	
less than 25 years	1(25%)	3(75%)	0	4
25 to 35 years	2(7.69%)	19(73.07%)	5(19.23%)	26
35 to 45 years	4(10%)	32(80%)	4(10%)	40
45 years and above	4(18.18%)	16(72.73%)	2(9.09%)	22
	11	70	11	92

Majority of the teachers were found to have medium level of awareness on cyber security irrespective of the age group. But none of the teachers from the age group of less than 25 years demonstrated high awareness, whereas

5(19.23%), 4(10%), 2(9.09%) teachers were found to have high awareness in 25-35 years, 35-45 years and 45 years and above age groups respectively. To find out whether this difference is statistically significant, One way ANOVA is carried out and the results are tabulated below:

Table- 6: Results of ANOVA for awareness of teachers w.r.t. Age

Categories	Sum of Squares	df	Mean Square	F	Sig.
Between groups	84.603	3	28.201	3.065	.032
Within groups	809.604	88	9.200		
Total	894.207	91			

Teachers belonging to different age group differ significantly with respect to cyber security awareness scores ($F=3.065$, $p<0.032$) at 5% level of significance. Hence, the null hypothesis "There is no significant difference in the awareness of teachers on cyber security with respect to their age" is rejected. It means that, the teachers belonging to different age group differ in their awareness on cyber security.

Further, to know the pair wise comparison of age with respect to cyber security awareness, Tukeys HSD post hoc procedures were followed and the results are presented in table-7.

Table- 7: Pair wise comparison of mean scores of cyber security awareness with respect to age of school teachers by Tukeys HSD post hoc procedure

Variable	Age(in years)	Less than 25	25-35	35-45	45 &above
	Mean	8.7500	12.7692	11.8750	10.7727
Cyber security awarenes	Less than 25	-	4.01923	3.12500	2.02273
	25-35	4.01923	-	0.89423	1.99650
	35-45	11.8750	0.89423	-	1.10227
	45 & above	10.7727	1.99650	1.10227	-

Interestingly from the above two tables it can be observed that overall teachers belonging to different age groups differ significantly with respect to cyber security awareness(ANOVA) but Tukeys HSD post hoc procedure after pair wise comparison of mean scores indicate that there is no significant difference in the awareness of teachers to cyber security when individually compared age wise.

Further question-wise analysis revealed that

- 64 (69.6 percent) of the participants knew how to create secure passwords taking care of different characters, length and avoiding mobile numbers and so on. But when asked how often do they use the same password for multiple accounts 37 percent and 33.7 percent teachers responded as always and

never, which indicates that many know how to create passwords but still are using the same password in multiple accounts.

- When asked "How often do you switch to incognito browsing for banking?", 37 percent of teachers responded as 'always' where as 38percent responded as 'never'. Further 39 percent prefer to use auto fill-in mode for apps such as paypal, paytm, google pay etc. only 10percent avoid doing it.
- 73 (79.3percent) of teachers knew that when they get a new PC, which has anti-virus software already installed, it is safe to use the internet by making sure that both anti-virus software and operating software are up to date, whereas some (8 (8.7 percent) still believe that the software that come inbuilt are obviously reliable. There was a mixed response on the updating of anti-virus software from the teachers, some 25 (27.2 percent) teachers were of opinion that when the system gets slow then it has to be updated. 78 percent of the teachers expressed that if antivirus software detects virus, then they delete that file permanently and 13percent of them treat that file through antivirus.
- Only 49 (53.3percent) of the teachers could make out that safe websites among the given and were able to differentiate https & http, whereas the others were not able to identify which one among them are safer to use while browsing. 60percent of the teachers were aware that before downloading any application one must check for the reliability of the resource.75 (81.5percent) of the teachers were aware that empty company messages of mails are threat to their devices but only 60 out of them knew the reason that they may have attached viruses.
- 74 (80.5percent) of them were aware that downloading applications from a third party website harms device, out of which 56 (60.9percent) knew the reason as they need to give access for the application to work whereas the remaining teachers were of the opinion that the application is not from the authentic webpage
- Very few participants 16 (17.4percent) were aware that when a system becomes a target of a cyber-attack one can access someone's computer and lock the user's personal files and data, many of them 72 (78.3percent) were under the impression that they can access only data available on the system. Only 45 (48.9percent) of the teachers knew that question papers saved in their phone can be leaked without their notice when the phone is hacked and others were not aware of it.
- 86 (93.5percent) out of 92 teachers were aware that one must take backup and erase data before giving a PC for repair.62 (67.4percent) teachers were aware that updating OS regularly help the devices away from viruses and hacking. Others were not aware of it. Further Very few teachers i.e. 19 (20.07percent)

were aware of the procedure to be followed when the phone is lost. Others were not sure of it. 40 (43.5percent) teachers expressed that leaving laptop on sleep mode while it is connected to internet threat as it is easy for the hackers to get access, others believed that nothing will happen. 83.7percent of them said that it is not safe to leave applications running on the background where as the remaining teachers contradicted on this opinion. Majority of the participants (70.7percent) of the study indicated that the temporary files are to be regularly removed whereas 35percent of them felt that they need to remove them only when the disc is full.

- Only 33.7percent teachers were aware of free and open softwares and operating systems like Ubuntu where as others were not at all knowing about it. They even believe that free wares are best to use.
- When asked "How often do you give permissions to all the apps to access your device's information after checking their privacy policy", 28.3percent, 13percent, 25percent, 5.4percent. 28.3 percent of teachers responded always, often, sometimes, rarely and never respectively. Out of 92, only20(21.7percent) teachers were aware that using GPS facility on phone for apps such as maps or social media is threat to them and others hardly know about it.
- 35.9percent of the teachers change the passwords of the computer promptly where as others hardly change. Further, 44.6percent of the teachers never connect to public WiFi by turning on the safety features where as others i.e. 26percent of them always turn on safety features.

Discussions

ICT and digital education has become an integral part of almost everyone's life. Although it provides immense opportunities, one should be aware of the associated risks too. As children need to utilise new technologies day by day, it is inevitable to keep themselves and the data safe and secure. In this regard the teachers' efforts are of utmost importance when it comes to educating the students for cyber safety and helping them use the internet safely. With the increase in e-learning initiatives into the education system, it has become necessary to create awareness about cyber threats as well as possible approaches to overcome them. Creating cyber security awareness among students especially for primary and secondary school is of great importance in the era of e-learning, e-commerce, e-medicine, etc. Thompson et. al. (2018), points out the misconceptions students have with regard to cyber security and how this affects their safety on the internet. Teachers can play a great role to eradicate their misconceptions and help the students use the internet safely and handle cyber threats. The results further suggest that the majority of teachers lack an understanding of the importance of cyber security and hence are not able to practice the same in their daily school routine, may it be

in maintaining the personal computers at schools or home. The Present study also witnessed similar findings where in the teachers have moderate awareness on cyber security at schools. These findings were in consonance with the study conducted by Baris Sezeret, et. al (2015) found that the teachers had an average level of awareness on cyber bullying, in general and they differ in their awareness with respect to ranch, gender and frequency of internet use. Similarly a study conducted on pre-service teachers in Haryana by Taruna Malhotra and M Malhotra (2017) evidenced that most of them have comparatively moderate awareness level of cybercrimes. Interestingly the qualitative analysis of the data also gave a clear picture that even though the teachers were aware of certain aspects like safe websites, do's and don'ts they were not applying them when it comes to utility. As no one can afford an attack it is essential to develop awareness among teachers and students on cyber safety and cyber security and motivate them to apply in their daily life situations.

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Research Article

Enhancing Teaching Proficiency through Mobile Learning During School Experience Programme

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Abstract

Increase in the availability and accessibility of mobile phones has given the common man a medium for engagement, entertainment, learning and being connected to each other at the click of a button. A study was conducted to see the change in teaching proficiency of 2nd year student-teachers pursuing Diploma in Elementary Education - a pre-service teacher education programme in Delhi, India. The data was collected while the student-teachers were placed in schools for their School Experience Programme. The study was conducted on 30 student-teachers assigned in two experimental groups and one control group. Complete teaching sessions of student-teachers in experimental groups were recorded using the video recording feature of the mobile phones, and shared along with the feedback which was sent through SMS or WhatsApp feature of the phones. Further, teaching tips were also shared with one of the experimental groups. The results of the study indicated that teaching proficiency of student-teachers in the experimental groups have improved to a greater extent in comparison to their counterparts in the control group.

Keywords: ICT, mobile learning, pre-service teacher education, m-learning, supervision, teacher training

Introduction

Mobile technology is altering the way of living and it has begun to change the way of learning also. According to a report the mobile phone industry has grown worldwide with over 7.8 billion connections, with more than 5 billion unique subscribers, at a penetration rate of 66percent till 2017 (GSMA, 2018). In developing countries, unique subscriber penetration stands at 67percent. India had 87 connections for every 100 people in 2017 according to World Bank data.

Mobile learning is a powerful and pervasive knowledge delivery medium used by many with little guidance or training. Mobile devices are getting widely used for learning activities like recording information on the device through audio and video recorders, storing data, browsing the internet for various educational or personal purposes, sharing information in form of text, audio, video, exchanging movies and music through Bluetooth and apps like ShareIt, Google Drive, Social Media, thus improving links between the field and classroom. These are some of the ways to exploit the potential of mobile phones in learning (Mtega, Bernard,

Msungu & Sanare, 2012). Use of all these applications with the features of mobile i.e. mobility, accessibility and convenience results in improved engagement, motivation, competence, personal touch, confidence and communication of learners (Attewell et al., 2009).

Mobile Learning

Mobile learning is an emerging field and it is in its conceptualisation phase. It has been defined in technical terms keeping in mind its hardware and also based on its uses taking its mobility and contextualisation of the learning for rich learner experience (Ally, 2009). Literature is full of definitions of mobile learning, which focus on its various attributes or features. O'Malley et al. (2005) have defined mobile learning as

"Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies."

It is "learning across multiple contexts, through social and content interactions, using personal electronic devices" Berge, Muilenburg and Crompton (2013).

There are various characteristics of mobile learning found in the literature (MoleNET, conferences, LSN education, MLearn conference) like ubiquitous, pervasive, personal, situated, contextual, bite-sized, spontaneous, portable, familiar etc. Ubiquity is available everywhere and is part of our environment, which is true in case of mobile technology as well. Then comes the term pervasive which means interaction between an individual and a device through which further interaction is possible to a number of connected devices i.e. mobile devices or other computing devices (Kukulska-Hulme and Traxler, 2005). Personal is the nature of this device in terms of ownership and also when an individual access the content for learning it is done keeping in mind the individual's requirements. Mobile devices deliver the learning -what, when and where the learner wants, which makes mobile learning a facilitator for personalised learning. Earlier the learning or formal education had been confined to the four walls of the classroom but today mobile devices have made a place for learning on the move and to the new settings or situations It can also be extended to field learning activities like learning of student teachers in real classrooms. This way mobile learning supports contextual and situated learning (Ally, 2009).

India, though, not behind in owning and using the portable technology for learning, lags significantly, when it comes to researches in m-learning, more so in the field of teacher education. To make any change visible in the field, it should, therefore, start with teacher education, a field which has impact on all fields. (Justice Verma Committee, 2012) also mentioned about the implications of extended reach of implementing educational technology in teacher education. (UNESCO, 2012) in its policy guidelines has mentioned that to fully exploit these mobile technologies in learning, training of teachers is required. It has been further emphasised that investment on training of teachers is

more important than investment in any kind of technology.

Teacher Preparation in India

Teachers in India are prepared through Pre-service Teacher Education (PSTE) programmes and further trained through In-Service Teacher Training. Pre-service teacher education programme has components of theory as well as practicum. Practicum or School Experience Programme (SEP) is a field based programme. During the School Experience Programme, student-teachers go out of campus for practising the art of teaching in real classroom scenario in schools where their competencies are enhanced through the supervision by teacher educators.

National Commission on Education (1983-85) reported about the insufficient time and attention given to the supervision of the lessons during SEP. Supervisors, due to scarcity of time and physical distance, are not able to give required attention to student-teachers. Mobile learning can support field based learning, which generally suffers from lack of supervision by teacher educators

Mobile Learning and Teacher Preparation

In the age of mobiles, technology enabled supervision and feedback can be of great support to student-teachers. Videos of the teaching sessions can be recorded and shared by the student teachers with their supervisors and feedback by the supervisors can also be shared through mobile phones. It will reduce the need for face-to-face interaction and will help in overcoming the barriers of time and distance. This will also provide a platform for comparing the performance of student-teachers with previous performances and also with pre-determined standards. Besides, watching video recordings of their own teaching episodes by student-teachers themselves will give them the opportunities for self-evaluation of performance leading to increased motivation and reflection on their teaching.

It has emerged through studies that the members of the faculty with basic technology skills and expertise can use this technique to provide feedback. This has been termed as e-Coaching by Dieker et al. (2014). Video recordings proved to be very effective in developing teaching skills through microteaching. The recording of the micro teaching sessions help the supervisors, peer teachers to comment on the teaching and the student- teachers to observe their own complete teaching episode and evaluate their own performance as well as discuss the feedback with the small group to reach at desired levels of particular teaching skill's proficiency (Anthonia, 2014). Audio and video recording has been considered an objective way of self-evaluation by (Schwartz, 2017). Mobile devices today are providing an opportunity to test and use this technology for improving the Teacher Education.

Therefore the researcher tested the effectiveness of mobile learning with reference to the change in teaching proficiency of student-teachers teaching class 6-8 during their SEP

The following research questions were raised:

- How does the viewing of video recordings of teaching sessions and getting feedback on them through mobile phones affect the teaching proficiency of student-teachers?
- What are the effects of receiving teaching tips along with viewing videos of classroom teaching performance and getting feedback through mobile phones?
- Following hypotheses were formulated:
- Student-teachers in Experimental Group I will show higher gain scores on teaching proficiency as compared to student-teachers in the Experimental Group II.
- Student-teachers in Experimental Group I will show higher gain scores on teaching proficiency than student-teachers in the Control Group.
- Student-teachers in Experimental Group II will show higher gain scores on teaching proficiency than student-teachers in the Control Group.

Methodology

The sample for the study comprised of 30 student-teachers of second year Diploma in Elememtary Teacher Education (D.El.Ed) Programme-a pre-service teacher education programme offered by District Institute of Education and Training under SCERT Delhi, India. The Sample of the study was chosen using Random Sampling technique. Pre-test - Post-test Control Group experimental design was used to conduct the experiment. There were two Experimental Groups and one Control Group 9 (Table-1).

Table-1: Experimental Design at a Glance

Experimental Group I	Experimental Group II	Control Group
• Video recording of 5 complete teaching episodes of each student-teacher at periodic intervals • Sharing of recordings and showing it to student-teachers, • Giving a feedback through SMS / WhatsApp individual messages, • Providing Teaching Tips on all the working days during the first half session of school	• Video recording of 5 complete teaching episode of each student-teacher at periodic intervals • Sharing of recordings and showing it to student-teachers; • Giving feedback through SMS / WhatsApp individual messages	• Video recording of 5 complete teaching sessions as placebo (For Comparison) Note: Video recordings were not shared with student teachers

The experiment was conducted for all the three groups for a period of 6 weeks covering 25 days. The data was collected prior to the experiment for testing intelligence (Raven Advanced Progressive Matrices), Achievement (Class XII achievement scores), and Availability and User-friendliness of mobile phones (Self developed Check list). Pre-test and post-test of each

group was conducted for the dependent variable of the study 'teaching proficiency'.

Videos of teaching sessions were recorded and shared with student-teachers in person and also through the Google Drive, and feedback on these recorded teaching sessions and teaching tips were given through SMS or WhatsApp individual messages. Mobile phones were used to record and share the videos, feedback and teaching tips messages. Teaching tips were small pieces of information (one-liners) based on the principles and maxims of teaching, teaching competencies and aspects covered in the observation scale. These were created by researchers and were validated by experts. These tips were sent to experimental group I to reinforce the aspects of effective teaching.

Feedback in the form of comments was also sent to all the student teachers of treatment groups through SMS messages. Feedback covering all the aspects of teaching proficiency schedule was also sent through SMS/WhatsApp individual messages. The feedback had instructive, corrective and encouraging comments as suggested by (Scheeler, 2008).

Teaching Proficiency observation schedule developed and validated (Singh, 2013) was used to observe and rate the teaching proficiency of student-teachers during SEP. The schedule comprised of different aspects of teaching behaviour as follows: Planning for Instruction; Mastery of Content Matter; Communication Skills; Instructional Skills; Use of relevant Approach based on Constructivist Paradigm; Use Teaching-learning material; Nature of Student Teacher Interaction; Classroom Environment; Handling Classroom Diversity needs of students; Using appropriate technology in the classroom.; Undertaking Assessment; and Teacher Dynamism. The schedule had content validity an inter rater consistency r=.84.

The data was analysed both quantitatively and qualitatively. The obtained quantitative data was analyzed using Gain Scores (Post test scores - Pre test scores) and applying one-tailed t-test of differences between two measures for each individual (Walker and Lev, 1965) for studying the effect of m-learning on the identified parameters. It was supplemented by the qualitative analysis of the data related to perception of student-teachers obtained through questionnaire and Focus Group Discussion.

Analysis and Results

Prior to the experiment, availability and user-friendliness of mobile phones was checked with the sample. Data showed 100percent availability of mobile phones in all the groups. It was found from the data that all the student-teachers irrespective of their social category, sex, and age had mobile phones. They all had phone with advanced features (Video camera and internet connectivity for apps, etc.) and the groups were found to be equal before the experiment in terms of the user friendliness of mobile phones.

It was also found that the three groups were similar on the criteria of age, sex and social category and were not

likely to influence the results of the experiment. The groups were also found to be equal on Intelligence, achievement and teaching proficiency prior to the experiment.

With a view to study the effectiveness of Experimental Groups I and II vis-a-vis the Control Group, mean gain scores were first computed through a difference in post-test mean scores and pre-test mean scores for all the three groups under study. Overall comparisons were then made using't' test using difference method. The gain scores of all the groups were analysed using mean, SD and t values were calculated (Table 2)

Table- 2: Teaching Proficiency Gain scores

Groups	N	Mean (Pre Test)	Mean (Post Test)	Mean Gain	t value	df	Significance Level
Experimental Group I	11	37.36	58.72	21.36			
Experimental Group II	10	37.7	59.1	21.4			at .025= 4.30 Significant
The Control Group	9	40.556	50.11	9.56	4.44	2	

Table-2 shows that the mean gain difference is significant at 0.025 level. Mean gains show the difference amongst the groups, Experimental Group I and II did not show difference in means whereas difference between Experimental Groups and the Control Group is high.

This has been further verified through the analysis of groups in pairs in table-3.

Table- 3: Teaching Proficiency - Pair Wise Gain scores

Groups	N	Total Scores	Mean	SD	t value	df	Significance Level
Experimental Group I	11	235	21.36	9.036	0.01	19	at .025= 2.09
Experimental Group II	10	214	21.4	7.198			Not significant
Experimental Group I	11	235	21.36	9.036	3.6	18	at .025= 2.10
The Control Group	9	86	9.56	7.019			significant
Experimental Group II	10	214	21.4	7.198	3.6	17	at .025= 2.11
The Control Group	9	86	9.56	7.019			significant

The means of the Experimental Group I , II and control group were 21.36 , 21.4and 9.56 respectively The value of t was found to be significant at 0.025 level at df 18 and 17 and the difference was not significant at 0.025 level and at df 19. Hence, two directional hypotheses were accepted and one was rejected as Experimental Group I and II did not differ on t value. The effectiveness of watching of one's own video and feedback in the form of comments sent through SMS/WhatsApp individual messages for improving teaching proficiency was thus established.

The findings of the study are consistent

with the findings of (Kong, Shroff and Hung, 2009) who mentioned in their study on a system of web based classroom video recording for self-evaluation and reflection that self-reflection on one's own performance is very critical for practicing teachers to bring quality in teaching. Video based technology was considered beneficial in making detailed self-reflection. Similarly (Wu & Kao, 2008) used web based video recording using video streaming technology to support pre service trainee teachers in peer assessment. Video recording was considered useful by the participants. Hundred percent trainees watched their own video of teaching sessions and sixty one percent watched it several times and watching their own videos helped them in self-analysis. (Ferry, 2009) used mobile phones with pre service teachers and reported that PSTs used mobile devices for video recording or for digital camera for capturing their teaching episodes which showed their impactful teaching sessions and it was the most successful use reported in the findings of the study. (Savas, 2012), reported that self-video recorded lessons through cell/ mobile phones used during micro teaching lessons had both advantages and challenges. The benefits stated in study were: video recording give a chance for objective self-evaluation through watching and correcting mistakes, it also helped in increasing self-confidence, improving communications and lesson plan.

'Teaching Tips' the added intervention given to Experimental Group I in comparison to Experimental Group II did not have any significant effect on the teaching proficiency of student-teachers.

Intervention given to the Experimental Group I and II led to the enhancement of teaching proficiency among student-teachers more than the conventional method of giving feedback (control group) without the use of mobile learning.

Perception of Student –teachers towards M-Learning

A questionnaire consisting of a few open ended questions was administered to the student-teachers to gain an insight into the findings of the study and focus group discussions were conducted to probe deeper into the mindset of student-teachers about the use of mobile technology during SEP.

Results of the questionnaire filled by student-teachers showed agreement on the usefulness of video recording. Use of mobile technology had many benefits but a few problems were also reported by student-teachers.

Benefits of Video Recording & Getting Feedback through Mobile Phones

After the post-test, a questionnaire was administered to know the perception of student teachers about the benefits of using mobile technology during SEP. The data were analysed and categorised on the basis of responses received. Majority of student-teachers mentioned that it helped in the improvement of their teaching as a whole.

SEP is a phase of real classroom experiences and helps student-teachers to practice this art of teaching and

improve as well as polish their skills. But the student-teachers mentioned that it gave them more chances of improvement as they could see themselves while teaching. Student-Teachers found it useful in improving their teaching and overall teaching learning process.

Confidence plays an important role in performing any activity, the same applies to teaching. Handling a class of 35-40 students is a difficult task only a confident and well prepared teacher can do that. A large number of student-teachers admitted that watching their own performances helped them in improving their confidence. In the words of one of the students – teachers, "I can see my weak areas like ineffective explanation. It is also helpful in improving the confidence level; I can say this because I have improved a lot." M-learning helped them in improving their communication skills, improving their lesson plans, maintaining the classroom discipline and also in getting immediate feedback.

Watching videos of teaching sessions helped the student-teachers in understanding the aspects that needed to be improved upon. The student-teachers said that they could see their teaching episodes again and again. It helped them in self-evaluation and reflection; they could identify their weak areas and tried to improve upon them. In the words of one of the student-teachers, "It helped me in regulating the speed with which I used to speak in the class while interacting with the students."

Self-evaluation is important and can be beneficial in increasing reflection of student-teachers. (Savas, 2012) also reported that video recording helped in increasing the self confidence amongst pre-service teachers, improving speaking skills as they could see and listen to their own pronunciation and also in organising their lesson plans meaningfully. Video recording allows for self-evaluation and correcting mistakes as the student teachers can evaluate their own work objectively and also know the weak points. (Cooper, 2015) had similar findings for video recording of teaching sessions. It was mentioned that digital natives should actively engage with technology for self-awareness, self-evaluation and self-development of their performance.

Feedback is an important component of the school experience programme, and feedback on the recorded teaching sessions were also sent through SMS or WhatsApp individual messages through mobile phones.

The student-teachers reported that it helped them in understanding their teaching better. They reported that feedback received in the form of SMS/ WhatsApp was useful to them as they could read it while watching the videos of their performance and pinpoint the weak and strong aspects. It helped them to evaluate their own performance.

Problems faced during Video Recording of Teaching Sessions

Student-Teachers reported certain problems which they faced during video recording sessions. A few student-teachers highlighted the problem of indiscipline in class or distraction of students from studies while recording.

They mentioned that,

- "It is difficult to maintain discipline in classroom when recording is done, Students get hyperactive".
- "When we record videos the students look at the mobile phones and class becomes indisciplined".
- When we record videos the students get conscious and become silent and do not respond to the questions."
- Students create lot of noise, the whole class gets messed up, Children get excited that their picture will come in the cameras".

The data revealed that video recording created excitement among the students which disturbed conventional maintenance of discipline which ultimately made student-teachers nervous as it could have direct implications on their evaluation.

A few student-teachers expressed their concern about the quality of mobile phone video recording.

All the student-teachers had a mobile phone with camera with different technical specifications. Some of the phones had camera of resolution of about two mega pixels only. This resolution was meant for viewing the video on mobile phones and was not clear enough for big screens like laptop or TV.

A few student- teachers reported about the nervousness they felt while video recording.

They said:

- "Sometimes students ask such questions which are not easy to answer. In this situation it increases the hesitation level of teacher".
- "Teacher can become nervous, if someone watches the video recording of the other, the person may get discouraged and lose confidence".

Though video recording was new exposure for student-teachers which even made them nervous but a continuous exposure helped them to overcome the nervousness. (Savas, 2012) also reported similar challenges of video recording that it made student teachers nervous and created problem of time for recoding videos.

One student teacher also reported that it was not easy to understand the messages, or abbreviations used, and there were chances of misunderstanding the feedback given.

However, a substantial number of student-teachers found m-learning quite useful foe developing teaching proficiency.

Suggestions given by stdent-teachers

Student-teachers mentioned about some problems while using mobile learning and suggested ways to improve the same. One problem of being nervous was recorded and it was suggested that nervousness happens initially, if recording is done regularly then it gives confidence and nervousness vanishes. For the problem of indiscipline and unavailability of a person to record they suggested that students get excited when they see recording happening for the first time, but when it becomes a practise they may

themselves start ignoring it. It was also mentioned that some in-built recording feature or hidden camera can be used like webcam. Problem of low quality of mobile camera was also mentioned and the suggestions of using each-others phone was given.

Problem of misunderstanding of messages, non- availability of phone or internet was also reported and it was suggested that feedback given should be discussed periodically in addition to SMS or written feedback to avoid any miscommunication.

They also suggested that video recording should become a regular feature of teacher preparation programme, whether it is during internship in schools, or practice in institution in micro teaching and simulated teaching sessions. It helps in developing the teaching competence.

Conclusions

Mobile phones are the device of everyone without any boundaries and everyone is familiar with their basic uses of calling, messaging, clicking pictures, recording videos and many are aware of its advanced features and handling new apps as well. Mobile learning should be used to enhance teaching proficiency of student teachers during school experience programme.

The results of this research study have indicated that m-learning helped the student teachers in self-evaluation and self-improvement. Through this they could see their teaching episodes and got the chance to identify their own weak areas and improve upon them with the help of supervisor's comments shared through SMs/WhatsApp. They could watch their recordings again and again as well as compare their new performance with the earlier one objectively. They could relate the feedback comments with their performance in the recorded episode. Video recording feature of mobile phones can be employed or any other technical instrument can be used for video recording of the teaching sessions and it can be directly shared with the supervisor through Google Drive to get a more comprehensive feedback. Data on the mobile phones will help supervisors to deploy the saved travelling time more productively. (Cooper, 2015) developed Lesson Observation On-line (Evidence Portfolio) platform (LOOP) and tested it during teacher experience programme in real classrooms. It was planned to create an alternative to traditional system of observation by visiting the school. The study reported that "The LOOP is not only feasible but achievable."

The purpose here is not to perfect the teaching abilities of student-teachers but to give them a chance to adapt themselves to the needs of the classroom and video recording can give a chance to see the classroom from the point of view of an outsider and understand the dynamics of the classroom.

It is recommended that the video recording of teaching sessions and online feedback should be used for strengthening the SEP and making it more effective in enhancing teaching proficiency of prospective teachers. Teacher educators shall be facilitated for supervision to improve its quality

as well as increase the number of and giving online feedback.
observations by viewing the recordings

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Research Article

Analysis of Recent Trends in Higher Education in India Using Information Communication Technology (ICT)

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Abstract

In the era of digitization, technology and knowledge have taken center stage in all national and international discussions. Education is a fundamental tool for socio-economic development and progress of the country. Higher education is an important area of focus, which needs to be modernized in order to make it more efficient and impactful. Information Communication Technology (ICT) can make this happen. Teaching and learning process have evolved from being one-sided activity to an active process involving exchange of ideas, introduction of creative tools and techniques has made the whole exercise a collaborative initiative. ICT is crafting the role of future education in India by emerging as one of the most efficient means used by both learner and teachers. The use of ICT in higher education works towards content generation, building research in critical areas imparting education and integrating knowledge with the advancement of technology. This article is divided into three sections. The first section explains the role of ICT in higher education system of India. It gives the macro-level analysis of recent initiatives taken by government in higher education sector using Information Technology, particularly those which have arisen due to Covid-19 pandemic. The second section reviews the importance of ICT in three key areas - teaching and learning, research, and education planning and administration. The final section highlights the role of ICT in addressing current challenges like those created by COVID-19 pandemic and suggests some policy solutions in implementing ICT in higher education.

Key Words: ICT, Higher education, Digital technology, e-Learning, Innovation.

Introduction

Information Communicatio Technology (ICT) has become an integral part of most of the sectors including education, where it acts like a catalyst of change. Use of ICT in education is rapidly improving the landscape of education in terms of the teaching and learning process. Traditionally, these two processes have been one-sided activities. However, with the advent of ICT, these are changing to active processes which involve exchange of ideas, introduction of creative tools and techniques, thereby making the whole exercise a collaborative initiative. In the present times, the role of ICT can be defined as a tool to maintain balance between the areas of knowledge, content creation, expansion of multi-disciplinary research, dissemination of information linking the stakeholders associated with education sector. This paper analyzes all these contours of discussion and brings insights into the higher education scenario in India and its patterns of growth.

India's education system is a major contributor in building its economy. The rise of all sectors based on advanced technologies and globalization has bought a paradigm shift in the knowledge requirements. Continuous competition has enhanced pressure on all individuals to acquire specialized skills. Technology has facilitated increasing the reach of education to various sections of society. As a result, the higher education system has witnessed tremendous growth in many aspects like improving equality, enhancing operational efficiency, enrolment numbers, teacher student ratio, institutional capacity, etc. The inception of ICT has transformed and expanded the conventional boundaries of education. New technologies and education software are not only changing the approach of students, they are also revolutionizing the role of educators, creating philosophical shifts in approaches to teaching and role modelling in classrooms (Bernard, 2017). Technology based learning system allows flexibility in terms of time and space. Technology solutions such as virtual classrooms can be accessed from anywhere across the world. ICT contributes in dissemination of information irrespective of the geographical boundaries (Oliver, 2002). The use of ICT in higher education has facilitated lifelong learning opportunities that allows people of continue their studies besides busy working hour schedules through distance and open learning. (Das, 2017) Traditional learning environment, bound to rigid time frame and location, has been replaced by web-based education. ICT generates a number of opportunities to enhance improvement of academic processes and coordination in higher education. It is mainly intended to improve education access so as to provide education for all.

Trends in the growth of Higher Education in India

India's higher education system is the world's third largest in terms of students, next to China and United States (Manoj, 2019). Higher education in India gained momentum with the establishment of ancient universities in Nalanda, Takshashila, Vallabhi, Kanchipuram and some other cities. However, the foundation of western education was laid by Britishers. One of the main purposes of western education was to establish English as a medium of instruction. Higher education in modern India covers education beyond 10+2 levels. It comprises of colleges and universities, which produce undergraduate, post-graduate, diploma, certificate, doctoral and post-doctoral courses in India. University Grants Commission (UGC) is a pioneer institute established by Central Government for promoting and coordinating university education and is also responsible for regulating and maintaining the standards of teaching, examination and research conducted by the universities.

The National Policy of Education NPE, 1986 has laid emphasis on the importance of higher education, due to its potential to contributing to national development through dissemination of specialized knowledge. Acknowledging the demand for technology in education, the Government started using it since the period of 1970's. After the major reforms in the year 1991, the relevance of technology in education was realized

in various policies and projects. The reforms of 1991 attracted large number of people towards entrepreneurship, which in-turn opened doors for privatization. Education was not only regarded as a symbol of status but also as a way to move ahead of others. This accelerated the establishment of large number of institutions and centers of excellence. The Right to Education Act RTE, 2009, which is often seen as a watershed moment in the education sector, stipulates compulsory and free education to all children in the age group of 6-14 years. This Act heavily relies on ICT to make education accessible to all.

Privatization and globalization of higher education seeks to establish global prospective on education and sensitize youth for understanding the technological changes in the multicultural world. Higher education in India has also undergone a significant change as a result of technological innovations (Mishra, S & R.C. Sharma, 2005). The present trend prophesizes that the foundation of higher education system will primarily continue to be in the conventional classroom halls. It will get enhanced with new technology-based tools and integration of modern techniques of education, specialized trainings and advanced analysis thereby extending the scope of learning opportunities.

ICT enabled education has provided a competitive edge by offering enhanced services to the students, flexibility driving greater efficiency and creating enriched leaning experiences. It is about a new way, in which people can communicate, inquire, learn, make decisions, and solve problems. The use of audio-visual aids like television, radio and internet for the dissimilation of information is not new. The integration of first satellite in education as Satellite Instruction Television Equipment (SITE) was launched in 1975-76. This led to the formation of Central Institute of Educational Technology (CIET) and State Institute of Educational Technology (SIET) studios for production and transmission of school-oriented programs. CEC was the nodal agency for creating educational media and resource centers and audio-visual centers in number of universities. Later with the launch of internet in 1995, computer and multimedia were introduced in teaching and learning process.

India has taken up major step towards content delivery and fostering education based on ICT through the launch of a satellite named EDUCAST on 20 September 2004, to bring a revolution in education. At present, a National Mission on Education through Information Communication Technology (NMEICT) was introduced in 2009 by the Ministry of Human Resource Development (MHRD) with an aim to provide an opportunity to every teacher and expert to expand knowledge collaboration for helping every individual learner, thereby reducing the technological divide.

The National Mission on Education focuses to create a balance between knowledge creation, content dissemination, research analysis in important area of imparting education and enhanced integration of best use practices globally with local practices. ICT helps in manifesting the capacity building of educational institutes.

National Knowledge Network (NKN) and NMEICT provide digital connectivity across all national and other colleges for the purpose of resource sharing and to establish country wide virtual classrooms. It has also helped to bridge the gap by proving e-content to students who fall short of resources. Similarly, UGC-Consortium for Educational Communication (CEC) and Indira Gandhi National Open University (IGNOU) were entrusted with responsibility to develop e-resources for both regular and distance learning courses. Digitalization has not only provided easy access but also low costs, affordable and high-quality resources to students and teachers.

Number of new initiatives like Global Initiative of Academic Networks (GIAN), Study Webs of Active learning for Young Aspiring Minds (SWAYAM), spoken tutorials, National Digital Library, National Programme on Technology Enhanced Learning (NPTEL), National Academic Depository (NAD) and Digi-Locker App for storage of academic documents are some of the series of programs and initiatives started by the Government in recent times. Their focus is to extend academic and research support by creating high quality e-content, teaching and learning material to develop collective learning experience

Role of ICT in the times of COVID-19 Pandemic

Perhaps the biggest proof of the utility and scope of ICT in education had emerged from the challenges created due to the COVID-19 pandemic. The crisis which has gripped the country and the world since the start of 2020 has been unprecedented in many ways. When it comes to the education sector, most States in India started closing down schools since March, 2020. As per an estimate by UNESCO, the current pandemic has affected about 70 percent of the children worldwide out of which, around 300 million children are in India (UNESCO, 2020). The disruption has affected more than 90 percent of the students in India (MHRD, 2020a). To mitigate the losses of students, ICT has been the key instruments in the hands of the Government and private institutions. The educational institutions are heavily relying on online delivery of class lectures, webinars, online group discussions and online assessment of student's learning. In India, the previous decade has shown a significant penetration of mobile and broadband connectivity. Although, the country was not fully prepared for such a huge shift from offline to online mode of education, concerted steps are being taken to make the process easier for both students and teachers. Some States like Chhattisgarh have launched a dedicated portal called 'Padhai Tuhar Dwar' (Education at Your Doorstep) which allows the teachers to deliver online lectures using mobile technology. As per the official data more than 1,80,000 teachers and more than 20 lakh students have registered on the portal. In some Union Territories like Jammu and Kashmir where high-speed connectivity is a problem, the schools are using recorded videos through social media apps like WhatApp and Google Drive to deliver the lectures. Similarly, other higher educational universities have moved

all the academic requirements like Ph. D. defense presentation and academic conferences, etc. to online mode (see for example Jamia Millia Islamia University, 2020).

The Ministry of Human Resource Development in India has recently launched a web-portal named YUKTI 2.0 (Young India Combating COVID with Knowledge, Technology and Innovation) to give better inputs for policy planning in COVID-19 pandemic and monitor the activities effectively (MHRD, 2020c). Further, the government is extensively using SWAYAM Prabha, a group of 34 DTH TV channels, and Radio including Community Radio to provide education to the students in the remotest parts of the country. In addition to this, many new ICT-based initiatives have been taken by the Government to address the challenges due to the pandemic. A comprehensive initiative called "PM e-Vidya" is going to be launched which will integrate all the digital modes of education like DIKSHA (one nation-one digital platform), SWAYAM, TV and radio (MHRD, 2020b). As per the assessment of The World Bank, Indian education sector has brought out many tools based on ICT technology. Digital apps like e-Pathshala (which provides NCERT material online) and The National Repository of Open Educational Resources (NROER) portal are few such examples (The World Bank, 2020). In education sector, 100 top ranked universities have been selected to provide full-fledged online programmes. This will be augmented with the already operational SWAYAM MOOCs courses covering the curriculum of many universities. The results in the past few months have been positive as the official data suggests that "about 50,000 people have accessed SWAYAM since 23 March, 2020" (MHRD, 2020d). Nevertheless, these efforts cannot be assumed to have solved the problems in online education completely and there are many challenges which still exist. These will be discussed subsequently in this paper.

ICT in Teaching and Learning

Ensuring universal access to ICT has been one of the prime objectives of government. The major teaching and learning challenge faced in higher education resolves around the student's diversity which includes academic excellence, language and schooling background. ICT enabled education has the potential to promote the development of student's decision making, problem solving, data processing skills and communication capabilities. Technology application is not limited to classroom but these sessions are being replaced with virtual sessions also. Critical thinking, deep-dive into a subject, cross-analysis and multi-angle approach has become very important as the sources of information are varied and the issues at hand complex.

Bringing ICT in the field of higher education has fulfilled the educational requirements of nation through part-time and distance learning schemes. Implementing online pedagogy across various universities and colleges has increased over the period of time. The installation of Wi-Fi enabled system has resulted in education system getting upgraded with easy accessibility, accountability and availability of subject

matter for the students.

Introduction of ICT in the field of academics depends upon teacher's ability to keep in pace with the developments since teachers are responsible for the aggregate development of learning process. ICT-based education makes use of new innovations like power point presentation, video clips, LCD projectors, animation modelling and stimulations, based on collaborative learning practices. ICT generates student-centered learning processes, where teacher acts a facilitator or mentor to promote learning among students based on interactive teaching strategies. Seminars, conferences and group discussion further builds up the learning capabilities of students through use of electronic devices and tele communication equipment's like projector, CD-ROM, LCD and other display services connected to internet.

Virtual learning practices include assimilation of different set of network system and information infrastructure for promoting education. Broadband, EDUCAST, Education and Research Network (ERNET), digital libraries and electronic resource programs serve different institution in different disciplines designed to enhance students learning experience. Collaborative learning based on the means of tele-education system supported by chain of networks system like EDUCAST, Wi-Fi and V-SAT promotes better teacher-student interaction.

According to Zhao (2001), there are three conditions necessary for teachers to introduce ICT into their classrooms – firstly teachers should believe in the effectiveness of technology, secondly teachers should believe that the use of technology will not cause any disturbance, and finally teachers should believe that they have control over technology. Most distance learning programs include a computer-based training (CBT) system and communications tools to produce a virtual classroom (Pingle, 2017). The implication of ICT has fundamentally challenged the basic structure of higher education in India. The government of India has formulated National ICT policy implemented through various institutions like University Grants Commission, All India Council for Technical Education (AICTE), Department of Science and Technology, National Informatics Centre (NIC) throughout the country (Singh & Sharma, 2010). Such initiatives strengthen teaching and learning practices enabling both teachers and students to gain direct access to technology, communication and better learning.

ICT in Research

The growth of higher education sector in India has rapidly moved way forward after diversifying technology in the field of education. ICT in learning process acts as a support system to generate knowledge from various interrelated aspects of education. Communication systems make it possible for the researcher to stay connected to all over the world than being confined to one single institution. The combination of both communication links and digital resources generate online expansion and equalize the access to academic resources. It establishes link across

all subject matter and social media networks. The collection and analysis of data has become much easier through the application of various softwares. The cumbersome task of analyzing data manually is reduced as it facilitates quick and accurate analysis of huge data.

Another important dimension of ICT is to provide use of online text base and online resource centers, which are directly the outcome of tele-communication network and technology. These databases provide provision of online access to e-books, journals, articles and other sources (Young, 2012). The new paradigm in the field of research calls for the development of national policies for ICT in higher education to establish joint information system linking all the higher education institutions. Hannafin & Girasoli (2008) explains the use of asynchronous Computer-mediated communication to promote student self-efficacy and hence improve academic performance ICT in academic research calls for mindsets that are adaptive towards change (Pingle, 2017).

ICT in Education Planning and Administration

During past two decades ICT has fundamentally changed the basic shape and the working of higher educational institutions. The demand for integration of ICT across various universities and colleges calls for the development of effective educational management practices with comprehensive set of functional administrative measures. With the readily available data for analysis, the administrators can make quick decisions about improvement in education and as well as improvement in the functioning of institution. By simplifying the administrative tasks and making efficient utilization of resources, it has reduced the cost of paper work and replaced the traditional system of maintaining records. The student administration driven by electronic methods helps in easy revival of information.

E-learning provides online discloser of assignments, course material, online tests and open educational resources. Other software like Learning Management Systems (LMS) allows the best planning of change management by enabling students to apply for courses directly online, pay fees using digital mediums and also get access to academic material and courses online itself. Thus, ICT can virtually end the physical boundaries by enabling students from across all geographical spectrums to interact and facilitate the rise of global education.

Institutional information systems provide tools for management of human resources including students, teachers and staff and make it easily available to parents and administrators. This provides a much-needed facility to administrators for planning and allocation of resources, work distribution, supervision and performance analysis. This also includes relevant communication to and from the institutions and among peers. Staff administration use Information and Communication Technology (ICT) for processing of voluminous records in a quick, meticulous and impeccable manner thereby making data retrieval easier. The difficult task to track the teachers as well as student's movements

and progress at college/university, state and central level and to keep the record of the assets has ultimately an impact on financial planning and budgeting (Meenakumari & Krishnavani, 2010). Joshi (2012) highlighted the usage of ICT for administration in higher education institution in terms of general administration, payroll and financial accounting, administration of the student's data, personal record maintenance and library systems.

Challenging factors affecting utilization of ICT in Higher Education

The emerging role of ICT in higher education provides prospects and trends of integrating technology into education activities. Technology-based education has shown a significant progress with regard to better quality, greater access and equality across the country. The availability of ICT has helped create a digital India and strengthen its technological capabilities in the recent decades. Ensuring equal access to technology means that the digital divide between the urban and rural students must be reduced and the students coming from educationally backward areas must be give tools to access information. The need is to articulate training and computing skills to bring awareness and reduce rural-urban divide which is one of the major challenges faced in implementing ICT in domain of higher education.

The inaccessibility of ICT resources may be due to the lack of personal access for the teachers, poor quality hardware, poor resource organization and software not being appropriate (Becta, 2004). ICT based education provides government an opportunity to reach more isolated groups. Berner (2003) found that the faculty's belief in their computer competence was the greatest predictor of their use of computers in the classroom. Therefore, lack of awareness about the ICT facilities and absence of skills to use the new technologies in teaching and learning is a major impediment (Sultana & Haque, 2018).

Another factor which is a challenge to ICT is financial crises and absence of political will. India has one of the largest higher education systems in the world with majority of students studying in various colleges and universities. Not enough has been done by the education technology providers to integrate pedagogy behind the use of technology. Most of the state universities and colleges are running short of infrastructure and funds. ICT supported systems like hardware, multimedia, audio visual aids of teaching demand for huge funds. The demand to meet the technological needs cannot be provided by stakeholders. The use of ICT in education depends upon the political will. Management of the India's education system faces challenges of centralization, rigid bureaucratic structures, lack of accountability, transparency and professionalism. As a result, the burden of carrying the administrative functions have increased and the focus on academics and research has diluted (Kumar & Ambrish, 2015). Many universities and higher educational institutes do not have adequate funds to purchase books and other printed material for their students.

Development of digital content enhance adaptive learning at personalized space allows learner to work in its own pace.

Linguistic Barrier is also a major challenge to ICT's success. India's linguistic diversity necessitates for the development of content in multiple language (Pegu, 2014). As English is dominant medium of instruction as well as the one most in use a large proposition of education software produced world-wide are in English. It limits the scope of information access to people who lack the ability to understand English language. Standardization of local language is necessary to lift the barrier between technology and common man.

Professional development of the teacher is the key factor to the successful integration of digital technology in teaching. Quality professional training programs help the teachers to a great extent in implementation of technology in education and in transformation of teaching practices (Brinkerhoff.J, 2006). The teachers should meet the demands of learners and provide them with the relevant curricula. Unavailability of technical support within the institutions results in ineffective use of resources. Another factor of consideration is the teacher's readiness to accept the change to promote critical thinking skills and collaborative learning practice in the students. Lack of confidence can also be due to the teachers' lagging in latest knowledge about technology and this leads to resistance in using ICT in education.

Extending support towards technical education is a very important necessity. Majority of educational portals show that much work has been done in the discipline of science and technology and not in humanities, social science or commerce. According to OECD (2014), the percentage of students enrolled under humanities and social science is comparatively lower than that of science and technology as a result lack of availability of e-content in such disciplines.

In terms of technical support many institutions like IITs, IIMs and NITs are well equipped with the advanced technological devices including high speed networking devices whereas non-science institutions are not at par. This gives a false perception that social science and humanities do not require technology. The technical problems faced while implementing ICT can "impede the smooth delivery of the lesson or the natural flow of the classroom activity" (Sicilia, 2005). As a result, these disciplines remain deprived from technology due lack of technical support like latest software and techniques used in research as well as academics.

Lack of ICT Support Infrastructure and Resources is another issue which needs to be tackled. The higher education system in India is facing chronic shortage due insufficient IT system and infrastructure. The logistical needs and technical support to such institutions can be addressed through proper Action plan. Further recurrent cost of software license like application for main information systems, specialized application, database platform and desktop application should be considered. This helps in strengthening system and norms of

higher educational institutions, thus increasing transparency. Another important barrier in integrating ICT in higher education requires balance between the educational goals and economic realities.

Wims (2008) found that lack of Developmentally-Appropriate Software (DAS) is one of the difficulties faced by teachers and students. The reason for human resource constraint at present is due to the lack of manpower for teaching and low motivation levels among the educators to integrate ICT in teaching and learning (Khan, Hasan, & Clement, 2012). Education system based on ICT requires the establishment of infrastructure facilities, acquisition of technologies and their periodic upgradation, management and professional support system. The other significant challenges rise from various external factors like environment, cultural and education aspects faced by policy makers, educational administrators and students which can be overruled by induction of innovative models collaborating with existing ones. ICT contributes in disseminating information irrespective of geographical boundaries. It disjoints information from physical location boundaries and thus, integrates rural and remote communities in the global network of knowledge and culture.

Conclusions

Digital revolution is a shift from mechanical and physical mediums to digital medium that focuses on various aspects of socio-economic parameters of society. In the present context of education, it is not possible to improve or disseminate knowledge without the help of technology. Internet has become the integral part of day today activates, integrating technology, content and various stakeholders involved. ICT in higher education is relevant in facilitating effective and quick decision making, aiding and analyzing data, facilitating information and improving skill acquisition.

Distance and open learning using virtual classrooms, internet and satellite medium provides quick mode of course delivery. A multidisciplinary approach in higher education is required so that students' knowledge may not be restricted only to their own subjects. Administrative support systems like Enterprise Resource Planning (ERP) system, implemented in universities help in maintaining the complete record of students. The government needs to increase investment in education through ICT, formulate policies that are adequately funded both at Center and at State to ensure democratization of education. The gap between demand and supply of education needs be fulfilled with technological innovations. In order to bridge this gap, it is necessary to facilitate the involvement and cooperation of public and private players in higher education. In addition to this, there should be proper control and licensing, quality assurance, accreditation of technology to reduce complexities in implementation.

Community participation and self-sustainability also adds a step forward towards adoption of technology. Government should take initiative to ensure a joint effort with software companies and teachers for preparing

quality content to support academic circular and language diversity. There is a need for government authorities to extend support to higher education institutions for better communication and integration of ICT in education for a successful process.

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Review Article

Media and Visual Subjectivity: Senses and Mediation

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This paper is an attempt to understand the formation of media subjectivity in the intermediary domains of visual media practices in India. The article emphasises to examine the historical formation of visual subjectivity while conceptualising forms of various visual-media practices such as painting, photography, cinema, and new media, to argue that the formation of visual media subjectivity is entrenched to the sensorial aspects of the individual and society. Further, it is being argued here that the formation of the visual subjectivity is often mediated by the realms of 'sensorial continuity and break' created though our own direct or indirect interactions with various forms of media technologies and their mechanisms of deliverances. Here, the idea of 'continuity' points out the way visual subject enunciates their subject position in tune with the secular the narrative structure of modernity, and 'break,' on the other hand, indicates an inevitable narrative break proposed by the forms of new media visuality. The paper, therefore, explores the phenomenological existence of the visual subject, in a larger context of technology, media, and sensorial perception, and then points out that the visual subjectivities are constitutive of discursively defined and technologically enhanced entities. They emerge out of a composite site of various practices, involved in technology, media, society, and culture.

Key Words: Media subjectivity, visuality, technologies of the self, secular narrative, grounded aesthetic, modernity, new media subject, technology, sense and perception.

Introduction

How do we understand the historical constitution of media subjectivity in the present era of 'digital media turn' or within the intermediary domain of Web 2.0 technologies in our everyday life? Primarily, this question leads us to understand the subjectivity in two rather overlapping epistemic structures of knowledge production; the social and technological formation of the subject. In this context, media subjectivity, like media text, makes it's processual presence in the intermediary domains of the social and the technological. Media subjectivity here implies an inside-out entity belonging to the broader field of cultural technologies, in which it is impossible to delimit it either to the social or to the technological experience of the subject. In other words, the enunciation of media subjectivity by and through any form of media encounter or experience is constitutive of both the social and technological practices of the self. The practices of self, as Foucault observes, "are not nevertheless something that the subject invents by himself. They are patterns that he finds in his culture and which are proposed, suggested and imposed on him by his culture, his society and his social group" (Foucault 1987:11). Media,

as one of the technological apparatus of the culture, has the power to determine, alter and modify this subjective consciousness. It often invents new signs, symbolic and gestural narrative forms to mediate this generative consciousness of the subject. Media here not just passively represents the subjectivity, but often actively invokes, invents and disseminates experience and presence of the agency of the subject. Hence, subjectivity is not to be deduced as something static - instead it always attempts to communicate and signify multiple forms of experiences and negotiations through the act of sensorial mediations involved in both the analogue and digital media, such as the act of listening, hearing, seeing, tasting and touching.

In fact, the enunciation of subjectivity through media encounter is in a way connected to the Foucauldian idea of the 'technologies of the self', which permits individuals to "affect by their own means or with the help of others a certain number of operations on their own bodies and souls, thoughts, conduct and way of being, so as to transform themselves in order to attain a certain state of happiness, purity, wisdom, perfection or immortality" (Foucault 1988:18). Undoubtedly, one can argue that media represents or mediates subjectivity as the way in which cultural technologies envisage or constitute them (Media representations of subjectivity are 'subjective in the sense that they constitute instances of media attempting to represent experiences that are necessarily exclusive to the inner realms of a character (or person), and there are representational because they attempt to medially transform the complex interactions of subjective intentional states into inter-subjectively comprehensible external forms of representation (Reinerth and Jan-Noel 2017:3, original emphasis). However, in the context of communicative modernity, and related interactive digital media era, it is imperative to understand the sensorial affective dimensions of the media subjectivity and their perceptional enunciations instead of simply looking at representational elements of the subject. In this age of converging media and 'convergence culture' (Jenkins 2006, cited Bakardjieva and Georgia 2012), the enunciations of the subject "are tightly intertwined with technologies of sign systems such as the mass communication media, the cultural industry, and the multi-sensory discourse they propagate" (Bakardjieva and Georgia 2012, 160). Media subjectivity, therefore, is not only connected to the historically formed multi-faceted narrative techniques of media to accurately represent the subjective perceptual experience of the character but is also intensively attached to the active, affective and embodied sensory actions and reactions of the recipient—listening, viewing, reading, observing or interactive subject—of the media text.

It is in this context that this paper attempts to analyze the formation of the visual subject in the domain of early modern Indian visuality (painting, photography, and cinema) and also to understand the conjectural rupture created in the sensorial perception of the subject by new media visuality. The first part of the paper proposes that it

is a secular visual narrative structure that predominantly idealises the visual perceptions of Indian modernity. However, the domain of new media visuality is a contested site where, on the one hand, it shows continuity or a superimposition of secular narrative structure, but on the other hand, there are daunting images of victims, the act of violence and bare life that tries to disrupt this secular imaginary and attempts to cater to a new visual subjectivity. However, the former narrative structure and the resultant humanitarian perceptions emerge out of a visual encounter and its affective promises but the latter narrative structure depends not only on the images and its immediate affects, but goes beyond the specific referent and trying to resurface with certain mythical morals, as against the 'universal subjectivity', through the violent and disruptive images. In both of these visual acts of social and political enunciation, the visual subject not only bears the 'presence' in the given space and time but also emphasises features of the 'cultural agency,' whereby, the act of seeing itself becomes the act of being in the world. The paper, therefore, intends to analyze the phenomenological existence of the visual subject, in a larger context of media and sensorial perception.

Media and Visual subjectivity

Social sciences and humanities discussions on sensation and perception, in conjunction with visual mediation, are highlighted with two major perspectives. The first gives an account that the visual media, including new and social media practices are reproducing forms of historical, cultural and social sensibilities and mentalities of the society hence there is continuity in sensorial perception. The second strand, while agreeing with these notions of reconfiguration of social and cultural elements in visual media practices and its enduring forms, announces a radical shift in perception and sensation. This shift is mainly attributed to the 'affective turn of visual media' in terms of its forms, content, circulation and redistribution, which provides new spectatorial perception and sensation that simultaneously have the power to generate new ethical and political questions, even for a non-contextual reader, viewer or listener. As it provides a sense of (dis) embodied information, this affective intensity involved in visuality, does not necessarily follow a strict historical continuity in its mediation of the senses. However, one of the common concerns for both these stands is the ways in which visuality shapes and reshapes the perception and sensation of the subject.

In the era of photographic flow and communicative modernity, or global visual experience, the visual subject has been defined as "a person who is both the agent of sight — regardless of his or her biological abilities to see — and an object of certain discourses of visuality", whereby the 'body stubbornly refused to be in more than one place at once, a networked visuality allowed us a measure of real-time global experience' (Mirzeoff 2006: 22).The visual subject is not only subject to discursive domains but also subject to technologies and related experiences. In the context of

the photographic perceptional image, the subject is located both inside and outside of the frame, whereby the former indicates the subject as an object of photographic act and latter indicates subject as a viewer, observer, or an active interlocutor. The photographic visual subject is an 'inside-out' entity, located in technologies, structures and meaning-making practices. Alternatively, it is located in the dialectical process of 'subjects making objects making subjects' (Pinney 2005:269). This position of the subject is not necessarily reduced to the imperatives of technological determinism but that of a fleeting subject; it is concurrent with visual literacy imparted by various technological disjuncture and social mediations, such as the affective, sonic, and performative aspects. As photographs not only represent but also evoke, the visual subjects are never passive, they think, they experience and are always active, even in the most dehumanizing situations of colonial anthropometric photography or at the times of bare-body experiences (Edward 2009).

The idea of media subjectivity or visual subjectivity cannot be restricted solely to media structure, forms or various institutional apparatus connected to its production, dissemination or consumption. Rather, the subjectivity should be understood as the 'space of the self' both at 'conscious and unconscious levels and the various factors contributing to the self's constitution and agency within the world', the forms of mediation—technological and social—are integral elements of such formation of the subjectivity (Corner 2011, 87). In other words, the subjectivities are constitutive of discursively defined and technologically enhanced entities. They emerge out of a composite site of various practices, involved in media, society, and culture. John Corner elaborates these points while stating that:

> It has levels of agency that are formative of sociality and it is formed by the social in ways that exceed the activities of the institutionalised media. Media processes bear upon the social in ways that are carried through into consequences for subjectivity but they also bear upon subjectivity directly in ways that have consequences for the social. Activities both at the social and the subjective level carry consequences for the operations of the media, even if in many research accounts the media are often seen to be 'dominant' in the relations that involve them, either in their own terms or in the terms of the elites whose power they are seen to reflect (Corner 2011, 90)

It is interesting to note that like the way the 'media text' has been defined as 'assemblage,' 'pastiche,' or 'allegorical,' media subjectivity reflects a compositeness of myriad forms and mentalities as well as social and cultural dispositions embedded in technology and culture. When forms of tenacity, authority, popular opinion, and a priori, as well as the aesthetic and presentable rationality of the media, enunciates the experience of the subject, this process is also being over-determined by the senses of cultural tastes, political self and civic self of the mediated subject

(Gaines 2010, 16-19: Corner 2011, 87). This, mutually inclusive and interactive relation between media and selfhood not only has both cognitive and affective implications in the process of formation of subjectivity but is also highlighted by an overtly media-dependent aspect of consciousness and action of the subject (Corner 2011). The manifestation of the subjective action and reaction, articulation of affective intensities are shaped and reshaped in this intermediary site of media and selfhood. Hence, the site can be considered as an assemblage space where various forms of media effects and affects are being manifested. However, several correlating factors are included in these two domains of media and selfhood, which in fact simultaneously function to enhance the sense and perception of the subject. As mentioned earlier, popular politics, cultural tastes, ethical and political concerns, grounded aesthetics, and fantasies along with dependent media ecology and symbolisms are some of the factors that mould the position of the subject in the everyday culture. 'The subjective is centrally implicated in any engagement with the production and circulation of knowledge and, perhaps even more obviously, with an exploration of pleasure. It is a site of imagination, of desire and of fear as well as of practical rationality' (Corner 2011). What needs to be understood in this symbolic environment and its logic of interactivity is the way it creates a sense of action, reaction or sensorial perception in the subject: the enunciation of affective, ethical and politically responsiveness of the subjectivity. Like the way the formation of subjectivity is in the process, and as the way it often tends to negotiate with various forms of existing knowledge, the position of the said subjectivity belongs to a cognate area between the local and the global. Local here refers to the 'contexts', in which the historically informed subject is located or the discursive contexts of the subject, which is also conditioned by the forms of institutional apparatus as well as cultural impulses and sentiments of the time.

On the other hand, global refers to an imaginative and universal realm construed through the forms of mediated experience and technologies. It is the combination of materiality of media and mentality of culture that constitutes the worldviews of the media subject. In a way, neither is fixed, and the identity of the subject is always transposed from one to another through appropriation, alteration and modification of knowledge and perception available in this symbolic environment. When it encounters with forms of media, as a dynamic entity, it always tends to show the potential to traverse from the local to the global and vice versa. The identity of the subject is not completely fixed by cultural essentialism or by mediated experience –rather, it always transcends in between culture and media. In this situation, to understand visual subjectivity, we need to study the nature of the affective intensities and the sensorial dimensions of the subject, enticed by and through the encounteral intermediation between media and culture.

The next question that automatically follows is how do we understand the visual subject? Undoubtedly, one can argue that the visual subject came into

existence within ruptural domains of the visual turn of the contemporary society. In other words, visual turn of the society is a contemporary realization, which indicates a perpetual break from the conventional perception, and simultaneously announces the formulation of a new subjectivity, in conjunction with the visuality and forms of visual practices and embodied experiences. In this domain, the ways of seeing and ways of being are collated as a single performative entity, which is an active 'bodily sense-impressions' of the visual subject. The visual subject simultaneously becomes an object of certain visual discourses (visuality) and also an active agent having the potentiality of self-reflexive action and reaction (see Armstrong). The visual subject, in this phenomenological proprioception, cannot belong exclusively to the visual sense but also dwells in the experiences of kinesthesia senses or embodied sensorial perceptions, through which the visual is performed and understood (Edward 29: Paterson 27).

In the context of visual media and process mediation, the sensory experience cannot be compartmentalized on the basis of any single faculty of senses. There are overlapping or collective sensorial experiences—the perception that becomes instrumental in the production of visual media content, its circulation and the consumption of the 'real'. Thus, media's encounter with the senses has the power to rediscover not only the feeling and emotion but also the knowledge of history, memory, experience, political subjectivities, social and cultural embodiments, and fantasies of the human subject. The visual media re/activation of senses manifested through a systematic and sometimes strategic redeployment of sign languages, signified practices and objectified values, work together to trigger cognition, sense perception, bodily and emotional engagement.

Narrative structure and Cultural agency

In these propositions, the visual subject is interlinked not only with a network of social relations and various technological mediations but also an object, which embodies multiple affective sensibilities and emotions entrenched to the discourses to which it belongs. It doesn't mean that the visual subject is an outcome of specific temporalities of modernity or postmodernity and the contextual visual turn, rather the formulation of the visual subjectivity is connected to the historicity of the myriad forms of social mediation as well as technologies of the visual mediation. Hence, the senses of the subject have been constitutive of historical experiences and also—the way what Crary pointed out—touched with the ideological apparatus and its optical devises, institutions of visual techniques and image-making practices (1990).

Let me explain the ways in which these historical and cultural perceptional experiences of the visual subject have been rooted not only in the ruptural domains of contemporary new media visuality but also in the formative period of the modern Indian visuality. Considering the early visual practices (painting, photography and cinema) it has been argued that the visual

subject has symbolically been recruited into a larger narrative structure of the longue duree. This narratological form of longue duree encompasses the connoted articulation and sequencing of the conjunctural affective moments and events of oral tradition, history, myth, traditional views and fantasy; quantifiable values and skills involved in the arena of dominant political, economic and cultural order (Rajadhyaksha 1993, 54-67). The iconic and frontal encounters, which are set up in this narrative structure, provide perceptual sense to the visual subject:

> All Indian art traditionally places an iconic articulation as central to it: this is elaborated into a series of elliptical, narrational encounters. As we are drawn into the discourse of universal configuration, we repeatedly encounter the icon; even we find our place in the world our seeing, mediated by several social exchanges, converge into the discourse contained by the iconic presence. Now, almost inevitably the iconic presence is placed frontally before us: our encounter with it is what sets off the discourse (Rajadhyaksha 1993, 54 emphases added).

Cultural references, mnemonic memories, icons and the 'series of perceptive shifts' that might occur through a visual encounter became constitutive of this narrative, and which intends to reactivate a historically specific cogitative experience. This narrative, therefore brings the past conjectures into the present, with all its value loaded cultural references—as a pre-text within the domain of modern—providing a 'standpoint from which, against which, the image could be mediated into the present' for visual consumption (Rajadhyaksha 1993, 54). What is so significant in this visual-narrative pattern and its intermediation process is that it is profoundly grounded within the linguistic imaginary to prefigure a visual image. For instance, as in the case of early Indian films, 'the filmic image exudes an inevitable lure', in order to fulfil the desire of the visual subject, whereby the reciprocal gaze, mediated by the narrative signs of the popular aesthetic (linguistic), which is now resurfaced into the cinema, sought in the realization for images 'it already knew and now saw, kinetically transformed' (Rajadhyaksha 1993, 69). The act of seeing here resonates with the idea of the act of being, and what is perceived in the image is not a psychological fact, but a phenomenological one. "It is "reduced," that is, the reality is "bracketed out." The image is always an image "of something"; it is intentional, pointing to a reality beyond itself..." (Buck-Morss, 1996; 46). Though the affective feeling generated by the image is an outcome of the spontaneous and momentary encounter, the 'reality' of the image is happening in the sphere of 'elsewhere,' beyond the frame and connected to the larger visual economy of consumption. Performative space and corporeal dimension of performance, posthumous memory, oral history, paraphernalia of presentation and theoretical propos, and the like, constitute the sphere of the visual economy of consumption (Frietag, 2001).

The linguistically mediated symbolic

apprehension of the real, as well as its technological interpretations, was not always filled with any unique visual convention or semiology, rather displays an unequal flow of sign-image and its inappropriate presence, however united by the discursive context. For instance, colonial studio photographic practices and their visual semiology articulate the sameness through a unity of civil style, while simultaneously showcasing the differences through a set of behavioral and moral authority. It involves semiology of indication and concealment, and a new 'civil' style of behaviour on the part of the subjects' (Udayakumar 2002, 166). Backdrops help to conceal the 'real' at the same time supplementing a new fusion of performative and theatrical space for body and subjects to enact their subjective imaginary, or in other words, what Kant calls 'subjective universality' (Kant 1998, 70). So, the meaning included in the photographic mediation of the social and social mediation of the photograph cannot be understood through the mere lenses of visual contents or codes, but only through various practices, experiences and embodiments that are generated by this medium.

In this context of linguistic flow of signs, the visual subjects and their perceptions 'are interpellated or 'recruited' by the Symbolic' (Prasad 1998, 10). In other words, the subject has been interpellated and enunciated by the ideologically sutured visual language and grounded perceptions. It means that "ideology involves a process of self-recognition by which the subject comes to acknowledge the truth or naturalness of its conditions of existence. The ideological process is unconscious and inescapable: there is no position outside ideology" (Ibid). Similarly, it is also been argued that the formation of the visual subject has depended on the specific discursive context, and it is the discursive context that makes meaning for the visual subjectivity; there is nothing outside the discourse, and hence claims that it is the context which needs to be studied to understand the visual subjectivity.

Psychoanalytical perspective, on the other hand, placed the yet to be completely formulated subject into the signs, which is a constitutive domain of linguistic, visual and symbolic. Nevertheless, the visual perception is always mediated by the transaction between the conscious and unconscious drives. The cultural codes and imaginary institutions play a crucial role in these transactions, whereby subjectivity is culturally as well as psychically constructed. The identification of the subject in this exchange with the real and imaginary or ideal, and its symbolic existence not only creates a sense of a traumatic separation from intimacy with referents but also produces a sense of alienation. The formation of the visual subject in this dialectical split between the real and the imaginary then involves an act of self-recognition-misrecognition and self-fragmentation.

It should be understood here that the above conceptual interpretations do not necessarily position the visual subject as a normative or linear entity to be recognized instantaneously as something which is determined by culturalism. On the contrary, the

subject is more active and agential, while appropriating and rearticulating the self in the intermediary domains of technological and cultural representation. This involves an art of appropriation enmeshed in the judgment of popular aesthetics. Therefore, visual practices involve an art of appropriation, the logic of inclusion and dissemination of a signified set of ideas, practices, things, commodities and their signified values and politics. Appropriation of the visual language, either as legitimised or as counter signifiers and their inclusion and exclusion in the frame can be defined as 'grounded aesthetics.' Grounded aesthetics are not only the yeast of common culture but also the intermediary and inter-textual visual media practices, and through which the 'cultural agency' is expressed in the popular and political aesthetics of the time. In many ways, the visual subject here endures the markers of 'cultural agency' either through embodied cultural expression and performativity or the refractory visual excess manifested through proprioception imaginary. 'Cultural agency' connotes a 'feel that exceeds both conventionally conceptualize(d) 'politics' and 'culture', an extended field of intervention, the world in which the spectatorship and appropriation of commercial cultural artefacts play a central role'(Pinney 2001,17).

There are many ways in which these dispositions of cultural agency of the visual subjects and bounded sensibilities have been deployed in the domain of visual narratives. They may address, on the one hand the powers of the image that dismantle the ever existing binary between linguistic and visual language through its powerful and affective visual syntax and, on the other hand, may assert and claim a disruption in the dominant form of visuality. However, all these disruptive codes and powerful images never managed to overcome or create a narrative/epistemological break in the existing visual mode of production and hence the perceptions of the visual subject either. Rather it encompasses all heterogeneous perceptions, disruptions and subversive ideas into a unique visual narrative; a secular visual narrative, as part of a larger narrative project of universal secular visibilities.

Let me explain this narrative technique while pointing out the ways in which how the Dalit and subaltern visual subjectivity has been integrated into these secular visibilities, which were formulated during the time of colonialism or what usually called as in the epistemic structure of colonial modernity.

Secular Aesthetics

The colonial and nationalist discourses invariably produce complex and hybrid visual practices, which had its genesis in the Western philosophical tradition of aesthetic as well as the artistic realism invented by the colonial art school. As Pinney writes, "colonial realism becomes xeno-real, which claims its power from its closeness to that reality that lies within the truth of colonial power" rather than from a connection to any objectively extant reality—that is, it is "mimicry of what colonialism (rather than nature) authorizes as 'real'

" (2004:31). The visual figure and subject collate a realism popularized by the dominant and mutually inclusive system of representations. These aesthetic formulation had its superimposition on elements such as the convention imposed by academic realism, ideological substances of Brahmanical cultural rituals, signs, objects and they foregrounded the spiritual recurrence of popular Hinduism as 'the natural assets of the entire nation'. The modernism project of Indian art was filled up with these pictorial codes of Indian nationalist modernity and their deep-seated affiliation to certain sociological constructions of cultural identities, and hence failed to produce any alternative perspective or spectatorial sensibility to critique the nature of its own structural formulations. "Social identity in the modernist space gets blurred as the issue of identity was already fixed in the Brahmanical nationalist context' (Alone, 2013). In other words, by reframing Gopal Guru's formulation of the language discourses of the nation, it can be said that the visual language of the beyond and its grounded aesthetic is deeply entrenched within the visual perceptions of the 'derivative' and 'desi' discourses, whereby the socially and culturally conditioned visual reflexes have been predominantly used in order to characterize 'the conditions and consciousness' of the Dalit and subaltern groups (Guru, 2011). In these blurred fields of visual economy, theirs is mere presences which can be easily identifiable as a distinct identity of the other, or as 'a part apart' category, however nevertheless a part. Visual conventions, thus supplemented with the social normative of caste hegemony where subalterns are caricatured with visual simulacra of negative, stereotype and atemporalize them as having no visual synonyms of political consciousness.

What is significant here is that the visual subject's embodied perceptions are conditioned by the social binaries; and hence, the secular narrative structure gives an adequate space to these binaries without disrupting each other social positioning. Visual subjects are born; they live and lose in this imaginary symbolic order construed by the larger narrative scheme of secular visibility, its continuity and its aesthetical dictum. The visual mediascape (painting, photography, cinema and new media), continuously reproduce culturally coded and politically meaningful visual signs without bemoaning any radical shift or reconfiguration of this narrative strategy. The meaning of the sign and the ways in which it is arranged in the visual spaces or surfaces may change due to the technological apparatus. However, it addresses a visual subject whose visual consumption desires and pleasures, or the embodied sensorial perceptions are conditioned to fit into a narrative order of the secular visibility. Here the visual subject's action and reactions, and affective sensibilities are connected to the visual literacy (secular) which produces both rational and irrational experiences and excesses such as social responsiveness, scopophilia, whistling fans and enthusiastic communities (Srinivas, 2013 and Prasad, 2009). In this context, the position of the visual subject can be identified in a space between social and psychological, between sacred and political.

New Media Visuality: assemblages and visual subjectivity

The epistemological domain of the secular narrative was, therefore, generated with a composite space to accommodate and fulfil the historical embodied sensory experiences, negotiations and reactionary elements of the visual subject. This secular narrative remains as a formidable visibility till recent times, without showing any epistemological break. However, it was new or social media visuality in the context of digital-visual turn and media convergence, which gave a narrative break in the visual perception of the subject. In India, especially after the 'technological modernity' there are genres of photographs (new media texts or assemblages) which are being widely circulated in the new media spheres, and these visuals - photographs, images, videos—are in a way representing visual-reality of the specific events of violence, tragedy, horror, human right violation, disaster, trauma, pain and suffering of the people. But, at the same time, these interactive visuals, as a new media text or assemblage, has the power to invite the attention of the visual subjects while activating their affective embodiments and sensorial intensities. It creates sensory affects, during the encounter with these new media texts. For instance, these recurring photographic or new media visual genres include the visual narratives of the disastrous industrial gas-tragedy in Bhopal, and the subsequent photographic campaign demanding justice for the victims, photographs of Indian partition and the resultant violence. Similarly we come across disturbing images of civil right activist- Irom Sharmila and her struggle and the on-going hunger strike demanding the Indian government's repeal of Armed Forces Special Power Act (AFSPA) of 1958. One may also mention here the photographs of the shocking and disturbing visuals of Gujarat genocide in 2002, images of mass movement against the water plunder of the Coco Cola company in Plachimada, Kerala, the photographs of agitation against Kudamkulam Nuclear Plant and Police atrocities, the pricking pictures of the deformed victims of the Endosulfan chemical pesticides, as well as photographs of mob lynching, conditions of refugees and migrants. Images of natural disastrous, caste violence and the like are some of the instances where genres of photographs powerfully disseminate the affective dimension. Such visuals arrest the consciousness of the visual subject and simultaneously these photographs articulate awareness about the captured event.

Indeed, these are visual testimonies of icons of pitiless events and suffering in the past and present; they can be treated as an evidence of the notion ' things have been there', or what existed (Barthes, 1982); they could also be treated as examples of interpretation of the real (Sontag, 1979). Nevertheless, the question here is not the one about 'evidence', 'framing' or 'staging', rather the manner in which these discursively arranged photographs or new media assemblages are able to produce an affective relationship between the suffering body and the viewer or the digital-citizen? Indeed, it can be said that traumatic visual signs, foregrounded

verbal or voice narratives are generative to create specific affective sensibilities or mental traumas (of both image and the viewer), which function as a medium or tool to raise certain critical political and cultural apprehensions about humans, their conditions and rights. In other words, the visual subject's (interactive viewer's) encounter with the surfaced 'bare body' in the spheres of digital visuality and the entrenched affective signifiers instigate a political question about one's own subject position as 'precarious life' within the political ideology of the present. The new media visual assemblage, on the other hand, involves all sorts of disruptive and haunting visual signifiers, political aesthetics, and overall a narrative text filled with emotions and politics. The digital interactions, and subsequent visual encounters and embodied experiences of the visual subject quite often have the power to transpose the consciousness and ethical perception of the subject. In this context, these digitally illuminated photographs are the sites where the subject's ethical and political positions encounter his/her own subjective apprehension about the subjectivity – as a being—belonging in the ideology of the contemporary. Seeing, in this context, is a sense of activism of the being and hence an act of becoming; seeing is not only believing but also being and becoming in the world.

Here, I am not looking at the indexical 'meaning of a single frame' or its symbolic attributions toward the real. My interest is largely foregrounded with the contested political connotations and implicit political consciousness of the visual subject (viewer), that these photographic or visual genres are able to mobilize, where the new media visual sites – genres of photographs- function as a 'public screen' to apprehending the real (pain, trauma and suffering) and recognizing justice or rights. Though the genres and its diverse visual effects could provide thematic impressions, which potentially provoke the ethical and moral positioning of the observer or visual subject, each frame of the new media visual assemblage or genres of photographs has its own implicated dimension to stimulate the sight of the viewer. Frames embody the conventional aesthetic principles as well as artistic quality; however, it renders the scenes of deformed body, tortured victims, pain and tenderness of bare life and its vulnerability. Therefore, in such photographs, there is an element of simultaneity as the appeal of artistic quality as well as solid engagement with the ethical position. The resultant recurrence of a deep paradox between the aesthetic sensibility and the affective engagements create a dialectical relation between the pleasure and pain in perceiving, which need further analysis. As Fischer wrote aesthetics of "bare life" engage us on an affective level that remains deeply ambiguous. The unsettling subject matter of the photographs and their striking artistic quality work against each other, where one operating as a limit on the other (Fischer, 2007: 15).

On the other hand, the systematic genre formulation based on disturbing contents of the photographs, and its diffusion in multiple popular and new media sites are drawing popular

attention not because of their striking aesthetic quality but its efficacy to activate the political consciousness based upon human virtues. Indeed, it is the discursive genre effect which combined the reflection of everyday life of the victims and epitomized emotions and irrecoverable suffering conditions which necessitate the look. On the other hand, it is also true that the effective nature of photographic genres and "their disturbing subject matter works against any feeling of aesthetic pleasure" (Fischer, 2007: 15). However, while rendering an aesthetic of catastrophe, the element of visual pleasure is an unavoidable component of these genres. The traumatic evident and its realism documented in the photographs or new media visuality may not be treated as an art, but "art" cannot be kept at a proper and secure distance from this atrocity. Apart from the "surplus enjoyment" or jouissance- the pleasure and pain principle, how could one define the aesthetic appreciation of sufferings or catastrophe? The common epistemic content of these digital frames of traumatic visual assemblages (victims of riots, lynching, state brutality, war or natural disasters) are that they induced with arbitrary violence and injustice inflicted by the state or the dominant on the vulnerable life of the human (human but not qualified as human!) and the stark visual exposures demanding an intervention of the state to protect their lives, "they appeal to the state for protection, but the state is precisely that from which they require protection"(Butler 2009, 26). These new media visual frames and their depiction of ever haunting suffering have a discursive political context and it is through which it presents the excessively fragile, decomposed, deceased and victimized figures to pose the idea of social 'responsiveness', and recognizability (Butler 2009, 66). These digital visual assemblage of new media always attributed to function as a public screen to diffuse 'shock waves', which render public reaction and action; the way in which visual consumptions of shock, act of violence and distracting visual signifiers and their affectivity transmit certain sensibilities of social and political righteousness. These images in the digital public sphere can be considered as an 'action-image' as its signifiers, figural excess and feeling always tend to produce certain perceptual experiences to the senses, and to incite subjective action and reaction. These subjective actions and reactions are not necessarily confined to the limited geographical or essentialist cultural context of the subject, rather the new visual media transpose its visual subject into a deterritorial and imagined context to invoke justice and social responsibility of the human. Butler says:

> Accordingly, our capacity to respond with outrage, opposition, and critique will depend in part on how the differential norm of the human is communicated through visual and discursive frames. There are ways of framing that will bring the human into view in its frailty and precariousness that will allow us to stand for the value and dignity of human life, to react with outrage when lives are degraded or eviscerated without regard for their value as lives (Butler 2009, 66).

In the new media visual assemblage and its circulation to point out suffering, it is the act of cruelty and torture, which mediates the affect. The shock in sight, the affective reactions, would further necessitate to be spoken about what is moral/immoral, justice/injustice and finally alert one to take a judgment on who is 'considered as human and inhuman'. This is a political judgment where one is dragged in to a query against the subjective conditioning of political discourse as well as against the normative coherence of the political narratives, and indeed a reorganization of one's own sensibility and the subjective position.

Visual subject as speaking subject

The technological ruptures and disjuncture (oil painting, analogue photography and digital simulations) and parallel social transformations and experiences, simultaneously announces the emergence of the visual subject, who does not merely represent an passive spectator, observer, or subject of any particular discourse, rather portrays an active agent who can be part of the interactive domains of the global visual imaginary, while using suitable signifiers, and symbolically recruiting himself or herself into it. Here, the sense of belongingness in the world is made possible through the symbolic significations available in the spheres of visual literacy. The visual culture and the technological dissemination of visual literacy generates particular individuals, as well as socio-cultural subjectivities, instead of visual cultures being created or established by individuals or through a cultural collective (Fuery and Fuery, 2003: 43). However, visual subjectivity and its activities are 'not just about dominant notions of subjectivity, but also about negotiations of selfhood and identity from various gendered, classed and ethnically constituted subject positions' (Doy, 2005: 49). The visual image or new media assemblage moves across historical experiences, so does the visual subject. Various technological interventions and interpretations, as well as bounded social and cultural significations, stimulate the shift in subjectivity from an uncritical and unaware spectating position to a conscious and self-reflexive positioning with respect to an image (Doy, 2005:7). This shift in subjectivity equally articulates the subject's position and involvement in signification as well as their insertion into the symbolic order. This position of the fragmented and flexible subject is what Julia Kristeva (1986) termed as 'speaking subject': the speaking subject is conceptualized as a formation of subjectivity and its multiplicity in the system of significations as well as in a social sphere. According to her, speaking subject involves aspects of reproduction and this is why a focus on the processes and effects of visual cultures and its language is so crucial (The speaking subject is a fundamental element that Kristeva works through in her theories on and about language with regard to signification and psychoanalysis. For her, the speaking subject is a fragmented subject, exposed to and compelled by Freudian drives (psychical energies) and regulated by social and cultural institutions (Kristeva, 1986)). In this insertion, interaction and negotiation, the body—the speaking subject—

moves across all cultural spaces and is part of both the symbolic language, the language of visual cultures, new media visuality, and spaces of resistance and negotiation.

Theoretically speaking, in the context of visual encounter and affective intensities, these reactionary videos or new media visual assemblages and their circulation help to gather ethical and political consciousness against such violent and barbaric acts. Nevertheless, such critically bounded humanitarian visual perception of the visual subject might help to develop an antithetic position against the visuals and the event of violence, but even then, the critical judgment of taste is an outcome of the secular visual narratives. It means the value judgment or the rational sensibility to define what is ugly, beautiful, violent, good or bad, as well as what pertains to atrocity and trauma are part of the visual literacy promulgated by and through the secular visual narrative structure of modernity. Undoubtedly, these disruptive visuals and their interactions not only generate an affective feeling against the visual act-event but also, try to help the visual subject to build ethical responsiveness and resistance against those inhuman acts of violence or disastrous insecure conditions of the human. It is conceptualized that the affective encounters and their intensities will also provide a promise; a shimmering inventiveness as affect is a promise for something. Nonetheless, in a visual encounter, these disruptive visual images and videos refuse to give any promises to the visual subject rather they decline to address the subjective consciousness and phenomenological experiences of the subject in the secular visibility. It means that these disruptive images are made for cognitive consumption not based on the immediate content or subject matter, not even based on the referent, rather based on 'absent centre' which is either metaphysically connected to the ethical and moral discourses of the universal secular visibility of modernity or the mythically connoted morals, ethical perception of any dominant religion or an ideology. Hence, the latter always challenges the former to disrupt its narrative structure to create a break in its secular perception through ever increasing violent signifiers and new media visual assemblages. The visual subjectivity enunciates its conscience in this contested paradox of secular and non-secular narrative paradigms of the contemporary.

Conclusions

The article attempted to conceptualise the formation of the visual media subjectivity in conjunction to various visual media technologies and their schemas of representations. While looking at various forms of visual media articulations and their appropriations by the masses, it is argued that the formation of the visual media subject is not only connected to the historically formed multi-faceted narrative techniques of media but also intensively attached to the active, affective and embodied sensory actions and reactions of the recipient—listening, viewing, reading, observing or interactive subject—of the media text. Media technologies and their visual apparatus

have a decisive role in shaping the sensory worldviews of the people. In other words, the mutually inclusive and interactive relation between media and selfhood has both cognitive and affective implications in the process of formation of subjectivity, however it is also highlighted by an overtly media-dependent - technologically defined-aspect of consciousness and action of the subject. If we look at visual subjectivity in the domain of analogue and new media technologies, it is observed here that one of the crucial aspects of the historical formation of the visual subjectivity is that its transition from the passive subjective position to an interactive sensorial subjective position of the contemporary. The visual subject is more active and agential, while appropriating and rearticulating the self in the intermediary domains of technological and cultural representation, and hence it is called as speaking subject: the one who is both the object and subject of certain discourses of technology and culture, however always enunciated to act according to the ethical imperatives of the present. The agency of this visual subject—or the sense of being in the world—is more prone to the social responsiveness and affective embodiments of the subject, however overtly determined by mediating technologies and their power of dissemination or significations connected to the media text. It depends on the way technologies enhance the sensorial effect of the subject for an effective action and reaction.

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General Article

Sustaining Digital Language Resources and Sign Language

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Abstract

This paper discusses the need of a multi-modal and multilingual sign language resource by providing insights from the experiences based on the development of digital based sign language resources which are the North East Sign Languages SignBank (A variety of the Indian Sign Language) in a web-based format and the Meghalaya SignBank (A variety of the ISL), a mobile application. It raises the challenges and concerns of sustaining such language resource and its use, drawing upon the cross modal perspectives of archiving human languages, issues in education and the cultural and linguistic diversity of the deaf community in India and particularly the North East region.

Keywords: Sign Language, Indian Sign Language, Digital Language Resources, Sustainability, Mobile Application, Web-based

Introduction

Sign language, a natural human language used predominantly by the deaf communities of the world, has linguistic properties similar to any spoken language. The idea that just hand movements and facial expressions can form the basis of an entire language, a unique culture and a different understanding of the world is mind-boggling. The arbitrariness of signs and their permutations and combinations are no different from the arbitrariness of the sounds of spoken language and their meanings, and yet, they both evolved and continue to evolve naturally through our universal need to connect and communicate. Embroiled in world of confusions and misconceptions, miscommunications and misunderstandings, it is easy to understand why a soundless language of a minority population of the people who cannot understand the spoken word would be conveniently overlooked and typecast as a disability.

Thus, the field of Sign Linguistics emerged with the ground-breaking work of William Stokoe (1960) on Sign Language Structure: An outline of the Visual Communication System of the American Deaf, which engendered more studies that investigated the influence of modality of communication on its language structure (see Brentari, 2002). Thus, research studies mostly circled around the role of gestures in a language (see Messing and Campbell, 1999; Liddell 2003). Research into the mechanics of sign language use, with its intricate coordination of hand movements and facial expression as the modes of production, offers interesting opportunities to investigate and gain

insights into human language. Hence, Stokoe's first ever linguistic description of sign language (see Stokoe 1960; Battison 1974; Brentari 1998) generated a whole new perspective in our understanding of human languages. This has given rise to other studies that investigate how sign language relates to cognition and how it is processed in the human brain (see Namir & Schlesinger 1978; Klima & Bellugi 1979 and several others studies).

Consequently, documentation of sign language and its compilation into a dictionary is vital for the analysis and description of the linguistic configurations of sign language. In the context of deafness and the deaf community, a dictionary can also serve as a means of developing an unknown language that has emerged out of a human need to connect with one another, thereby inherently identifying them as a community having their own unique culture. A sign language dictionary also serves the purpose of propagation of the language (see Lucas, 2003), where a corpus based analysis of sign language usually results in various printed dictionaries (see Brien, 1992; Johnston, 1989, and several others). In India, sign language dictionaries in printed form started in the 1970's in the four major cities of India (see Vasishta, Woodward, & Wilson (1978); Vasishta, Woodward, De Santis, 1980; Vasishta, Woodward, De Santis & Sharma, 1985; and 1987).

With technological advancements and the race towards a digital global world, it became much more feasible and viable to document visual language such as sign language in multi-media modes which have greatly improved in recent times. There are numerous digital based sign language resources, but only a few are mentioned in this paper. An online resource such as the British-Sign.co.uk (https://www.british-sign.co.uk/) is a website which is available online where one can learn British Sign Language (BSL), fingerspellings and even online courses. It also provides free resources regarding BSL and contains many links for beginners. Signing Savvy (https://www.signingsavvy.com/) is another online dictionary of American Sign Language (ASL) displaying thousands of fingerspellings and signs common to both Canada and America. It consists of tutorials and courses on how to use Sign language for the users. Auslan Signbank (http://www.auslan.org.au/) an interactive dictionary of Australian Sign Language (AUSLAN) is also available online. Links include the AUSLAN archive and corpus, etc. Users can interact online by providing feedback and reporting missing signs.

Further, many apps for translation have been developed around the world with the objective of breaking communication barriers for the deaf community around the world and improving the services dedicated towards D (The term 'Deaf' is used with a capital 'D' referring to a group of deaf people whose first language is sign language having their own specific and unique culture and a community of their own, which is the contemporary trend in linguistic research. In this paper, the same convention is also followed.)/ deaf individuals in various public spaces. Hand Talk (www.handtalk.me), a virtual interpreter led by a by a 3D character known as 'Hugo', offers digital

translation to Brazilian Sign Language, a language used by the deaf community in Brazil. It automatically translates text and audio to Libras on smartphones and tablets. It can be used by individuals on their phones or by companies to translate website content that contain information which may not be readable. Motion Savvy's (https://techcrunch.com/2014/06/06/motionsavvy-is-a-tablet-app-that-understands-sign-language/) new sign language app is a real time translation technology that is able to track both hands and 10 fingers, and convert sign language to grammatically correct spoken language. This comes in a device (UNI) which captures the voice of the speaker and displays it in text format so that the deaf can read.

In India, however, very few sign language resources are available, these include an online course on ISL which was developed in web and mobile based applications such as the "Talking Hands (https://www.talkinghands.co.in/)" (Deaf Enabled Foundation, Bengaluru initiated in 2013). Since 2000, the Ramakrishna Mission in Coimbatore (2001) has documented sign language according to different semantic categories derived from a project in collaboration with CBM international. Wallang (2015) has also attempted to document the language used by the deaf community in the form of a Multi-media dictionary of Shillong Sign language (ShSL) and in printed form that contains phonological description of each sign (Wallang, 2014). Currently, the Indian Sign Language Research Training Centre, (ISLRTC (under the Ministry of Social Justice and Empowerment, Govt. of India)) has recently launched an ISL dictionary encompassing the varieties of sign languages operating in the country, with an entry of 3000 words (Wallang, 2019). Recently a DEF-ISL app (https://play.google.com/store/apps/details?id=in.eightfolds.deafenabled&hl=en_IN) was launched in India on the month of April 2019, with a view to bridge communication barriers and enhances English language skills. It was developed in collaboration with Larsen & Tubro (L&T) and the Deaf Enable Foundation and it can be used in phones using both Android and IOS. It comprises of 5000 + easy phrases and sentences in sign language. The app is categorised into semantic groups where users can use the search button to look for a particular sign citation.

Background of the Digital Sign Language Resources

The NESL SignBank: The NESL SignBank (See Wallang, 2019) comprises of a variety of sign languages commonly used by the deaf community across the North Eastern (NE) states in India. This was developed at the North East Regional Institute of Education (a unit of NCERT in Shillong) to promote and strengthen teacher education in regular and inclusive classrooms where D/deaf students are available. Hence, the database consists of lexical items of more than 5000 signs citation which are commonly used in the field of education. Signs included in this Web-App cover several areas which have been classified into different semantic categories i.e. basic words, question words, kinship terms, colour terms, food items, locations, professions,

educational terms (of various subject areas), etc. Besides the lexical items, fingerspellings, both single-handed and double-handed, along with numerals have also been included. This web-based format also extends more information about the demographics of deafness in the region, and provides insights into the linguistic properties of the language. Hence, it offers more understanding into the grammatical and organisational principles of the language in general, which supports the user while communicating in sign language. It is not simply listing of words, but it also takes into account the lexical variation that exists across the region by incorporating all variants. This was done to ensure that smaller deaf communities that exist in the region are not eliminated or dominated by major communities. The end product of the NESL-SignBank was prepared to be hosted in the institutes' website whereby users can simply access information through online mode and send questions and give feedback.

The Meghalaya SignBank App: Meghalaya SignBank (Meg SignBank) app was launched during the observation of International Day of PWDs on the 3rd of December, 2018. The app already contains a list of approximately 3000 words. Meghalaya Sign Language which is a variety of the ISL is commonly shared across the deaf communities in the state of Meghalaya. The development of this app symbolizes their strength as a linguistic entity and gives recognition and empowerment to the language and its users. It was developed to take precedence in the field of education and public institutions by ensuring communication access to all hearing or deaf and particularly for the deaf community where they can exercise equal opportunities in all spheres of their lives. Every educational institution can adapt this app in its teaching and learning process to show respect for and adhere to the language of such communities.

It was designed in a user-friendly manner, where English, Khasi and Garo languages (the official languages of the state) can be used to access sign language and it is portable since users can install it in their phones with minimal space requirements. The user can simply type a word in any of these languages and the corresponding sign will be displayed in a video format. A series of data collection through video recordings of each sign was carried out and collected from Deaf native signers across the state following linguistic methods. Each word in the Meg SignBank has been translated from sign language to English, Khasi and Garo. Further, if there are two variants of a single word, both variants are included. In other words, if there happens to be two to three ways of signing a single word having a similar meaning in the three spoken languages, these variants are incorporated to ensure that the deaf communities in different parts of the state understand each other. Words have been semantically cagtegorised and 17 categories have been identified so that users can simply click on the semantic category they want and then find a list of words relevant to that category. These are Agricultural terms, Animals & Insects, Apparels & Clothing, Calender, Colour terms,

Games & Sports, Greetings and Simple Phrases, Health and Medical terms, Legal and Government terms, Places and Institutions, Relgious terms, Socio-cultural terms, Local Places, Electoral terms and Tools. There are two types of fingerspellings–the single-handed and the double handed spellings, which are simply the manual representation of the English alphabets. They are kept in two windows under the Meg SL option which consist of hand images for each alphabet. The Home window also consists of information about the developmental process of the app, the team involved, and instructions for using the settings of the app. Users can simply click on any of these category to access a sign. Regarding access and availability, this MegSignBank (A variety of Indian Sign Language) was developed with a team of engineers (NIC, Meghalaya), and it is currently available for android phones or tablets at Google Playstore for free.

Sustainability of Sign Language Resources

This section discusses a few challenges experienced in the development of NESL SignBank and the Meg SignBank (both of which are varieties of ISL), and highlights the need to build a more comprehensive resource in terms of sustaining the relevance of such language archives, dictionaries, etc. With the advent of computer applications and mobile apps, it is possible to store language resources for one's own information. However, such digital resources are liable to become obsolete due to the on-going requirements of updating information in the emerging computer formats. Further, besides the information update that is required from time to time, they also need conscious effort in different areas to gain wider acceptance in most hearing communities. It is yet to attain the vibrancy in education needed for its sustainability, and this is particularly the case in rural areas than in urban mainstream India. Simons and Birds (2008) pointed out that "A language resource is any physical or digital item that is a product of language documentation, description, or development or is a tool that specifically supports the creation and use of such products" (p.88). According to Simons and Bird (2008) language resources in discussing the 'Open Language Archives Community' and the dangers of extinction of knowledge, there are necessary and sufficient conditions for sustaining use of language. The Sustainability model they pointed out has the following characteristic features–the Extant, Discoverable, Available, Interpretable, Portable and Relevant. They also discussed the roles of the creators, the archives (institutions that create long term language resources), the aggregators (institutions that gather data from multiple resources) and the users in sustaining these virtual language libraries. What is pertinent in their argument is the role of aggregators in providing technical infrastructure in sustaining language use which is responsible for accessibility, the ability to adapt in varied formats and availability.

In the context of sign language, the viability of the sign language dictionaries needs to be taken into consideration. Can Signbanks or apps really support

communication and classroom teaching and learning? They are commonly used to learn individual signs, which is the equivalent of looking up a particular word of a spoken language in a dictionary. However, simply listing signs in a dictionary format with no linguistic description does not offer much to the users. It doesn't help in opening one's mind and ability to understand the role of spatial grammar and its implications on pedagogy and language learning. In other words, when one looks at a spoken language dictionary, one not only sees the meaning of words, but also learns how to pronounce the word according to the sounds pattern of that particular language. Similarly, in a visual –manual language, apart from learning the meaning of a sign, one would also gain more information of how it is supposed to be produced. A user is simultaneously introduced into the phonological features involved in the production of each sign, for instance, which handshape, movement, location etc. are associated with it. Rather than continuing to present sign language pictures and videos, this requires one to visually learn movement of hands and facial expressions.

A user should be able to decipher the importance of the phonological features of a sign which is integral to its production and its grammatical structure. However, it is usually the case that users utilise such resources in classroom situations by signing a single sign or make use of fingerspellings within an English structure while communicating. Hence, it becomes a word-by-word translation of a spoken form, which is usually inaccurate, since not every word has a sign correspondent and most of the grammatical features such as plural forms, pronouns, verb forms, tense, etc. of spoken forms are simultaneously expressed in the manner of movement of the hands, and spatial modification.

This kind of signing muddles up with the sign language grammar, making it impossible for the deaf signer - who has no access to English language - to understand what is being signed. Further, sign languages have a more spatial syntactic structure which gets disfigured due to use of the word-by-word translations.

When one simply incorporates sign language in their speech, the discourse that follows in the classroom is mostly lacking in meaning and content to the deaf listeners. This was observed (based on a study) much more closely when a teacher was teaching mathematics, and formulae and rules of calculation were simply fingerspelled. Even if interpreters were present, they invariably have no clue as to the subject of teaching and would misunderstand the lesson, especially since there is no proper coordination between the interpreter and the teacher prior to the lesson.

So, how relevant are dictionaries and apps? However advanced we may think our educational institutions are we cannot ignore the reality that D/deaf children are still expected to learn English language or any other spoken language in many schools. Teachers and instructors need technical support in terms of sign language training with special focus on the intricacies of spatial grammar. Although the NESL SignBank does provide information on the

grammatical features, it needs to extend to being able to provide naturalistic data that will support meaningful classroom instructions. Hence, a multi-modal corpus on sign language needs to be considered so as to be able to render a natural discourse that will be more relevant to such classroom situations and thus, contribute to sustaining such languages.

Sign Language Corpus as a Language Resource

Several attempts have been made to build language corpora that thrive on collecting natural language data through rigorous recordings of actual language use in real world such as the Brown Corpus by Kureća and Francis, in the 1960's and several others developed on the same lines such as the Lancaster-Oslo/Bergen Corpus (see Beale, 1985). These corpora have been collected from native speakers and have often been used to extract information related to word frequency; structural rules, phonological aspects of that language etc. and they have been instrumental in the creation of comprehensive grammar books. Hence, corpus linguistics as a method for linguistic analysis is relevant for any discussion on the need for developing a multi-modal sign language corpus. In the context of sign language, a visual-manual mode of communication, the absence of a form of writing, the lack of consensus for a standardised notation system of transcription and the struggle for recognition of most sign languages, particularly in India, developing a corpus is more crucial than a dictionary, simply because the data and information in a corpus is more comprehensive. A corpus contains both spoken and written forms of language taken from real situations and stored in a machine-readable format. Modern digital corpora however, are more flexible and more competent to store all forms of text in multi-media mode with suitable notation software and glossing. As Johnston and Schembri (2013) points out till 2008, sign language 'corpus' remains simply a list of video recordings with no linguistic descriptions with the exception of some which contain written forms of transcription. Studies on ISL and its variety have been initiated since the year 2000 (see Zeshan, 2000, 2001, 2002, 2003a, 2003b; Sinha, 2017, Wallang, 2014, 2015), and these are based on data collected from a selected group of informants, and not based on a larger corpora considering the cultural diversity in the country.

A multi-modal corpus that draws natural language data from various sources is needed. As stated above, in India attempts have been made to incorporate sign varieties operating across India (Indian Sign Language Research & Training (http://www.islrtc.nic.in/.) and yet this is only a dictionary which is accessible online. The online dictionary contains a variety of semantic categories which includes legal, medical, technical terms, English idioms, names of places, numerals, etc. Nevertheless, these are all attempts that contribute towards understanding of sign language in India and thus manoeuvre more academic resources which support the deaf community and promote equity in education. Johnston and Schembri (2006) working on AUSLAN, points out the difficulty in archiving sign

languages. He highlighted the issues in sustaining data which for the most part, involves time-consuming series of video recordings, and necessary annotation for linguistic analysis. Today, creation of multi-modal sign language corpora is possible with the advent of multimedia software for example, the ELAN software (see Crasborn & Sloetjes, 2008) that can automatically annotate multimodal forms of language; and iLex (see Hanke & Storke, 2008) a database tool to transcribe sign languages. In India, the urgent need is to create an open source multi-modal sign language resource that could be productive for those sectors dealing with the deaf community and render better services that would contribute to its sustainability.

Sign Language in Education amidst Diversity

As pointed out above, a multi-modal based corpus on sign language is needed for larger understanding of its structure, the implications on language acquisition and the integration of pedagogy in classrooms. In education, attempts (NCERT on Barkha series, North East Regional Institute of Education on 'Reading cards', Folktales, Children stories, the NESL SignBank, and several others) have been made to integrate sign language in school education by ensuring pedagogical materials are translated and represented in sign language. However, the status of sign language in language policy is yet to gain momentum particularly in the field of academics. By legislation, several provisions have been made to ensure sign language should be made accessible as per the Rights of Person with Disability Act (2016). Although the United Nations Convention on Rights of Person with Disability advocate for formal recognition of sign languages (see Batterbury, 2012) yet in the RPWD Act, (2016) sign language is still being reflected under the 'augmentative and alternative communication' in the context of 'disability', hence, it is not treated at par like any other spoken language which by constitutional rights (Article 29, (1&2)) can be promoted like any other minor tribal languages. Its status as a natural language with a diverse group of deaf community members is yet to be understood. Thus a major corpus for linguistic archiving of sign languages drawn from multiple resources is necessary. Although sign language may have minimal functions in the larger society as compared to the dominant languages in the country, its place in education right from school education needs much more than simple archiving of the language or integrating it in ICT classroom materials for instance, by providing simultaneous translation of classroom instructions and materials. It is often the case that such translations cater to inclusive classrooms, but the sign language used in these materials may be of a variety that is different from the students or teachers who may not have the knowledge of other varieties of sign language used in different parts of the country. Consequently, there may be possibilities of lexical and structural differences, or even the risk of losing the indigenous forms of sign language varieties by incorporating more borrowed forms from dominant sign languages. A multi-modal corpus in ISL that takes consideration of

the varieties that exists in a cultural and diverse country will no doubt have extensive vocabulary with more intriguing structural features, which can contribute to the study of human languages.

Sign language in the context of inclusive education remains a setback. Although, attempts have been made to integrate inclusive education in both pre-service and in-service teacher education, yet sign language within the concept of 'total communication' loses its stance as a natural language. In pre-service education, sign language does not appear to be incorporated seriously in most teacher education programmes, in the NE region. Although diploma courses and short term trainings are available (Rehabilitation Council of India based institutions) and with the commencement of ISLRTC most courses on ISL are regulated by the ISLRTC, which need to work collectively with teacher training centres. In mainstream education, in-service teacher training programmes and teaching learning materials in sign language are quite rare. D/deaf children are not commonly found in mainstream schools since most of them prefer to study in deaf schools where they can communicate with each other and even reside there. Hence, rather than a sign language training of teachers, it is more viable to have awareness programmes on the basics of sign language and integrate it into the regular training programmes.

Although NCERT has been providing exclusive trainings in this area in the NE region, the state educational functionaries have initiated similar trainings as well, particularly in Meghalaya, Nagaland and Mizoram. Based on these short term trainings, it has been observed that most teachers often learn the language quickly, but its actual utilisation in schools remains unknown and probably unused because of a lack of clear-cut guidelines and resources. Even with the Meg SignBank, an initiative taken by the state government of Meghalaya from the department on disability (rather than from the mainstream educational functionaries) failed to make a definitive impact as the app was not mandated as a resource for teaching and learning and perhaps, it is yet to build itself extensively for the purpose of education. However, the NESL SignBank does contain information that can support teacher education even if it still requires incorporating more data and instructional materials. To ensure sustainability of such digital language resources, one needs to extend and ensure that the data is relevant for the users. Therefore, relevance of a larger corpus is needed in order to develop and improve teaching-learning materials.

The present scenario reveals that sign language is yet to make its way into the existing special schools in the NE states, let alone 'mainstream education'. Different schools have their own preferences for the kind of curriculum, method of teaching and the type of sign language used. One school may advocate for the use of ISL while another may rely on whatever sign language resources and/or training are available for the children's benefit. Thus, there are many disagreements amongst schools, and more often than not, teachers would prefer to use

what is easily available and/or under the expertise of people from outside the region, while disregarding the deaf community's perspective.

The onus falls on the creators of these programmes and applications to address these issues. Based on the development of the Meg SignBank, one has to take into account the need of the users, for example, the need to use the app in public institutions such as in hospitals, in legal matters, electoral duties (as part of the campaign on inclusive election), and so on. Thus, simply listing signs may be productive to cater to short term trainings, but to sustain the app, it needs to incorporate more instances of natural language use in actual contexts and at the same time ensure that these are translated to the local languages as well so as to include those users (hearing) who may not understand English.

Additionally, one of the critical concerns in today's world is the decreasing rate of linguistic diversity due to the rapid speed in information and technology and economic advancements. Some may not agree to the link between economic advancements and language development and preservation, and perhaps it may be true in reference to spoken languages only. However, the NE states with its linguistic diversity, rich traditions, cultures, folklores and numerous oral history of distinct folktales present an interesting area to derive insights into deafness and the disconnect that the deaf community faces from the hearing world's traditional knowledge and culture (this is not dealt in this paper). Due to this varied nature, one expects diversity even within deaf communities existing in this region.

However, deaf communities are not defined by geographical boundaries- they exist in places where deaf people congregate and often live together such as residential schools, deaf clubs and associations, or in small villages where families having hereditary deafness are present. Schools are usually located in urban areas of the region and they mostly form the platform where most sign languages develop by virtue of having deaf students with the basic human need to communicate. Homesigns (the signs used at home) are the initial forms of communication that children carry to such schools. In the context of deafness and sign language, it was observed that smaller deaf communities (while working on the database of both NESL SignBank and Meg SignBank) tend to move towards mainstream languages which are considered to be more beneficial and more advanced as they meet the communication requirements particularly in academic and occupational spaces.

In the context of the NE region, sign language variations at the lexical level and structural level across the region were observed particularly while documenting the NESL SignBank. Striking differences can be seen particularly in the state of Nagaland, where the structural features of the sign language use in the deaf schools in Nagaland is similar to the ASL. Further, while compiling signs for the Meg SignBank, disagreements as to what is considered the correct or standard form of single sign for a particular word emerged from those residing in urban

areas and rural interior parts of the state. However, the groups representing the urban areas predominate in most instances, as they are more exposed to ISL and ASL due to contact with different NGOs and other national and international organisations that often relate to their programmes or in other social platforms. Similarly, when these groups meet native signers from other states, they tend to borrow signs which result in loan signs, and often replace their own indigenous signs for many reasons.

In view of the inherent nature of cultural diversity in India and particularly in the NE States, sign language dictionaries, archives, SignBanks, and so on so forth ought to contain national and regional dialects. Hence, the requirement of a multi-modal and multilingual corpus becomes indispensable particularly in the NE region. This is possible with the support of the institutions and functionaries and their active role in mainstream education (or as Simons and Bird uses the terms 'archives' and 'aggregates') for the sustainability of the sign language corpus and for it to be treated at par with the corpora of spoken languages. Bearing in mind that such resource should have open access may not only be seen as language resources, but can also help one to understand the underlying structures of such languages in order to able to use and integrate in their daily lives, particularly in an academic environment.

To sum up, the sustaining model as pointed out by Simons and Bird (2008) requires much more in building a digitally based sign language corpus than our efforts till date, and this is yet to be achieved. It is not enough to create resources in sign languages in the form of apps or dictionaries as a corollary of technological advancement in aiding data collection, storage, automatic annotation (transcription), accessibility (in multi-media or in print), availability, and relevance. Sign language faces a great many challenges such as the dearth of materials, its status which is still not recognised as a natural language in our country, and its place in the curriculum at all levels of education. To truly sustain the growth of sign language resources, educational institutions can be the mechanism to provide a platform for building and updating such corpora for extensive research with long-term financial support and at the same time to ensure their continuity and relevance.
students on the post-test. The graph shows that experimental group scores were better than traditional group scores. It is indicated that the computer assisted instruction better than traditional method of teaching.

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Social and Emotional Well-being Amidst COVID

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With the announcement of country lockdown by our prime minister on March 18, 2020, the nation's activities came to a sudden halt. With no preparation time to combat the situation the teachers were struggling to impart lessons using online platforms. Addressing social-emotional needs remotely seemed to be a distant goal for all. All these challenges made us reflect to devise a plan to address learning by incorporating the social-emotional component and making classrooms happy, inclusive and accessible for all.

The sudden, forced adoption of remote learning affected the well-being of teachers and students alike. We created a Wellness mantras series which contains six posters comprising of simple doable tips to keep oneself motivated.

#1 Are you digitally smart
#2 Are you emotionally smart
#3 Are you physical active
#4 Is your social connect empathetic
#5 Are we practicing occupational wellness routine
#6 Are we socially responsible

Link:https://wakelet.com/wake/eAtVFtbJIAbn6Gz8MoYih

Wellness mantras empowered teachers and students to believe that they have the ability to contribute to each other's wellbeing by staying motivated. They shared their stories on various aspects of wellness. Their stories included a tiny contribution of calling their grandparents regularly to know their wellbeing, to help their friends stay fit by conducting collective online fitness sessions and learning simple DIYs using online platform. Teachers shared their stories about how they are helping their peers in e-content development or using the online teaching platform effectively by incorporating the concept of train the trainer.

Remote learning times are challenging times for students with diverse needs in the classrooms. We created a video series "Addressing Diverse Need in Remote Learning Times" comprising of three videos to address their learning as well as social-emotional needs.

Our first video encompasses resources related to addressing challenges of Reading, Writing and Math, Executive Functions and Speech, Language and Communication challenges: Link: https://www.youtube.com/watch?v=9bNYmz9Sn4c

Our second video addresses the Hearing, Mobility and Vision challenges of the students which comprised of various tools needed to accelerate the learning of students. Link: https://www.youtube.com/watch?v=N3AcACXhIHk

Not every disability is visible!!! Variety of Tools needed to enhance the learning of students with Neurodiversity, Multiply Impaired/Medically Fragile and challenges related to Mental Health were collated in the form of a video to address their needs: Link: https://www.youtube.com/watch?v=CJO9MmfwhpM

These videos were shared with the larger community. This helped teachers to use free online tools to address students' needs in a remote learning environment and for the parents to help their children in their learning at home. This also empowered students to access the content and personalise it according to their needs to stay at the pace of the online learning class. More than 1000 views of these videos collectively explains the impact and usefulness of this free resource in online classrooms.

Considering how Life skills classes were impacted during pandemic due to the lack of resources for online delivery of these skills we have launched e-content of life skills. The content is made in the form of comic strip and supports audio, visual and text learning to address needs of the students and is aligned to CBSE Life skills syllabus.

Teachers had started using this e-content within a day of release of this. They found this content quite useful to address why life skills are important in remote learning classrooms. We had more than 447 views of our video in just 2 days. We received phone calls from teachers about how this e-content is proving beneficial in online classroom. We have received calls from the students and their parents that they like the character of Super Granny and were able to reflect on the importance of life skills in their life. Link: https://www.youtube.com/watch?v=Cakjos78UCk

To benefit the larger community all the resources created were shared via social media on the forums for educators and students.

Coping with COVID-19: Teaching- Learning with Technology

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The global pandemic of COVID-19 outbreak has brought a halt to the education of millions of students worldwide. Cutting across the globe all Schools, colleges and universities had cancelled the classes. As of 18th June 2020, an estimated 1.725 billion learners have directly impacted because of closures of schools in response to the pandemic. The closures impacts have far reaching social and economic consequences apart from impacts on students, teachers and families. According to UNICEF monitoring, so far 134 countries have instigated nationwide closures of schools and 38 colleges have implemented local closures, impacting around 98.5% of the student population worldwide.

The impact has a drastic effect on children and their families, causing continuous interruption of the learning system, healthcare problems, compromised nutrition, and ensuing economic cost to families who has nothing to do as daily labourers because of complete lockdown. The pandemic is an opportunity to explore and to get ready for this unpredictable world such as adaptability and resilience into our education system as well. It should be an attempt to understand the impacts on the education sector in the form of closures of schools and also impacts on formal education. It also highlights how COVID-19 is a golden opportunity in the education sector. However, several measures have been suggested by UNESCO to revamp the education system. With efforts to thwart the blowout of COVID-19, education is swiftly moving digitally through online means. The major challenges would be the implementation of a new education system in such a way that it would reach out to every section of societies.

During this challenging situation of Corona pandemic, it is responsibility of teachers to impart excellent education services to the students. Also, students' are more liable to comprehend simple concepts of online education and distance education and should work with the constructive approach in the teaching- learning process in the field of education and should work in the positive direction of achieving academic excellence.

Critically analyzing online education, it made me realize that as Teaching-Learning with technology has its own pros and cons.

- It has led to advancements in the education sector.
- It has opened up new horizons during this novel Corona pandemic situation.
- It has resulted in major

advancements in the field of Educational Technology (ET).

- It has led the government to explore new methods and ways and to release different platforms for digital education.
- Increased use of online resources and access to online materials resulted in higher retention power of students and lifelong learning.
- It is a fun loving and highly interactive mode of communication.
- It largely attracts most number of students to engage themselves in the teaching- learning process respectively.
- It is more convenient for both teacher and student to attend lectures online.
- It offers flexibility and brings education at your doorstep.
- It helped in making linkages, meeting and connecting with new people from different fields.
- It offers us real world skills by interacting with different people.
- It engages us in the process of globalization by reaching to the masses globally.
- It involves direct feedback from the teachers.
- It results in real time monitoring of the students.
- It is more affordable by a major chunk of the population.
- In depth concentration on one child at a time and individualized learning.

Further, there are certain drawbacks or overcoming with it also.

- It has resulted in increased stress and mental stress between teachers as well as students in the country.
- It has resulted in sleep disorders, discipline problems in children at home.
- It requires more time than offline classes thus is time consuming.
- Procrastination is very easy due to online education.
- It has created a sense of isolation amidst Covid-19 situation.
- It requires good management skills.
- It requires active participation.
- Sometimes, it gives us more freedom than required or expected.
- It results in lack of social life and social interaction.
- It requires a higher degree of self-discipline.
- It requires higher computer literacy.
- It depends upon the competency of teachers and the knowledge of latest approaches in online education.

As a research scholar, I got an opportunity to learn, gain knowledge and experience from my teachers, mentors in online mode and also to share the thoughts, idea, ideologies of the related academic content via different apps and technology. I used different apps for online classes and regular discourse as part of our curriculum like- Zoom meetings, Cisco WebEx, Gotowebinar, etc. Google Classrooms, Microsoft Teams, Teach

Online, BYJU's- The Learning App, Virtual Classroom, Canvas Teacher, Visible Classroom, The TeacherApp, etc. to attend various online sessions. Apart from attending online classroom sessions with my teachers and mentors, I used these apps for attending various different online conference, webinars, symposium, and workshops during this novel Corona pandemic, COVID-19. It was an add-on to my previous existing knowledge with the usage of such apps.

The number of Zoom daily meetings has increased to 300 million + in April 2020 as compared to roughly around 10 million in December 2019. The total number of downloads have also increased to about 2.13 million in the month of March 2020 as compared to the 56000 downloads in January 2020. Its usage has increased to about 67% between Jan and March 2020 during the Covid-19 crisis.

Microsoft Teams is another platform for provision of online education and imparting knowledge. It is part of Microsoft 365. The number of daily users reached to 44 million on 19th March 2020 from around 32 million daily active users in just one week. It has gone through a major crest wherein a drastic hike has been observed in its usage. A daily record of 2.7 billion meeting minutes have been observed and recorded in a single day, which is up to 200% from 900 million minutes in mid-March.

I personally feel that it is a technical drift, which is going to stay for longer period of time. Digitalization is a new trend in the economy. Feedback from learners at different levels of education, that is, primary, secondary and higher levels of education depicts that students are adapting to the changing need of the society and are very much efficient in learning via new learning modes respectively.

COVID-19 crisis seems like a major driving force for revamping the Indian economy and the rest of the world. New horizons of Online Education can be seen with a pinch of salt and can be further worked upon and improved again. It is a new trend, which is here to stay for decades now and will strengthen the dream of Digital India. It is a challenge for the policy makers, skilled and unskilled labour force, human resources of the country as well as for nature to uphold its strength again and bring drastic but useful, operative and efficient changes, which will result in rejuvenation and revival of the economy.

Communication

Challenges of Online Teaching in the Wake of Covid-19 Pandemic

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Schools and colleges have never been locked down nationwide in the past as it happened in present time due to deadly covid-19 pandemic. Under the circumstances, shifting from conventional instruction-based classroom teaching to online teaching is undoubtedly an obligation for teaching as well as learning. There are numerous online teaching technologies/software/ apps such as Skype, Zoom, WebEx-Cisco and Google meet etc. to adopt while moving on this new path during the gigantic educational crisis but it is not so easy to be well accustomed with these in a short span of time.

My hands-on experience

With an intent to provide effective learning experiences to my students, I have included many online tools and applications in my teaching pedagogy like use of audio-video clips in lectures, giving weekly assignments online or sharing of lessons on WhatsApp groups, e-mails or google drive for self-learning. It is my firm belief that the present adverse situation has not only provided us with many innovative ideas but also provided opportunity to build our professional competencies on digital platform.

Students' feedback

The feedback was obtained from students while attending their classes online and after classes on google feedback form about e-learning. As expected, a larger number of students believe that online classes are very enriching for them. With more convenient timings of the classes, absence of the need of travelling, freedom to sit in a more comfortable and homely environment, overall is a good experience. However, a few other students faced difficulty in using this digital platform due to lack of resources. Also some students are not enough competent to use e-learning technologies. Still majority of the students are satisfied with this new way of learning.

On the other hand, my experiences on using technology while teaching acclaim that:

- This crisis has brought all teachers together and they work as a team instead of individuals to provide students the best support system.
- Education is not only about classroom teaching but it also involves interactions, free flow of ideas, open discussions and mentoring of students; so ample opportunities are provided on digital platform by organising debates, discussions etc.
- With academic growth it is also important to take care of affective and psychomotor domain

therefore to connect emotionally with students along with digital connectivity, special weekly classes are organized for their well-being, where the students can discuss even about their anxiety and fear because of lockdown.

- To give students the feeling of a normal classroom, Socratic Method of dialogue should be used. Firstly, the content is explained for 15 to 20 minutes, followed by students' discussions and questions.
- Grounded on the student feedback and my own experiences as a teacher in using these technologies, I would like to make following observations reflecting challenges to the use of technology in our present education system.
- Students are from diverse economic background where every student does not have resources like laptop, tablet, Smartphone to attend online classes;
- Issues related to internet connectivity pose a hurdle in effective teaching;
- It is really a difficult task to keep students involved and keep a check on their distractions during teaching learning process; and
- Conducting internal assessment is another tedious task as students have to use their own devices and nobody is there to have an eye on them.

In a nutshell, although online classes are need of the hour, but replacing the traditional classroom teaching is next to impossible. Therefore, in future we expect to return back to the same buildings of school or colleges for real teaching learning experiences.

Where There is Will, There is Google!

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Maharashtra has been the worst affected state by the COVID 19 pandemic. Pune, the IT hub of Maharashtra was one of the first to close down, a week before the rest of the country faced lock-down. Like others in the city, we were caught completely unawares while returning home on Friday, 13th of March, from the University.

I teach B. Ed and M.A. Education, both post graduate courses. Many of my students come from rural background where internet connectivity was a hindrance. Additionally, the number of devices was lesser than the number of people in the family who accessed them. To, overcome the challenge, the online sessions were conducted as per the convenience of majority of students and recording for others. Since we were already at the end of the academic session, the main task was to conduct doubt solving sessions. Thankfully, all the students have a valid email id and have at least one social media account.

With the backdrop of the above-mentioned constraints, there were two things that I was looking out for - one, an asynchronous tool and a strategy that would solve their doubts; the other, that could help me know the topics that they found most difficult for a focused discussion during the online sessions. I did not want them to be hassled with learning new tools at this time. Google came to the rescue!

Google Doc as asynchronous peer-learning environment

I created a Google document titled "doubt solving" for each course, shared it with the respective students giving them editing access. I wrote clear instructions of using the document with example. They could post their doubts and were expected to answer to questions put by others. They were instructed to write their names below and to write only one point, thus enabling discussion amongst all. I guided, corrected their points wherever necessary in the form of 'comments' at respective places. We thus enabled a comprehensive asynchronous peer learning environment.

Google forms as a stepping stone towards a democratic flipped classroom: The second hurdle was to prioritize the selection of the topic for focused discussion. A firm believer of democratic class environment, I wanted to discuss their doubts rather than what could possibly be a doubt in my perspective. I created a Google form with a drop-down menu, listing the course, the topic and a short answer format item to write the precise doubt. I informed that the doubt-solving would be arranged in descending order of the votes. I instructed them to continue filling up the form on every Sunday. This enabled me to schedule all the doubt solving sessions with a focus, incorporating

flipped classroom elements.

Feedback from students: The students reported that the doubt solving document idea enabled them to ask doubts freely and by answering doubts, they were guided by the instructor- me. The students expressed that this activity eliminated the feeling of isolation while avoiding the clutter of WhatsApp communication. The students hinted that this type of exchange added to their motivation and gave them a feeling of being “heard”. The students conveyed that the instructor was perceived to be “approachable”.

Reflections: A democratic class room is the corner stone of an engaged class. To voice pinpointed doubts, the students had to be thorough with content. The doubt solving document, served as a channel for peer-learning, peer communication and learner-instructor communication. A well-planned strategy for asynchronous communication works effectively, keeps things organized and reduces the load of individual emails and that of data consumption. The flexibility of schedules saw more engagement of the students. Thus, simple and popular tools can be effectively used for a collaborative learning environment when planned carefully and with prudence.

My Experiments with Technology

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The COVID-19 pandemic left the gamut of teachers and students in a state of crisis. The pandemic which struck mid-session left courses and assessment incomplete. With no access to schools and colleges it became difficult to reach out to students. Technology has played a major role in bringing teachers and students together. It has provided a common platform that could serve as a binding element and helping all in this moment of instability. During this crucial point technology has served as a boon not only to the people who are adept in its use but also to people who have been limited users of it. Such is the nature of technology, that it makes tasks easier and absolutely friendly.

I have used a number of applications in my virtual classrooms that I created for the teaching learning process to go on smoothly and effectively. Here is a list of the assistive technology that I have been making use of -

1. Google Classroom - A Learning Management System (LMS) is the first pre-requisite for the smooth functioning of any virtual platform. The Google Classroom provides a perfect environment for this purpose. Forming classrooms and adding students and teachers as fellow collaborators is a very easy task. Further it also provides a comfortable environment to send study material, assignments, videos and quizzes to the students for their perusal. Forming Rubrics for the purpose of assessment makes the process a cakewalk. Finding everything in one place i.e. in the Google Drive makes everything very systematic and convenient. One element found missing in the Classroom is that it does not allow parents to participate as key stake holders, which I consider is a very integral part of the whole process of learning.
2. Bandicam- Bandicam is a light weight screen capturing application for windows. The process of making videos through the screen capturing function is rather effective and easy. Making PPTs and converting them into videos with an audio video screen capture turns out to be efficient and is interactive too. Bandicam comes with a very bold watermark in the free version of the application. To avoid this one will have to purchase the paid version of it.
3. Virtual Meetings- Meetings with individual classes were scheduled on a regular basis. Most of these meetings were done initially through Zoom and later on through Cisco WebEx. These meetings provided a platform where the teacher could personally interact with the students. Though nothing can be compared to the face to face

interaction but it was still worth the effort. These meetings helped the students to clear doubts and also to have interaction and collaboration with their peers. On the other hand, it was also noted that it was difficult for the teachers to manage students who were disinterested. Moreover, it provided less opportunity to those set of students who were reticent and chose to remain silent.

4. Google apps- All Google apps such as Google docs, Google slides, Google Forms came in handy along with the Google Classroom. All these applications are beautifully integrated with the Google Classroom. There are certain limitations, wherein there are a number of services that can be used as add-ons which have to be installed. Gaining expertise in using these add-ons is another daunty task for a new user of technology

5. Padlet- Padlet provides a unique platform to the students to express their views and share opinions with not only the teacher but also their fellow classmates. It is in the form of a common whiteboard where each child has the liberty to express his/her thoughts. The students found padlet a creative resource in the classroom where they could collaborate with each other but there were many instances, wherein students had to be discouraged to use language that was incorrect and inappropriate.

6. Socrative- As a formative assessment tool Socrative proved its worth in the class. The best part is that Socrative can be accessed on any kind of device and gives the teacher the ability to give immediate feedback to the students. It is interactive and engaging and provides a number of question types which can be used for the purpose of assessment. The only lacuna is that it becomes very difficult for the teacher to analyse student data on an individual basis, since it requires lot of time and effort on the part of the teacher.

7. Pixton- Making comic strips with the Pixton app is a fun task. Students love to read educational content in the form of comic strips and the end results are very effective. It helps in enhancing the process of learning. Teachers can also encourage students to hone their creative skills and come up with comic strips of their own. The characters and background scenes are too limited in the free version and for every other thing it asks the user to upgrade.

Every aspect has its pros and cons. On the one hand, technology has proven to be a blessing for the fraternity of teachers in this state of flux and crisis. It has not only showed the path to many teachers but has also fostered the feelings of oneness and standing in unison in these times. On the other hand, if we see, there are certain limitations to it too. Internet services are still in the preliminary stages in the Indian context and it becomes difficult to reach out to students located in remote areas where these facilities are meagre. Moreover, there is a certain group which still has to acquire pace and learn the use of technology. Though the challenges are

many, but these challenges should not undermine the spirit of a passionate and innovative teacher.

Teaching-Learning with Technology

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The COVID-19 pandemic has affected education system worldwide leading to the near total closure of the schools, colleges, universities. To attenuate its impact on education, teachers all over the world are making a remarkable effort through online classroom to let their students learn staying at home. Though in India where most of the teachers and students are not so savvy with the use of technology, we are inspiring one another to comprehend the situation in a positive way.

Primarily as a matter of jest I started online class with sharing pdf related to the topic on Google classroom with 22 students registered out of 93. Students also showed interest in online classroom by registering and replying at my post. They used to say "Good morning sir", "How are you sir?" in attractive fonts and smiley. Reading their comments! I used to feel their warmth, affability and ebullience. More number of students started joining my class using the code generated by me, sooner the attendance rose to 78 out of 93. I believe lack of access to technology and internet access refrained the remaining to register in Google classroom attributing to their necessitous family background.

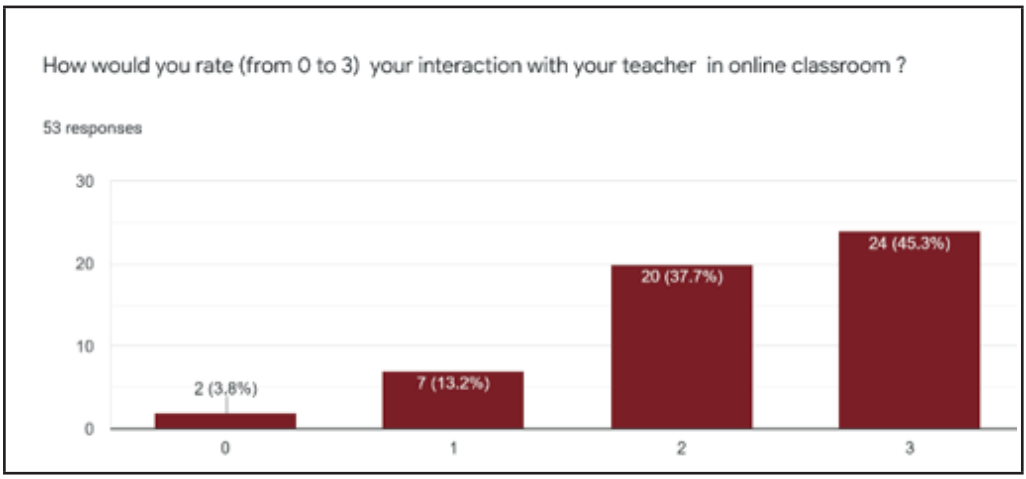
But alas! What happened?

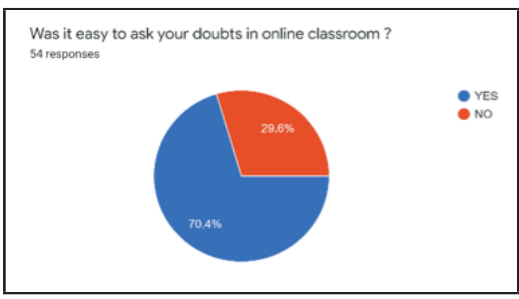
In a couple of days, the good morning wishes and the replies to my posts declined rapidly inferring that mere sharing pdf of related topics couldn't help them in mathematisation. Conceptual notes were shared to intrigue them in subject but their distrait behaviour made me realise that they seek my presence in the Google classroom. I decided to record an audio on introduction of "Integers" to fascinate them, keeping in mind that not only students but their parents, family members are also going to listen it and anticipate my capability, competence, and potential as a teacher. Unlike actual classroom, it was very difficult to record an audio imagining students are sitting in front of me. After much trial, deleting and editing for several hours, my intense earnestness led to successful cessation with a 7.26MB audio. On that very day I, with full excitement, shared the audio and sat back with satisfaction, until a notification popped with message "couldn't send, something went wrong". I resend the audio and moved my phone in air but these efforts were in vain. Audio later edited in smaller clips and sent successfully at midnight. No doubts or counter questions were posed by them. Quiziz.com, google forms were used to make stimulating questions for their inquisitiveness. As we proceeded in the lesson, videos were required to make them understand the mathematical logics and concepts. Inadequate internet speed coerced me to share YouTube links instead of sharing my own videos.

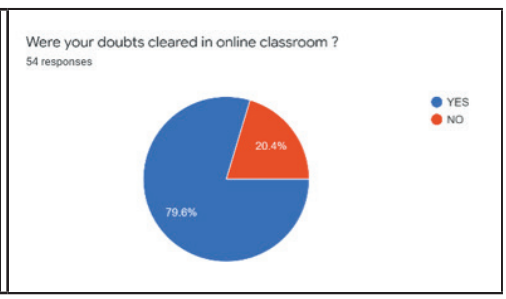
I asked some students for their feedback through Google form and got

few responses:

Four point rating scale i.e. even numbered rating scale is used to avoid apathetic response as many students have the tendency to choose the average one.

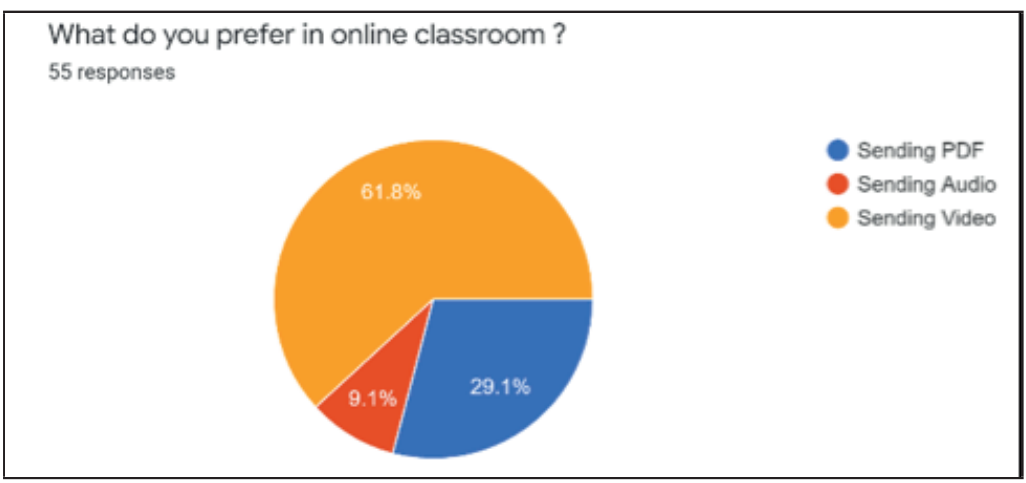






Most of the students were able to ask their doubts and despite of the slow internet access, were cleared

Most of the students prefer online classes through videos or live classroom, which is onerous for me in such internet speed.



I used strategically placed prompts, cues, question, direct explanations and modelling to guide their thinking and facilitate an increased responsibility for the completion of a task. However, COVID-19 has become a catalyst for educational institutions worldwide to search for innovative solutions in a relatively short time period, we have to evolve our prowess in ICT and assimilate it in teaching learning process with insightful contents for their enduring involvement. By the time actual classroom begins learning outcomes ought to be reoriented to horizontal mathematisation instead of vertical and the focus should be on learning, rather than testing for scores.

'Google form' to Deliver Content to Students

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Introduction

The world is passing through transformation. All of sudden, in this pandemic situation, the platform of teaching-learning is changed. A discussion has been going on for a long period about the usage of ICT. Modern classrooms are equipped with advanced devices. But, the situation of a pandemic has given new tasks to teacher fraternity because the effect of COVID 19 is perennial. It is difficult to say when our schools will get students in the classrooms? Hence, it is necessary to think about the teaching-learning process which is almost stagnant at this moment. What can be done to revive it? The present write-up is written to answer aforesaid question.

A brief description of the technology used in teaching and learning

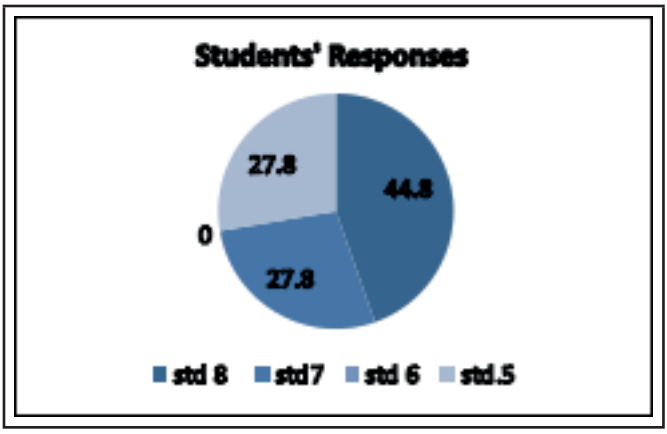
This is the story of the curse which becomes boon. As a principal of the school I used to ask questions to my students about current affairs on Monday assembly. Those students who used to give the correct answer they used to receive prise. This activity has been carried out for last three years in the school. The present situation indicated that students are not going to join us for the next three months. It is difficult to say anything about the reopening of the school. All the teachers have been instructed to create WhatsApp groups of their classes. It was created to pass on messages or necessary information. Now, the concept of ICT has touched its culmination at present. The internet, cell phone, Google classroom, Google forms and spreadsheet, etc. these are the technology without which it would be difficult to think about the teaching-learning process. Among all, I prefer to use "a Google form" to deliver content in quiz form. The concept of Google form is very easy to use. Hence, I developed various quizzes like awareness about the corona, tenses for the students of eight standards, current affairs, etc. All the teachers distributed among their respective groups. Surprisingly, we received overwhelming responses. Now, schools are not in session, but with the help of a quiz, all teachers are in touch with students. They eagerly wait for the quiz. This is the first time in history, that the students of government schools are in touch with schools and the teaching-learning process is going on. Before one year, we used to receive circulars that teachers should not use cell phones in the classroom. Now, the cell phone is the only medium to communicate with our students. Even, this year admission forms are circulated through WhatsApp groups. This is how the curse has become a boon.

Their reflections of using the technology the feedback from the learners

The present quiz was developed for the students of the fifth to eight standards. The basic question we're asked about the COVID-19. The basic intent of this exercise was to know the awareness of the students about the current pandemic. Based on their responses, the second quiz will be developed to give them more details. Hence, some more content will be developed on the Functions of English grammar and general knowledge, which will be helpful to them for competitive exams.

The Students Response

The responses of the students (as given in Fig-1) made us think about two matters: One, this is a new way to send content towards them. Therefore, they enjoyed it. Second, about any current situation, a quiz can be developed and shared with them. It will create one bridge of knowledge sharing. This will inculcate new habits among learners. On the other side, the teacher will also enjoy delivering content in a new manner.



The analysis of responses also gave us information about their perception about COVID 19, and we have tried to provide correct answers also so that they can get upgraded information

Conclusions

As a teacher or as a student, we enjoy answering questions or some time framing questions for the students. This is a good method and we have been using it for a long period. With the support of "Google Form", we are trying to change the flavour of it. A "quiz" is a wonderful concept for information sharing. Our students always like this type of activity.

References

Link: https://forms.gle/LAMwXLHi7yfywNev5 (Quiz Link)

Teaching with Technology: Educator's Experience

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The inevitable lockdown owing to the COVID-19 pandemic has created a situation of all-around chaos across all sectors of the economy. A threat resulting in an unprecedented standstill is being experienced by educational institutions. The traditional education system necessitating physical teacher-student interaction for teaching-learning transactions is completely disrupted. A positive outlook on this current crisis is that, it has opened new avenues to digital technology platforms for teaching, training, and research. Looking at the current situation, online platforms are the only means to assure continuity of the teaching-learning-mentoring process to minimize the damage. Besides online teaching, these platforms extend an opportunity to educators working from home to continue teaching for routine classes and guiding students' research, business-plan projects. The educators are also taking exposure to the advanced features of these tools and are upgrading themselves by attending workshops and webinars to enhance their skills and adapting to newer learning methods.

This article discusses our reflection and experience of various digital learning platforms which we have used for teaching, evaluations, and mentoring our students. We also share our learning exposure while getting hands-on-experience on these tools.

Transforming classroom learning through digital platforms

We have conducted our classes/ presentations/exams using various platforms such as Zoom, Cisco WebEx, and Google products (viz. Classrooms-Meetups-Hangouts-Duo). These video-conferencing platforms provide the convenience of having a large gathering of listeners, features like screen share facility to share various websites, PowerPoint slides, documents, exercises on excel sheets, and using artificial intelligence for data analysis and evaluation of quizzes and assignments. With the chat options, students were able to raise their queries during sessions which made it easier for us to understand their pace of grasping and learning using these platforms. WhatsApp (with its eight-member video-call facility and easy information sharing) was mainly used for announcements or personalized discussions with students collaboratively working in group projects.

These platforms have made the learning experience more enriching and interesting, the mentoring activities required regular interactions with students here Zoom served the purpose with its free version turned out to be a boon enabling us to interact and share

our feedback instantly. The constraints that could be felt in zoom were related to a time limit of 40 minutes for a free plan and that of the multi-call feature of WhatsApp was the maximum 8 number of concurrent participants at one go. Also, as a learner, while attending a workshop the breakout-room feature that enabled secluded discussions between groups formed out of participants, was a valuable addition to our skills.

Students' feedback

A quick feedback of students revealed that initially when this sudden switch took place, they felt the new system was a bit difficult to adapt, and at times there were internet connectivity issues that resulted in the loss of continuity at times. "Being aware of the limitations, we allowed the session to continue without disturbing you when we lost a few seconds of connectivity or loss of voice, however, it was not too significant" said one student. While another student said that "I was too naïve in using such a system and initially, I was too scared that I avoided interactions, but was comfortable as the sessions progressed with days." In general, the students initially required a bit of time to adapt to the technology-enabled learning process, but with passing days they enjoyed this new approach.

Conclusions

Digital learning has taken a huge leap from what it was perceived earlier as a complementary approach to now the only source of our survival for teaching. These platforms have emerged as must-have tools in times of lockdown for a seamless education process. After some initial hiccups students and teachers have become adept in the use of these tools. These tools have given opportunities for business continuity in times of crisis for the education sector. Thanks to Online tools that served as saviours.

Communication

Gamification for Student Engagement on Virtual Classes

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During the period of COVID-19 outbreak, we have adopted technology to cater the needs of teaching and learning process. In this article, I would like to share my experience teaching and tools that I have used to engage students during an online class. There are lot of challenges for a teacher when they are teaching in an online class, such as evaluation, lack of motivation in online learners, assessing the learning outcome, technical difficulties and many more. One of the biggest challenges that I faced would be engaging students during the class and also how to make sure that they are clear with the concepts taught. I had come across concepts of gamification earlier but had never used them in online classes. Gamification introduces game elements into non-game contexts to attract participants and create gameful experiences (Hamari, Koivisto and Sarsa, 2014). Researchers have emphasized the importance of gamification design in technology related activities specially to motivate the user. Exploring various options for using gamification in online classes, I found a website for making quizzes i.e. Quizziz.com.

Quizziz is an online tool that helps teachers to conduct formative assessments in a fun and engaging way for any age group of students. This online tool can be incorporated in the instructional design, evaluation and helps in revision of the topics taught. Students are provided with a unique code to start the quiz in a live class or the quiz can be given as homework with a specific deadline. After the quiz gets over both the teacher and the student can review the performance of the student. A detailed report of the questions, answers given by the student and overall accuracy of answering the questions can be downloaded from the Reports section in Quizziz. I used this report also to mark the attendance of students to see how many are actively participating in the class. I could also see the time taken by students to answer each question. There were lesser chances for the student to cheat in the quiz as each question had a specific time limit to complete and also the questions were randomized for each student. Other advantage of Quizziz is that the tool is integrated with Google Classroom. Redemption question is a feature in this tool that repeats a question a student got wrong. This motivates the student to reflect and learn from their mistake they have made earlier. Research studies have shown that reflecting on the mistakes and retrieval contributes to learning and memory (Roediger and Karpicke, 2006).

Students enjoyed and felt competitive while attending the quizzes made on Quizziz platform. Students implied that joining each quiz was easy and

does not have the hazzle of sign up or log in. They also felt playfully focusing on the quiz was important even when attending online assessments. 'I wanted to come on the top of the game rank list, and for that I used to revise all the topics before attending the quiz' said one student when asked about the learning using Quizziz. There was a growing interest and motivation among the students attending the class online. Students also had the drive to be attentive in the classes and reduce other distractions. Such technology tools used in the process of teaching – learning will definitely support in the student's cognitive and emotional outlook.

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Book Review

The Social Photo: On Photography and Social Media (ISBN-13:978-1-78873-091-4) By: Jurgenson, Nathan, Published by Verso, 2019

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The practice of photography has always invited adequate probing and queries from such varied fields of scholarship as art history, visual culture and media studies which have each viewed the subject through its own unique lens and thus found something the others overlooked. Likewise, social media as an emergent phenomenon of any and every society has not escaped the piercing probosces of social science theorists.

Jurgenson's book stems from a discontent over how photography and social media are never talked about in a single serious academic conversation that does not succumb to the temptations of either techno-cynicism or techno-utopianism.

In this remarkably well referenced work— one that is also highly ambitious —the author attempts to systematically dismantle the elite discourses that have thus far governed the study of photographs and instead focuses on the very raw and unvarnished modes of engagement with photography that social media is representative of. In doing so, his work also stands critical of the sniggering disregard for social media shared across academia, which is often blithely dismissive of it as being too banal and commonplace for serious enquiry.

The book is divided into two quite hefty chapters, each of which runs in the form of a slightly discomforting Twitter-speak series of threads woven together into a very long essay. It is followed by a tiny essay for a third chapter, the existence of which is questionable.

The first chapter, titled Documentary Vision, proposes new formulations that can help understand the phenomenology of the 'eye' as a photographic subject which shifts from being an erstwhile 'camera eye' to the contemporary 'Instagram eye', wherein the social media driven impulse to photograph has been discussed with great vim and clarity.

Jurgensen quite refreshingly departs from the age old critical discomfort with the technological anthropocene and proposes a new scope and scape of the eye that is enabled by and operates through a series of apps. Something that he finds particularly interesting is the frquent use of faux-vintage filters in photos taken today, which reproduce (or attempt to reproduce) the character of vintage photographs rendered obsolete today, diluting it all down into an aesthetically pleasing digital effect that is wilfully anachronistic. What follows is a cogent and effective series of

arguments that tie together the physical character of photographs, the category of nostalgia, and the ephemeral lives of photos today.

The chapter draws from the distinction between information and communication in any media and constructing the frame for documentary vision it argues that the shift from a skill oriented technical practice of photography to a more casual and ubiquitous practice of taking pictures of everything is a result of a shift in the purpose of the medium itself from informing to communicating. Further, the author uses this ceaseless desire to capture the various bits and bobs that make up the world immediately around us to provide a commentary on the temporality of the photos thus envisioned— where the present is always seen as a potential future past.

Through this formulation, we come across an interesting concept called visual literacy— which the author argues is above and beyond literacy as we understand it. The emancipatory potential of this visual discourse in the contemporary social media age lies in simply noticing the world around you and presenting it as a mechanism for communication that is then read and engaged with by the viewer.

The second chapter, titled The Real Life, is quite ironically a critique of the real - virtual duality. This is also the chapter where the author allows the sociologist in him to quit backseat driving that one could sense throughout the first chapter and take the wheel instead.

He takes on bunch photographic habits born of social media like clicking selfies and candids, to put them to test very many core sociological theories, most notable of which is symbolic interactionism. He is in vehement opposition to the mainstream view that refuses to see possibilities of real authentic selves within our online personas and instead he urges us to realise the potential of the virtual spaces in being a part of the process of creating and curating our offline selves. Besides granting the online self-equal authenticity, the essay shows us how the virtual also becomes that space which allows us to peep at the in-between moments of a performance, the Goffmanian backstage becomes available for public viewing and scrutiny, and in turn forms a part of one's self-image. This book is arguably the most nuanced exploration of the 'selfie,' which is otherwise, ridiculed and scoffed at by academia.

The third chapter is a woefully short and inadequate exercise where he tries to extend the same arguments of still photography to videos and that mostly fall flat without the necessary support. One might be tempted to wonder why the chapter exists at all and I shall not delve into its specifics.

This is perhaps the first attempt at trying to understand the visual medium of photography through the lenses of the social, and not the other way round. It presents an exhaustive set of possibilities of reading photos socially and is thereby as much a resource for readers interested in visual studies as a delight for sociologists. Jurgenson puts together an extensive and enviable bibliography as throughout the book he borrows from a plethora of scholarship

spanning all across social sciences and media studies, and weaves together a beautiful tapestry that displays at once, the richness of these debates, and the profundity of his own arguments placed judiciously therein.

However, the book suffers from what I suppose is Jurgenson's restlessness to either stick to a central thesis of argument or analyse a reference sufficiently before hopping onto the next temptation of thought. Therefore, despite such rich references, the essays only end up looking like prestigious dinner parties where every notable name from the social sciences and cultural studies are in attendance, but who for some unspoken reason refuse to talk to one another or to Jurgenson himself and only blurt out pithy maxims out of turn - all of which gives rise to an unseemly and cacophonic chaos.

The essays that oscillate between exhausting and exhaustive, thus snatch away from other works, at least in the immediate future, every prospective perspective of looking at photographs in the social realm. Until a major technological breakthrough occurs that shatters all existing modes of interaction with photography, it is perhaps nearly impossible to present a point of view that Jurgenson hasn't touched upon already.

What might keep this work from being a notable mention in the academic reservoir of ideas is precisely what makes it exceptional. In presenting nearly every possible way of looking at the social photo, the author says all that can be said, at once, and thereby falls short of developing any of those ideas fully through and through with as much time and rigour as the reader might require to process it.

He writes as though chased by a rash urgency that is somewhat typical of our times and presents a rapidly shifting series of spiralling thoughts without dwelling on any of those long enough to hook casual readers.

The book can, therefore, be an immensely fruitful repository for undergrad students to find a multitude of topics they can develop for their end of term thesis, or for sophomores to sigh in frustration and marvel at the extent of Jurgenson's thought and drop truth bombs about the social photo at parties they gatecrash, or perhaps even for a lover of reading to fish this paperback out of their personal library once every Sunday and amuse themselves with the tidbits of its content. Beyond that I find it difficult to see this book turn into a text or be inducted as a canon in itself. But perhaps it demands of academia a new way of reading– that is a shift from sluggish to bloggish; that is several nuggets of bite-sized wisdom which the reader is free to consume at once or over several helpings, depending on their appetite.

In the Indian context, an interesting point to dwell upon if one allows oneself to go beyond the obvious critique of the digital divide is how ubiquitous this visual literacy and its vocabulary is, whether the subaltern can finally speak, free from the elite discourses of literacy as we understand it and equipped with a visual mode of self-assertion, or if it will be just another new way of gagging the subaltern from participating in

this newfound democracy of photos through more easily available concrete filters.

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