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Technology Intergration in Teaching, Student Motivation, and Reading Achievement

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Abstract.

The study investigated technology integration impact on students' reading achievement, student motivation, and teacher proficiency in technology integration. The objective of the study was to find ways to improve students' classroom experiences in order to foster learning. The focus was on improving students' reading scores. The importance of the study was that reading exam scores together with all other subjects were declining in selected community junior secondary school. Using the theory of experiential learning, we designed the single group pretest and posttest study. Three research questions were formulated and investigated. Data were collected from four junior secondary schools, two in Lobatse City and two in the city of Gaborone. A sample of 140 students was pretested and post tested for reading achievement and motivation after been exposed to the Interactive board technology teaching. (SMART board technology). Four teachers for the four classes were also pretested and post tested for proficiency after been trained. Data were analyzed using SPSS. Results showed that the integration of technology in the method of teaching improved, reading scores, motivation and teacher proficiency.

Keywords: Reading achievement, blended e - learning, experiential learning and motivation

INTRODUCTION

Since the year 2010 the school leaving examination results percentage pass have been declining in Botswana. Educators are looking for causes. This study considers the use of technology as a possible solution to this problem. There is a natural leeway for junior secondary students to use reading as an effective tool for higher achievement in any subject. However there is a theoretical and empirical work asserting benefits of reading that go beyond homework. Junior Secondary School students of modern Botswana conduct their reading activities though varied sources, including electronic ones, specifically the cellular phones, the i-Pod, tables and electronic games. Research show that carefully planned integration of technology in the classroom enhances student motivation and achievement. (Ministry of education exam results analysis report 2013)

Previous studies also revealed that integration of technology in classroom instruction, does not only improve students' scores, but also develops student ability to work on their own, as well as teacher proficiency(Minor,Losike-Sedimo,Reglin,&Royster;2013;Bates, Hopkins,& Kratcoski 2012; O'Connor, 2012;Picciotto, 2012)

The current generation of students in Botswana Community Junior Secondary Schools, irrespective of their SES, is more advanced in technology than those of the 90s and early 2000s. (Losike-Sedimmo & Ngwako, 2012, Losike –Sedimo 2010; Losike-Sedimmo & Ngwako, 2009).

The use of smart board technology in the classroom fascinates students and eventually after using it they gain independence in learning and development of social, cognitive and emotional skills. The developed skills facilitates higher achievement (Keller, 1984; Bauer,2010;Marzano2012; Picciotto, 2012). Teachers as well feel empowered by the integration of technology in their classroom teaching. Currently teachers have improved access to technology. However not everyone is interested or knowledgeable, competent in integrating technology. In one of the research sites technology was reserved for conferences and seminars only. In a study by Losike-Sedimo in Botswana.(2003), the results indicated that technology when used properly in instruction it accommodates different teaching and learning styles. This is supported by recent studies. As such we had reason to believe that this study will benefit the nation and all the readers.

STATEMENT OF THE PROBLEM

Most schools in Botswana have been supplied with technology including computers and interactive boards. But the level of technology use is restricted to internet search and production of teaching materials. The further one moves into rural schools the less integration of technology into instruction processes. It not a popular concept to use blended learning in schools

Significance

The teacher training programs in Botswana, offer instructional technology as well as teaching methods. The institutions have not assumed the responsibility of technology integration in schools. Neither the ministry of education nor school leaders have made the technology integration a priority (MOH teaching and learning policy). For the past three years, the end of term and school leaving examination results have fallen .It is therefore important to seek ways of improving both teaching methods and learning.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Two theories formed the framework of this study. Kolb (1984) and Rogers (1969) guided the investigation. Learning and teaching are two different complex processes that impact a learner's achievement. Though different they correlate in producing the leaners' success in school (Le-Françoise, 1994, 2000). The reviewed studies elaborate on this relationship and how the leaners achievement is affected. Experiential leaning describes the expected learners' experiences and narrows the description into operational terms.

Experiential learning and motivation

Two authors popularized experiential learning in education—Kolb (1984) and Rogers (1969). According to experiential learning theory, people learn by doing or experiencing the new concepts (Kaagan, 1999). Kolb defined an experiential learning model as consisting of four steps: (a) concrete experiences, (b) observations and reflections, (c) formulations of abstract concepts and generalizations, and (d) testing the implications of concepts in new situations.

Rogers' (1969) theory of experiential learning evolved as part of the humanistic education movement. Rogers distinguished two types of learning: (a) cognitive (meaningless), and (b) experiential (significant). The former corresponds to academic knowledge such as learning vocabulary or multiplication tables, and the latter refers to applied knowledge such as learning about engines in order to repair a car. The key to the distinction is that experiential learning addresses the needs and wants of the learner. Rogers listed the following qualities as basic to experiential learning: (a) personal involvement, (b) self-initiation, (c) evaluation by the learner, and (d) pervasive effects on the learner. To Rogers, experiential learning is equivalent

to personal change and growth. Rogers noted that all human beings have a natural propensity to learn, and that the role of the teacher is to facilitate learning. The facilitation was stated to include (a) setting a positive climate for learning, (b) clarifying the purposes for the learners, (c) organizing and making learning resources available, (d) balancing intellectual and emotional components of learning, and (e) sharing feelings and thoughts with learners without dominating. According to Rogers, learning is facilitated when (a) the student participates completely in the learning process and has control over the learning's nature and direction; (b) it is primarily based upon direct confrontation with practical, social, personal or research problems; and (c) self-evaluation is the principal method of assessing progress or success.

Rogers also emphasized the importance of learning to learn and an openness to change. Instruction can be designed to follow these various views of learning. Intrinsic to each design would be merits and weaknesses inherent in the approach used. This study selected the approach of experiential learning because it naturally caters to the conditions the study seeks to investigate. The lesson plan was based on the concepts above. The pre-test and posttest assessed the output of such an experiential learning and teaching.

Motivation and learner achievement

Studies from mediated communication have portrayed virtual technology as a great motivator. Interest and motivation are desired learner characteristics for instruction. The implementer of instruction wants the student to choose to attend and to choose to make the effort and apply himself or herself fully. For example, in a Web environment, intrinsic motivation is a must. The learners must have the interest and inclination to turn the computer on and pay attention to the message stimuli. They have to deal with content in a given physical environment that has its own distractions and, above all, there must be an outcome at the end of the lesson. In addition to intrinsic motivation, there has to be coding, decoding, interpretations, rehearsals, and chunking of information to come up with concepts, output, and observed behavior.

In instruction, Keller's (1983) ARCS model is used for motivation processes. The model addresses two types of motivation from within and motivation from outside the learner. The four letters form an acronym representing four major conditions for motivation: (a) attention, (b) relevance, (c) confidence, and (d) satisfaction. According to Keller's research, the four conditions are needed to produce instruction that is interesting, meaningful, and appropriately challenging. SMART board technologies afford the educators the opportunity to use these concepts in planning and implementing instruction. lesson. The immersion would be an example of internal motivation. In multimedia research, structured interactions between learners that are focused on achieving meaningful shared learning tasks have been observed to promote academic achievement and motivation (David,. Evans, & Popova; Angelo 1998; Salomon, Perkins, & Gloderson, 1991 Angelo proposed that motivation , to learn is alterable. It can be positively or negatively affected by (a) the task, (b) the environment, (c) the learner, (d) the teacher, and (e) the course design. I designing the experiment lesson plan the researchers considered all aspects of motivation elements described above.

Technology enhanced learning and teaching

In technology enhanced instruction, tasks, environment, teacher, and course designs are altered or coordinated to promote motivation and learning. Both simple and advanced instruction technology, when used properly produce good results. This study used the smart board to enhance learning and promote teacher efficacy. Minor, Losike-Sedimo,Reglin,&Royster;2013; Abram, Bernard., Borokhovski, Waddington, Wade, &

Persson,2015).reported SMART board in classroom teaching and reported that, leaners not only learn critical thinking skills, they also actively engage themselves in cognitive and social context. And that through socialization the student used the board as a tool to perform and assist each other to be successful in the classroom learning. The success was reported to facilitate their personal autonmy.Teachers also benefited from using SMART board as students depended less on them, which allowed them time to improve professionally. That time included practicing how to use technology in the classroom proficiently. Many researchers reported similar results. (Liu, Lin, Tsai, Paas, 2011). Brian, Belland, Andrew , Walker, Kim Mason, (2016) found strong effects of technology enhanced learning

METHODOLOGY

Research design. The purpose of this study was to determine to what extent the integration of technology in the instruction process would increase the community junior secondary school learners, reading test scores, students' motivation, as well as the teachers' proficiency in using technology in the classroom instruction. The study was a single group and posttest research design.

Participants: came from four junior secondary schools in the city of Gaborone. And Lobatse town. The classes were chosen purposively as the researchers were supervising teaching practice in the two areas. There were 140 students and four teachers. Students completed ARCS survey and the demographic survey. Next, they were pretested in reading. Teacher participants were pretested in proficiency before training and post tested after training

Research questions:

Three research questions were formulated and investigated. Data were collected from the sample of 140 students and four teachers. The independent variable was the technology enhanced teaching method (the integration of SMART board technology in reading instruction. The dependent variables were the reading scores and motivation scores, for students. For teachers the dependent variable SMART board technology proficiency test scores. The research questions were 1. To what extent will technology enhanced method (TEM) increase the students' scores from pretest to posttest as measured by a reading test? 2. To what extent will the TEM increase teachers' perceptions of their proficiency level with the use of the smart board technology from pre-training to post training. as measured by the SMART board proficiency survey? 3 To what extent will the TEM increase the learners' motivation as measured by the ARCS inventory?

Instruments: Four instruments were used to collect data, as mentioned above each question had a separate instrument with established reliability. Reading test had reliability coefficient of .80, .91 and .88 for A R.C.S, TEM MODELS respectively. These instruments were all acquired form the literature used in studies dating from 1987(Keller, 1987). The demographic survey was designed by the researchers. And teacher proficiency test was adopted from the internet and modified to suit the study.

Analysis was done using SPSS. (Statistical package for social sciences)

PROCEDURES.

Training

The training involved hands on practice of using the SMART board technology to interestingly teach reading. The place of training was the school premises. First researchers modified the University of Botswana teaching practice lesson plan in order to insert the use of mobile

phones with smart technology in reading. The training did not interfere with school days as it took place an hour after school .There were 24 2hour sessions over a period of 8 weeks. Teachers worked individually to learn the following strategies. Using basic and advanced functions of smart phones, including interactive activities, customizing the subject matter, using hand writing feature, ,formatting and locking text. Each session ended with question and summary. By the 7th week teachers had mustered the basics.

The researchers started by attaining a research permit from the ministry of education for the use of human subjects. We also sought permission to enter schools, and use the required tool. Only participants that consented to do the study were engaged. After the consent forms we held a pre – training conference with the teachers explained all procedures and later administered the pre- training survey. After 8 weeks of training we administered the post survey. The same procedure applied to the learners. The procedures were explained to the students who later took the reading test, the ARCS inventory and the demographic survey. The post testing was done after twelve weeks for the student participants.

Data collection and Analysis

Four instruments were used to collect data. The student motivation survey, student achievement test, teacher's proficiency test and student demographic survey. Data was analyzed using the statistical package for social science. (SPSS)

FINDINGS

Students' motivation pre and posttests by gender.

Table 1 revealed differences in means for both genders .The highest posttest mean was for the female group (M =79.00, SD = 9.04) while the male group had the lower mean (M = 63.00, SD = 8.2.).The difference between the means within each group was 16.42 for males and 13.00 for girls. A t test for pared sample was performed for boys and girls. For boys the p value (0.06) which was higher than the alpha value of (0.05) and therefore insignificant, while the girls t - value was significant at p = (0.03). By the researchers' naturalistic observation boys showed higher motivation than girls.

Table 1: Pretest and Posttest Means and Standard Deviations of the motivation scores by gender

Male						Female					
Pretest			Posttest			Pretest			Posttest		
n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
72	79.42	7.68	72	63.00	8.20	68	66.89	8.08	68	79.00	9.04

Note: n denotes number of participant's, M mean SD standard deviation

Table 2 displays the results of the reading scores for the whole sample. It compare the pretests results with the post tests. The table responds to the question 1, "To what extent will the technology enhanced method (TEM) increase the students reading scores from pretest to post test.

Table 2: Students' reading scores Means and t values
Table two suggest that overall impact is that both boys' and girls' reading scores improved.

N	pretest M	post M	t-value	M difference	*df*	*p* value
140	53.25	89.45	0.02	36.25	2	0.002

Note: Note: n denotes number of participants', M mean SD standard deviation, df degrees of freedom, p probability value

TABLE

Teaching method and teacher proficiency scores

The findings showed each of the four teachers increased the SMART Board technology proficiency scores from pre-implementation to post-implementation. As a result of their participation in the study all teachers' proficiency scores increased. Table three which is not included here shows that teachers' pretest scores on the proficiency test and the post test scores differed significantly. Results were as follows Teacher one had increased from pretest score of 23% to post test of 63%, teacher 2 from 25% to 70% teacher three from 27 to 78% and teacher 4 from 20 to 69% Teachers 2 and 3 had the highest post-test increases of 45 and 51% respectively. The mean post- the integration score was 63.50 with a small standard deviation of 2.5. The mean score of 63.50 was in the range of high or outstanding SMART Board technology proficiency scores. These findings were interpreted to mean that training increased teachers' scores from pre-test to post-test. The findings for this study were consistent with the majority of the literature (Glazer & Hannifin, 2008; Lowden, 2005; Smith & Shoffner, 2001) .

DISCUSSION

The motivation scores for students went up; the achievement scores went up too. As well as the teacher proficiency scores. Results showed that the integration of technology in reading instruction increased students' motivation, and reading achievement. Each of the four teachers increased the SMART board technology proficiency from pre – training to post – training. By comparing the prepost and posttest means and testing for valid difference, using the t – test statistic we concluded that students learning improved the teachers' proficiency also improved.

Implications.

Teachers have to move with the times. It is therefore commendable that teacher training institutions and policy maker and education researchers do more studies that will lead to teacher proficiency in technology integration

The results are in agreement with many studies reviewed. In this era of technology driven life, students are very technology inclined. Therefore there should be a shift from using the computer alone for technology integration to include more advanced instructional technologies and other technology based platforms.

SUMMARY AND CONCLUSION

The results of this study might provide education practitioners with a framework for effective designs of technology enhanced instruction. It was clearly demonstrated in this study that careful merging of technology properties and student abilities and interest can be exploited to create desired sets of behaviors or experience. It provided information on learning and critical

design issues regarding the use of technology. Finally, as a result of this study, SMART board technology has been established as an effective learning and teaching tool.

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