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Research Article

Technology Mediated Learning: Learning from the Case Study of a Government School

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Abstract

In the present dynamic milieu, innovation may well be the most important issue in any aspect of life. This holds especially true for education because it is intimately connected with different aspects of our life. Information and communication technologies (ICT), offer an array of technologies that can be used for multipurpose activities like research, teaching-learning process, assessment system, extension activities, governance, management etc. A critical role has been played by ICT along with World Wide Web, in worldwide changes that have occurred in the last few decades. These developments have bridged gaps and resulted in learning. The present paper presents observations from the case study of a school which adopted ICT as an innovation. The study is based on Government Higher Secondary School in Jehangirabad of Bhopal, Madhya Pradesh where, Microsoft sponsored Digital Learning Classroom project had been adopted. This is the first such school in the state where, this project has been implemented. The researchers intend to study the experiences of adoption of tablets by both, students and teachers of the school after training. The aspects of study would focus on the change in attendance pattern, attitude of teachers towards using new technology, experiences of students and teachers regarding their experiences of integrating technology in teaching - learning process.

Keywords: Technology mediated learning, Learning, Government school

Introduction

Today, nearly every aspect of our lives, from working to socializing, learning to playing is getting influenced by information and communication technology. According to UNESCO (2005) document, there are four stages of technology i.e. emerging, applying, infusing and transforming. India has moved beyond emerging and is presently in the applying stage. What is needed is as quick transition to infusing stage and transforming stage. The urban digital natives are fast moving towards transforming stage but, the digital immigrants and rural population are still in applying stage and at this point digital divide needs to be bridged. With initiatives like, Digital India, the gap will be bridged soon. The digital age has transformed the way young people communicate, network, travel, socialize, seek help, access information and 'learn'. The role of ICT in learning is taking a predominant form and needs to be accepted and appreciated well. The reasons for the same are pedagogical, motivational, economic, and social among others. Researches have given enough evidences about the benefits associated with incorporation of ICT in the teaching-learning situations (Sangara and

Sanmad, 2016). Information and communication technologies tend to allow a higher quality lessons through collaboration with teachers in planning and preparing resources (Ofs ted, 2002). Students get to learn new skills: analytical, including improvements in reading comprehension. It also helps in developing some writing skills: spelling, grammar, punctuation, editing and re-drafting (Lewin et al., 2000). Further, new technologies encourage independent and active learning as well as, students' responsibility for their own learning (Passey, 1999).

It has been established by studies that students, who regularly used technology, are motivated to learn (Handley, 2016; Harris, Al-Bataineh and Al-Bataineh, 2016), have increased self-confidence (Cakir, 2012) and are successful in academics (Harris, Al-Bataineh and Al-Bataineh, 2016). It is also confirmed that many students found learning in a technology-enhanced setting more stimulating and much better than in a traditional classroom environment (Pedretti and Mayer-Smith, 1998). Moreover, links have been made between computer use and constructivist, collaborative, and inquiry-based learning and pedagogical change (Scrimshaw, 2004). Some researchers suggest that computer technology can overhaul education, serving as a panacea, or as an agent of change. Generally, it is accepted that computers have the potential to enhance teaching and learning (Roschelle et al., 2000) and provide students with a learning experience that other strategies cannot provide (Wellington, 1990). Further, from the perspective of the nation's growth, disparities in the levels of ICT readiness and use could translate into disparities in the level of productivities and hence, could influence a country's rate of economic growth (Cornelius, 2003).

Many theories and different forms of learning have evolved with the use of technology in learning. Technology-mediated learning environments refer to settings in which computer-based applications and simulations, personal and mobile computing devices such as smart-phones or tablets, Web-based platforms, online or distance learning programs, video games, exhibits or installations that feature digital media, wearable technology, or other tools support participants' engagement with new knowledge, skills, or practices.

As technology becomes entwined in the culture of a society, the nation must provide its learners with relevant and contemporary experiences that allow them to successfully engage with technology and prepare them for a life after school. Governments in most developing countries have responded to these challenges by initiating national programs to introduce computers in education. In 1984, the Government of India while assessing the importance of computer in education initiated a project called Computer Literacy and Studies in Schools (CLASS) wherein, almost 12,000 secondary and senior secondary schools were distributed computers. It aimed at, well acquaintance of students and teachers with new upcoming technology and revolutionizing the teaching-learning process of the classrooms. From then onwards, education system was experimented with various kinds of technologies. The significant role ICT can play in school education is highlighted in the national school policy document called National Curriculum Framework (NCERT, 2005). Later, Ministry of Human Resource Development (MHRD) of GoI with its National Mission in Education through ICT has initiated an ICT policy in 2009. The mission was to devise, catalyze, support, sustain ICT and ICT enabled activities and processes in order to improve access, quality and efficiency in the school system. It also promotes networking, research, evaluation

and experimentation in ICT tools and ICT enabled practices to utilize the potentials of ICT in school education. Later in 2012, National policy on ICT in School Education was adopted with an aim at preparing youth to participate creatively in the establishment sustenance and growth of a knowledge society leading to, all round socio-economic development of the nation and global competitiveness. The mission of the policy is to devise, catalyze, support and sustain ICT and ICT enabled activities and processes in order to improve access, quality and efficiency in the school system.

The task of taking ICT to all schools in all parts of India is a daunting task and would need monetary investment of large numbers, which could not have been handled easily considering the share of education in the total budget of India. Strong partnerships between non-profit organizations, private sector and the government were suggested by Arora (2007) to create meaningful and engaging ICT-enabled content for children. So, the corporate sectors have been roped in through the Corporate Social Responsibility (CSR) programmes in the mission. Several companies like TCS, Infosys, HP India, Microsoft, Accenture, SAP, Dell and many other are contributing to different educational initiatives. The present paper is based on one such initiative of Microsoft Limited.

Literature Review

In the past couple of decades, there has been a large-scale change in the way technology has entered our lives and our youngest generation is the most adapted one. This goes well when Green and Hannon (2007) voice out that 'Our newest generation – currently in K-12 – is demonstrating for us the impact of having developed under the digital wave. These youth have been completely normalized by digital technologies—it is a fully integrated aspect of their lives'. Technology has to be integrated and adapted well into the education system and particularly the teaching-learning process. In one of the policy documents, UNESCO (2008) highlighted that the lack of ICT in classrooms means denying the opportunities to the learners to acquire skills and attributes that are necessary to participate in the 21st century. Right from the inception of motion picture till mobile technologies, whenever technology is integrated with education it has changed the teaching-learning outcomes of education (Lim et al., 2013). Researches done on technology mediated learning across the world have yielded positive results as far as participation level of learners, learner motivation, performance among leaner's, pedagogical and interactive, collaboration among learners and development of high order thinking skills are concerned. Though, literature available in India is in scarce but, globally plenty of researches are available on technology mediated learning.

According to Alavi and Leidner (2001), technology mediated learning means an environment wherein learner uses information technology while interacting with peer-groups, learning materials. Technology Mediated Learning (TML) has numerous variations and often combination of several modes. Gupta and Bostrom (2009) have highlighted that TML could be of the form web-based or computer-based, asynchronous or synchronous, instructor-led or self-paced, individual-based or team-based. Law, Pelgrum, & Plomp (2008) conducted a study on 28 countries across different continents which shows that, technology has been able to change the classroom practices and learning process. Light (2009) used a case study approach to examine the impact of an ICT tool called the Intel Teach Essentials Course in six

schools in India, Chile and Turkey. The impact of the course for teachers was with respect to a change in their knowledge, beliefs and attitudes, teachers' greater understanding of student-centred practices and an improvement in teachers' ICT knowledge and skills. With respect to students, the ICT course influenced the students' engagement with the course content, and resulted in collaborative relationships among teachers, students and parents. Shifts in pedagogical paradigms were suggested not only with respect to the teachers but, also at the educational system level. Goos et al. (2003) conducted a three-year longitudinal research in mathematics classroom at secondary level where, it was reported that technology can promote collaborative learning as well as develop better mathematical understanding. Integrating technology in India is not new. As early as in 1975 when SITE experiment was conducted, educational technology was used for capacity building of teachers. Later on, with the introduction of computers in the school under CLASS scheme, students were taught and given hands-on experience on the subject. These initial experiments with technology yielded mix results for India. According to Bhattacharya and Sharma (2007) in Kerala, a constituency Vadakkekara, is poised to be the first fully integrated e-learning constituency in the state. All schools, including primary, upper primary, high school and higher secondary schools in the Government and aided sectors, in the constituency would be brought under the project which is being implemented with the cooperation of the IT@school project and Keltron. A 50-CD library is proposed to be set up in all upper primary and lower primary schools as part of this project.

Objectives

The objectives of the research were:

- To observe the difference in attendance pattern of students enrolled in the school after the introduction of digital classroom project.
- To study the perception of children regarding use of technology in teaching-learning process.
- To study the experiences of principal and teachers after the introduction of technology in the classroom.

Methodology

Internship is the integral component of teacher education programme in India. As per the latest revised curriculum of NCTE (2014), each pupil-teacher has to undergo intensive training for six months in schools to get acquainted with various functioning of schools, including teaching. Because of this, researcher send a batch of seven students to one of the government school where, the technology mediated teaching-learning process was started. This school was selected for the pilot project in Bhopal city, to see how technology helps the learner, teacher and teaching-learning process effectively. Another aim was to understand how the underprivileged children coming into the government schools can be benefitted from technology mediated learning so that, 21st century skills can be developed among them. During student internship, this entire research was carried out. Case-study method was chosen as an appropriate for the present research. All the information collected was done through classroom observations, as well as with interaction with teachers, students and from

the interview conducted by the researcher of principal and facilitator of the project. Though data obtained from Microsoft facilitator regarding training, development of animated topic-wise module was corroborated from the students, teachers as well as from the principal while interacting with them. Few classroom observations were also done by the researcher where, teachers were integrating technology during their classroom hour. Observations on how students were actively engaged during the classroom while learning through technology was also done. Microsoft facilitator was present there from July to December 2016 for assistance if any, during the classroom session either to the teacher or to the students.

About the Project

The project is being run by Nokia Corporate Social Responsibility division, a wing of Microsoft India. The project started in the month of January, 2016 when Department of Education, Madhya Pradesh Government gave permission to start the project. It was a one-year project and culminated in December 2016. Initially, the project was started with equipping the school with LCD screen and computer with in-built projector. So, the school was connected with Wi-Fi system having online support system from Microsoft technological division. The computer system was loaded with some pre-specified modules (programmes) prepared by the Microsoft Company from the text book of class VI, VII and VIII. Modules were mostly animated in nature with lots of additional inputs related to specified topics. Teachers were trained to handle and operate the electronic gadgets. They were also trained to integrate the technology in their daily teaching. Initially, mathematics and science teachers were trained but, later teachers of languages and social sciences were trained to integrate the technology in daily teaching. Since, technology was initially handled by teachers only, tablets were later distributed to students. They were also given hands-on experience of using technology in the classroom to equip students with technological skills as well as to enable them to increase the ability of students to think creatively. In this manner, students were also trained to use tablets for self-learning. In the month of June, Microsoft distributed 45 tablets to the school with pre-loaded textbooks of class VI, VII and VIII in order to reduce the burden of carrying bags to the school. Like many private schools, students were also given on-site training of use of technology for developing technological skills as one of the essential skills for 21st Century.

Only one room was made technology enabled therefore, timetable of class VI, VII and VIII was set in a manner where, per day one subject teacher took the classroom in technology enabled room. Teacher started his/her classroom by presenting the topic to be taught on that particular day (modular and animated form). Teachers encourage the students to ask questions related to the topic. Further, teachers asked the students to seek and explore more about the topic using tablets and available Wi-Fi connections. Both these processes helped the students to comprehend the topic more effectively. Microsoft Educational Division has also developed an evaluation tool called rubrics through which, they measure various aspects of 21st century skills like, communication, technological, creative skills and thinking skills, etc. Students not only explored the content but, also prepared projects, searched for words and meanings, videos related to the content, etc. in their period. Later on, teacher prepared a PowerPoint presentation or digital lesson plan in consultation with the Microsoft facilitator. Students were also provided with other resources in their tablet on the topic being taught in

the class. Similarly, teachers were also provided with resources related to the topic by the Microsoft, to make the content more comprehensible. Presently, teachers and students are utilizing the technology for teaching-learning process. Since one classroom is equipped with technology, therefore, school timetable is set in such a manner that once a week each class from Class VI- X is taught through technology for a period of almost 90 minutes. As the project was initiated by Department of Education, M.P. Government for its efficacy, therefore, all the material and resources given by the Microsoft Company to the school was the property of Education Department which can't be shared with others as a matter of policy. So, details of the content could not be shared with the researcher, completely. The project got ended in December, 2016 and Microsoft Company facilitator was moved out of the school. As per the latest information project was not extended to other schools. Though, school and its teachers were utilizing their training to teach students through technology as they had learned in the training and through their own experiences.

About the School

The Government Girls Higher Secondary School is located in Jehangirabad at old Bhopal. The school is located in a very congested place mostly inhabited by people of low socio-economic status. The percentage of Muslims has larger share in the total population in the area. If we look at the occupational status of the parents of the children studying in the school, majority of parents are found to be working as street vendors, motor mechanics, daily casual labourers, or working in some shops. Recently, government of Madhya Pradesh has started English medium sections in some of the schools in Bhopal and this school is one of them which is running a section of English medium along with Hindi medium of instruction.

Main Findings

Data collected from different tools and sources has been clubbed under several headings for the ease of understanding.

- Attendance pattern of students – Attendance in classrooms is one indicator for knowing the effectiveness of teaching-learning process. A basic indicator of opportunity to learn, in Elaine Allen Worth's view is, student attendance. "If kids are not in school, they are not learning," she observed, and proposed an indicator of, school attendance by age. Data collected from the attendance register has been encapsulated in the following table:

Table 1: Class-wise Average Attendance

Class	Total Enrolment	Average attendance per month					
		Previous year	July	August	September	October	November
VI	50	30	39	42	44	42	45
VII	47	33	38	41	45	39	43
VIII	55	37	42	45	49	43	47

From the above table, it is easy to decipher that the attendance has improved since the introduction of the project in the school. Attendance is often viewed as a trivial or low-level predictor, she added but, it is highly predictive of eventual educational attainment. This is because, it influences learning, grades, and graduation rates. Thus, increase in attendance is promising for the teachers, the teaching-learning process and the project too.

- Experience of the learners – Learners were excited to share their experiences of learning with 'tablets'. They equivocally said that they are learning new things and they enjoy more when they are learning through tablets. It was reported that students tried to look for new information on tablets on their own also, which aids self-learning. Students reported that absenteeism from the school was common. But, as teachers started taking classes with the help of technology and students were made to use tablets for learning process, they avoid taking leave from the school. Now, they find learning to be joyful and enriching and they do not miss the school. These positive experiences of the learners pave a way for effective learning. Poole and De Sanctis (1990) suggest three dimensions that indicate appropriation: faithfulness, attitudes and level of consensus. This means, technology structures will only have their intended effect if the design principles are kept intact (faithfulness), if members do not react negatively to it (attitudes), and if members agree substantially over how structures are used (consensus).

- Experiences of the teachers – Before understanding the experiences of the teachers, a short demographic detail of the teachers can be given. In all, thirteen teachers from the school, of different subjects, were trained by the Microsoft trainer. Out of these, four teachers were males and rest nine were females. All the teachers were trained teachers having at least graduation degree with either LT/B.Ed./D.El.Ed. degree. The average age of teachers in the school was 46.6 years. The seniormost teacher was 58 years old whereas, the youngest teacher was 40 years old. All the teachers had minimum 12 years of teaching experience in various government schools of Madhya Pradesh.

  During the focused group discussion with the teachers, the researcher observed that there was initial resentment or fear among them about the use of new technology in the teaching-learning process. During discussions with them it was said:

  '*Hum classroom mein blackboard par padhane wale log the aur achanak yeh technology – hum nahi chahte the ki hume padhane ke tarika badalna pade*'.
  Since it was a pilot project started by the state government with Microsoft company, so it started in five different districts of Madhya Pradesh including, Bhopal. They appreciated the role of Microsoft trainer and their school principal who encouraged them to adapt to the new technology. The training was valued for making them learn the use of new technology. While talking to Microsoft trainer, the school principal

reported that there were lot of apprehensions among teachers about learning and using technology and it took teachers six months (January to June, 2016) to get trained. This included, use of technological devices and integration of technology in teaching-learning process. Microsoft trainer also helped teachers to develop small modules (lesson plan) on different topics. Teachers had to be convinced that they can learn technology and use them for their own benefit and for the benefit of their students. Microsoft trainer also ascertained that after the initial phase of training, teachers started using technology for themselves and for their students, making the teaching-learning process interactive and joyful. As one of the teachers among them said, '*mujhe ab mazaa aata hai ab main class mein padhaane ke liye aati hun to bachhon ke chehre ki muskan mujhe khushi deti hai'*.

They further opined that learners were curious and eager to learn. They themselves felt that the process of teaching has become easier. Teachers felt that a new environment has been created in the classroom. The attendance pattern of learners has changed and there is an increase in punctuality and attendance of learners in the classroom. They further showed their gratitude to Master Trainer of Microsoft for helping them in learning technology the manner in which technology would be integrated in the classroom learning.

From a teacher's perspective, Deghaidy and Nouby (2008) have suggested a blended e-learning approach required for new pedagogic skills so that, the learner gains the most from the course. Further, they have also highlighted the effectiveness of handling technology in different in-service programmes. They have further emphasized on hands-on experience and its benefits.

- Experience of the principal – The school principal was very optimistic about the project. The initial 'excitement' about technology among the learners and an initial 'hitch' among the teachers was felt at the beginning. But, the positive effects of technology integrated learning could be gradually seen in attendance, level of curiosity, punctuality, and the general confidence of the learners. The recent inspection of the school by an outside group also gave a positive feedback with regard to the performance of learners. The collaborative efforts of teachers and learners was appreciated in making the project a success. Teachers, especially of Urdu language were found to have well adapted to the technology. Teachers have been able to use the LCD projector and other things comfortably for regular teaching exercise and the efforts of the Microsoft team was lauded.

- Experience of the trainer – The training of teachers for use of technology for teaching and integration of technology in teaching-learning was found difficult by the trainer. The unfavourable attitude the teachers had regarding adoption of new technology was held responsible for this. However, gradually the teachers have been found adapting to these technologies and learning. The trainer was found to be more optimistic about the learners because, the amount of efforts put in by them was large to learn the use of new technology.

The trainer opined that the adoption of new technology seems to have made the teaching-learning process more enjoyable especially, for learners. The team aimed at developing digital lessons for teachers which would further add impetus to the teaching-learning process.

Conclusion

Technology has the potential to support curriculum and policy reform. However, reform efforts alone will not cause the necessary change. There is a reciprocal relation between reform and technology. As Means (1994) argued, technology drives reform in education, but also 'education reform makes a school ripe for technology' (p. xii). It should not be assumed in any case that once technology is introduced in schools, reform will automatically take place. Reforms can happen only when technology is integrated in schools through in-service professional development of teachers, reform during pre-service training and reform of pedagogical practices from teacher-centred to student-centred approaches. This not only calls for increased efforts but, also financial assistance.

It is an accepted fact that for successful technology integration, there needs to be a shift in pedagogical approaches which requires reforms of teacher education programmes. With the study of literature and the research on the concerned project, it can be argued that if technology has to be made an integral part of instruction in elementary and secondary schools, then changes need to be made in teacher education both, at pre-service and in-service stages. This would prepare the prospective teachers as well as practicing teachers for better integration of technology in the teaching-learning process. This further implies that emphasis needs to be placed on policy and curriculum reforms as, they relate to the use of information technologies for teacher education.

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