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A Study of Technology Enhanced Learning (TEL) in Geography Classrooms at Secondary Level in Howrah District of West Bengal

ABSTRACT:

With technology such an important part of our lives, how technology can be best used in the education of our children is gradually becoming a matter of concern so far as modern education system is concerned. This study is concerned with the applications of technology in Geography classrooms at Secondary Level in Howrah District of West Bengal. The study was broken down into two parts: the first consisted of observations and the second consisted of surveys. Observations were conducted in various high school geography classrooms in four high schools in Howrah District of West Bengal; a total of forty observations were conducted. The tool was administered on 40 observations & surveys were conducted on 20 teachers. Once every survey was conducted, a comparative analysis and statistics were then used to analyze the data. This study tries to assess how technology is used in the secondary geography classroom. The overall purpose of the study was to gather information to help to propose a method of how technology can be used in the classroom.

Key words: Technology, Geography classroom, Modern education system, Technology Enhanced Learning (TEL).

1. INTRODUCTION :

With technology such an important part of our lives, how technology can be best used in the education of our children is gradually becoming a matter of concern so far as modern education system is concerned. Education is thought to be the process of preparing children for the "real world" and giving students the tools they need to live and function on their own. Through the education process, children become literate, but being literate no longer means simply being able to read and write. There are many new forms of literacy, including technology or information literacy. Being so dependent on technology, then, it is worthy of study how it might best integrated into the classroom. Not only does technology prepare students for the "real world," but it also actively engages them in their own learning.

Technology that is incorporated into the classroom for the purpose of enhancing the learning process is referred to as Technology Enhanced Learning (TEL) (Dror, 2008). Despite high expectations of the ability of school administrators and teachers to enhance student learning through the incorporation of technology in the classroom, TEL programs have produced lackluster results (Sinclair 46).

Problems implementing TEL programs have risen due to lack of understanding of the most effective approaches of selecting which technologies to use, the most effective ways to integrate technology, and a lack of understanding of what factors may impact the effectiveness of TEL programs (Bordbar, 2010; Communication Without Barriers, 2007; Sinclair, 2009; Venezky, 2004). Additionally, during the technology integration process, a common problem is that Technology in the Classroom teachers often rely on the technology to teach students, rather than using the technology as an educational tool, or the technology is used in situations that do not warrant its use (Dror, 2008; Honan, 2010). When implementing technology into curriculum, it is

critical to assess what tasks can be completed without the use of various technologies, and to "*remind ourselves of what may be lost when we do use them*" (Beniger 120).

1.1 CRITICAL FACTORS RELATED TO THE NEED OF TECHNOLOGY IN SECONDARY SCHOOLS IN WEST BENGAL:

• Capacity building is one of the key areas where there is a scope of development. There is a lack of a trained pool of teachers, who can efficiently train the students and appreciate the aligning of ICT with the regular curriculum.

• Infrastructure in schools remains a key bottleneck; existing infrastructural facilities in schools need to be improved for the successful and unhindered implementation of ICT.

• The curriculum needs to be updated and new mode of learning needs to be promoted in order to keep pace with changing requirements.

• An effective partnership with private players with clearly defined roles and responsibilities can ensure better management and can support the government initiatives efficiently.

• Better coordination between different government departments, with responsibility for IT and education initiatives would result in more streamlined and effective implementation of major schemes.

• Since ICT is new to rural areas it will be appropriate to establish institutional networks at panchayat samiti (local self government body) level to facilitate in-service training of teachers and panchayat samiti officials to ensure optimal utilization of ICT resources. State institute of education and training could provide leadership at the state level which can have network with districts and district level lead institute can develop network with panchayat samities. These

institutions, if provided with adequate funding and professionally trained staff, can effectively take responsibility of capacity building at different levels to ensure absorption of ICT inputs.

2. THE PROBLEM:

The study is concerned with the applications of Technology Enhanced Learning (TEL) in Geography classrooms at Secondary Level in Howrah District of West Bengal.

2.1 REVIEW OF THE RELATED LITERATURE

Bahr, C. M. and Rieth, H.J. (1989) compared the effects of conventional instruction, computerized drill and practice, and computer games on the mathematics achievement of learning disabled junior and senior high school students. Students in the drill and practice condition outperformed other students to a modest degree.

Tsai ,Lin., and Yuan (2000) described an attempt of using a www-based concept map testing system, which was developed to assess high school students' concepts in physics. A total of ninety Taiwanese eleventh graders were tested through the on-line system and they, then, completed a questionnaire. The responses of the questionnaire revealed that the speed of information transferring, supported by the system was not quick enough. However, students did not think on-line test would cause some problems of cheating. More than a half of the subjects showed willingness of using the system in the future.

It has been noted by *Jones and Kozma (2003)* that national ICT policies can serve several important functions. Firstly, ICT policies provide a rationale, a set of goals, and a vision of how education systems work if ICT is introduced into teaching and learning, and they can benefit students, teachers, parents and the general population of a given country. Secondly, ICT policies

are expected to provide guidance, and failure to do so means that individual school and classroom innovations would be unlikely to be sustained. Additionally, individual efforts are less likely to be felt across the country unless there is a shared vision clearly laid out in the policy. With technology such a major part of every aspect of our lives, it is no wonder that it is being seen more and more in schools. Educators have a responsibility to prepare students for the future and technology is a very real component of that future (*Mullen & Wedwick, 2008*).

Additionally, technology allows teachers to reach to different types of learners (*Gorder, 2008*). Not all students learn the same way and with the use of technology, teachers can adapt their lessons to a multitude of needs for their students. With such a mutually beneficial relationship, teachers should be willing to integrate technology into their classroom activities.

2.2 PURPOSE OF THE STUDY:

The purpose of this study will be to examine the use of technology in the classroom by analyzing literature, observations and surveys. The end result of this analysis is a coherent plan for how technology should be integrated into the classroom. Observations of high school geography classrooms will be conducted to see how technology is being used in the classrooms. Not only is the integration of technology be noted, but also its impact on student engagement. Additionally, surveys of teachers will also be conducted to assess their beliefs and their comfort level with technology use in the classroom.

2.3 OBJECTIVES OF THE STUDY:

- To assess how technology is used in the Secondary Geography classroom.

- To examine the use of technology in the Geography classroom at Secondary level by analyzing literature, observations and surveys.

- To analyze how technology should be integrated into the Geography classroom at Secondary level in a coherent way.

- To assess the beliefs of the geography teachers and their comfort level with technology use in the classroom.

2.4 RESEARCH QUESTIONS:

The literature review and research conducted will attempt to answer the following research questions:

1. What effect does technology use in the classroom have on student achievement and engagement?

2. What best practices do teachers exhibit in the use of technology for achievement and engagement?

2.5 DELIMITATION OF THE STUDY:

I) Sample : The study was broken down into two parts: the first consisted of observations and the second consisted of surveys. Observations were conducted in various high school geography classrooms in four high schools in Howrah District of West Bengal; a total of forty observations were conducted. The four high schools are DPS Howrah, Asian International School, Oxford High School & Hope Institute of Bengal. For each class period, the same observation report was used to record activities in the classroom. The second component of the research was survey. Surveys were conducted in four high school geography departments for

teachers to complete. For this particular study Purposive Sampling Technique was used for conduction of observation & survey.

II) Class : The class selected for applying the tools was class VIII & IX.

III) Area : The school was selected from sub-urban areas.

IV) Number of Respondents : The tool was administered on 40 observations & surveys were conducted on 20 teachers.

V) Sex : Out of 20 teachers, 12 were male teachers and 8 were female teachers.

3. RESEARCH DESIGN:

This particular study was of Descriptive Research type. The study was broken down into two parts: the first consisted of observations and the second consisted of surveys. The qualitative aspect of the research was consisted of classroom observations, whereas the surveys that was conducted form the quantitative aspect of the research. For the purpose of this study, it was important to look at the frequency of use of technology by the teachers who participated in the survey. On the other hand, the observations were used primarily to describe what was occurring in the classrooms and to look for an explanation as to how and why the technology was being used. Also two achievement tests of Geography for Class IX were conducted; one as Pre-test and another as Post-test to understand the impact of applications of technology on the Achievement level of the students. Achievement tests were conducted on 80 students; 20 students of class IX from each four schools. Therefore, the combination of these two methods of research has used both quantitative and qualitative data; the observations were hopefully provided meaning to the surveys completed by teachers.

3.1 DATA COLLECTION TECHNIQUES:

Observations were conducted in various high school geography classrooms in four high schools in Howrah District of West Bengal; a total of forty observations were conducted. The schools in which the observations were performed were chosen based on professional contacts and the appropriate permission was obtained from the cooperating teachers. For each class period, the same observation report was used to record activities in the classroom. The first part of the report was consisted of information about the school, teacher and class. The technological resources available in the classroom were also recorded. The observations were focused on how the technology was used during the class period. Therefore, there was a checklist employed to record which technologies were utilized by either the teacher or the students in the classroom. The options for technology use ranged from an overhead projector, to interactive whiteboards or Smart Board technology, to interactive classroom response technology. There was also a spot to record any additional technology used by the teacher or students that was not there on the checklist. The second major component of the observation report was to record the attentiveness of the students. In order to evaluate whether students were engaged in the lesson, a count was done to see how many students appeared to be off -task at ten minute intervals.

The second component of the research was the survey. Surveys were conducted for four high school geography departments teachers who use technology in their Geography classes. Private schools were chosen because the procedure to obtain permission to survey teachers facilitated the potential for a higher response rate than may have been the case in public school districts.

3.1.1 *Observation* **:** The researcher acted as observer in the classrooms to develop an understanding what actually occurred there in the classroom. The roles of the teacher and

students were considered in these observations. A structured observation schedule was used to observe the applications of technology in dealing with several units and sub-units of Geography in different classes of class VIII & IX. The observation schedule contains several statements which can be graded by the observer. Also comments and viewpoints of the observer can be given accordingly with respect to each and every statement of the observation schedule.

3.1.2 Open-ended Questionnaires for survey of teachers: These were used to collect information regarding the applications of technology in Geography classrooms at Secondary level in Howrah district of West Bengal. Surveys were conducted for four high school geography departments teachers who use technology in their Geography classes. Private schools were chosen because the procedure to obtain permission to survey teachers facilitated the potential for a higher response rate than may have been the case in public school districts.

The questionnaire was arranged in the following format:

A- School resources

The questions focused at the educational technology resources that are available in the four schools of Howrah district of West Bengal that were studied. However availability of resources does not imply abundance usage; however lack of resources is sure a contributing factor towards effective usage of ICT tools.

B- Training of educators

The questions focused on the duration of onsite training and distance training and continued support from the educators' tutors. Also the continuing usage of computers after training was looked into. Professional development plays a major role for continued usage of ICT resources.

C- Use of educational technology in the classroom

The questions focused on the extent to which educators are using the educational technology in their classes and for what purposes. It is through how ICT tools are used that their benefits and opportunities can be realized.

D- Educators' perceptions about educational technology

The questions focused on the educators understanding and preconceived ideas about the educational technology. Educators' perceptions have an influence on attitudes developed towards technology use.

E- Educational competence

The questions focused on technological competency as indicated by Zhao and Frank (2003) of the educators in using the resources and also in their content subject in this instance Geography.

4. ANALYSIS OF THE DATA:

Once every survey was conducted, a comparative analysis and statistics will then be used to analyze the data. Both the observation portion and the survey portion of this study had limitations. Observations in geography classrooms usually do not involve the use of interactive classroom response technology or a classroom blog. Therefore, the observations that were completed did not include all potential technology available to classroom teachers. However, the technology which was observed is the most commonly used and is, therefore, possibly the convention for most secondary teachers. Of the twenty teachers that participated in the study only eight had attended the training of educators and was trained on the following modules:

• Word processing

• Spreadsheet

• Using web resources

• Using Internet to find information.

During training time of educators, there were no subject specific modules focusing at the different subject that are available. However later there were two other modules developed which are specifically for Mathematics and Physical Science. Not all teachers of the four schools that were studied were trained on Computer usage in teaching and learning. One third of the educators were trained. This can negatively impact on the integration of educational technology in the teaching and learning. Section C of the educators' questionnaire focused on computer technology usage in Geography teaching and learning. The first part of the section requested educators to indicate the frequency of usage of different technological tools. All educators indicated in their responses that they have never used those tools. All Geography educators do not make provision for computer integration in the classroom situation. The observation checklist for classroom interaction and review of educators' portfolios were used to triangulate data of section C in the educators' questionnaire. The portfolios did not show any evidence of computer technology usage in the educators teaching and learning. Everything that the educators kept as their records in the portfolios was hand written and there was no indication in their planning for any activity in the computer laboratory. However the computer laboratory was used for other purposes outside the teaching and learning. During the data collection process a handful of educators will come, type and compile class lists and mark sheets.

To get reliable information, educators were asked to respond on a four point scale, ranging from (1) Strongly Disagree (SD), (2) Disagree (D), (3) Undecided (U), (4) Agree (A)

through to (5) Strongly Agree (SA). Educators' perceptions on the use of ICTs were arranged into the following categories:

- Improvement of the overall performance of the learners in the school, motivation and encouragement of learners to love and enjoy their work and catering for the different learning styles;

- Improvement and relief of educators' administrative responsibilities and reinforcement of the pedagogical approach by creating a collaborative environment among colleagues;

- Effectiveness as opposed to traditional approach;

- Replacement of educators.

Of the mentioned categories all the respondents showed a strong positive perception about the first three categories. A strong positive perception about the technology will result in a positive attitude about educational technology usage. On the other hand, in order to see whether there were significant differences between the results of the pre-test and post-test of achievement level of the students in Geography, "t" test had been used. Table 1.1, 1.2, 1.3 & 1.4 shows the comparative mean scores of the achievement test of Geography of the pre-test & post-test. These results help us to understand the significant changes that were found in the academic scores of the students due to applications of technology in geography classes. Table 1.5 shows the educators' perceptions on computer usage in Geography teaching and learning.

Table 1.1 : School- DPS Howrah

Comparative Mean Scores of the achievement test of geography of the pre-test & post-test

GROUP	MEAN SCORE	VARIANCE	SIZE OF SAMPLE	"T" TEST
A	40.8	17.28	20	5.18
B	34.5	12.35	20	

Value of "t" = 5.18; Significant at the 0.01 level

Table 1.2 : School- Asian International School

Comparative Mean Scores of the achievement test of geography of the pre-test & post-test

GROUP	MEAN SCORE	VARIANCE	SIZE OF SAMPLE	"T" TEST
A	40.9	17.18	20	5.12
B	35.5	12.32	20	

Value of "t" = 5.12; Significant at the 0.01 level

Table 1.3 : School- Oxford High School

Comparative Mean Scores of the achievement test of geography of the pre-test & post-test

GROUP	MEAN SCORE	VARIANCE	SIZE OF SAMPLE	"T" TEST
A	41.8	17.29	20	5.17
B	34.3	12.32	20	

Value of "t" = 5.17; Significant at the 0.01 level

Table 1.4 : School- Hope Institute of Bengal

Comparative Mean Scores of the achievement test of geography of the pre-test & post-test

GROUP	MEAN SCORE	VARIANCE	SIZE OF SAMPLE	"T" TEST
A	41.9	17.98	20	5.19
B	33.5	12.45	20	

Value of "t" = 5.19; Significant at the 0.01 level

[where A- Post test; B- Pre test]

Table 1.5 : Educators' perceptions on computer usage in Geography teaching and learning

Educator's Views	Frequency
Strongly Agree	10
Agree	6
Disagree	2
Strongly Disagree	2

4.1 INTERPRETATION OF THE DATA:

The result of this particular study help us to understand that significant changes were found in the academic scores of the students due to applications of technology in geography classes. Also Table 1.5 shows the educators' perceptions on computer usage in Geography teaching and learning. It explains that out of 20 teachers who were surveyed, 10 teachers strongly agree and 6 teachers agree that computer usage has a strong impact in Geography teaching and learning.

5. CONCLUSION:

This study tries to assess how technology is used in the secondary geography classroom. The overall purpose of the research was to gather information to help to propose a method of how technology can be used in the classroom. As can be seen from the study, ICT tools are not very widely used in Geography teaching and learning. There are lot of contributing factors to this condition at the four Schools that were studied like:

• The absence of guidelines or policy on the use of ICT tools in the whole school;

• Inadequate training of educators on ICT tools usage in teaching and learning; and

• Lack of relevant ICT tools for rural schools.

5.1 RECOMMENDATIONS:

Educators need to articulate how the use of ICT tools fit into the Mathematics curriculum and Instructional framework. Ping et al (2003) see correct and appropriate classroom practice helping educators to acquaint themselves more with the effective and efficient use of ICT tools in the teaching and learning environment. They further mention the correct and appropriate classroom practice as aspects like:

- Coming up with correct and appropriate procedures for working with ICT tools in a group situation;

- Designing clearly defined roles of learners in an ICT- based learning environment so as to avoid unproductive and chaotic learning environment; and

- Coming up with general rules that will help the learners to stay focused on their tasks, like prohibiting them from playing computer games which are not related to their activities while in the computer laboratory.

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