

The Effectiveness of Computer-Assisted Education in Teaching Mathematics among Senior Secondary Schools in Yobe State

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Abstract: This research aim to reveal the difference exist between the use of traditional method and computer base instruction in teaching basic mathematics in senior secondary schools in Yobe state where three schools were selected randomly. The survey was conducted using interview and continue assessment test. Interview was conducted among the respondents and responses were obtained from all selected schools and the result revealed that all the respondents agree that teaching mathematics using computer base instruction is more understanding for both the teachers and the students. The test achievement of students; performance corded into SPSS 22 and analyzed using descriptive statistics and T-Test and the result revealed that all selected secondary schools shows that base on the frequencies/percentages, the scores of the students; performance using computer base is higher than that of traditional method and the T-Test shows that there difference exists between the two methods of teaching mathematics.

Key Words: mathematics, computer, base, instruction, traditional, method, modern, students, performance.

I. INTRODUCTION

Zenel A. (2013), stated that the introduction of computers into the business world in the mid-1950s made important changes for future perspectives because the purpose of the first generation computers had been purely scientific. The early 1960s saw the integration of computers into both business and scientific life, but this was only in limited functions. Microprocessors were used to build microcomputers in the mid-1970s and the first personal computers (PCs) were introduced for individual use for business and education. An abundance of educational and business software was also developed. In this era, the computer caught the imagination of educators to see how it could enhance learning and thinking. Tomorrow's citizen, the teachers should possess training in using the most modern technologies in the field of education. (Zenel A. 2013).

Bhalla(2013), stated that computer assisted instructions (CAI) has emerged as an effective and efficient media of instruction. The CAI not only makes the communication impressive, but also helps in motivating the learners and arouses curiosity. In science teaching the CAI has been proved to be greatly beneficial to understand the unfamiliar situations and in making the conceptual clarity. Certain topics in Mathematics

are based more on imagination; the computer assisted instructions.(CAI) can prove to be helpful to teach such topics. (Bhalla 2013).

There is a need to recognize the importance of media of communications including audio visual and demonstration material as necessary device to impart scientific knowledge to pupils. Therefore, it is worthwhile to find the primary mode of instruction remained the lecture and textbook. Following a six week study, difference scores were examined to substantiate the primary hypothesis that the use of Computer Assisted Instruction led to increases student achievement when compares to traditional method techniques. Findings: In spite of variability in performance in individual types of fraction operations, the overall improvement scores were significantly greater in Computer Assisted classrooms than in the traditional classrooms. Further, in spite of the achievement difference between schools, the Computer Assisted classrooms performed better than the traditional classrooms at each school selected.(Joseph B. 2014).

Eric A. (2015), the teachers of mathematics are confused with wide amount of proposals on how to teach mathematics with a computer. Teachers' attitudes towards computers vary mostly as a function of teachers' age or years in service. Complete 'ignorance' attitude towards computers still continues, although its magnitude is weaker compared to past years this attitude is mostly shared by teachers who had their training before the start of the computer age who have the most negative attitudes towards its pedagogical use and who insist on using the traditional modes of teaching. Second major attitude is not being able to abandon their traditional habits completely foreseeing its potential for the future of education. Most prevalent and widening attitude is the understanding and acceptance of the importance of computers for education. (Eric A. 2015).

The effectiveness of CAI as compared to traditional instruction has been examined for decades. Various studies have been conducted at different educational levels and in various areas of instruction (Sherry L. S. 2013).

II. THEORETICAL FRAME WORK

Both methods have unique features but either one may be used to provide instruction for a specific learning knowledge. This increases the inquiry of which is the more effective method for a better learning experience. One way to answer this question would be to compare the two methods by measuring the respective advances in learning. Hence, there have been several studies of electronic education's effectiveness. (Sherry L. Stultz 2013).

The research hypothesis that leads the analysis was 'Does computer- assisted education has a positive impact on learners' academic success when compared to traditional teaching method?' These technological development and technological products being carried with them required traditional education system to be changed and add new ones to means and tools used (Kristof W. 2014).

According to the Kristof W. et., al (2014), it is possible to follows and keeps up with the term if only required the effect of educational system. Computers and instructional materials being used as both tool and method are effective for students used on improving the attention on the course, understanding the lesion, synthesizing and improving positive feelings for the course. (Cepni et al.; 2004; Demiel, 2004 in Kristof W. et., al 2014)). So especially for teaching abstract concepts like in the science education courses, it is very important to use visual materials for students to understand the lesion better and improving positive attitude towards the lesion. (Kristof W. 2014).

Experiment evidences are found that verbal only method is not always working so well increasing visual context makes instruction lasting and effective when principles of how people learn are taken in to account (Mayer, 2003 In (Olga P. 2008).

According to the Gross T, J. (2013), the finding suggests that para-educators proximity effectively reduced student opportunities to engage with the classroom teacher and could be used to support the argument that the presence of a para-educators allows the argument that the presence of a para-educators allows the classroom teacher to be relieved of responsibility for the child. At the same time, observations showed that the issue of gestures or cueing occurred less than 1% of the time a problem because all students had difficulty with verbal direction and needed cues and prompts. Nevertheless, students were on task, appropriate amount of time most often when working with a peer at variance with these findings.

Satsangi R. (2015), observed that para-educators working in classrooms where students with disabilities were included. Their observations focused on;

1. The activities in which the instructional assistant was involved.
2. Participants in the interactions, and

3. Whether the interaction occurred in or out of the classroom.

Heppen J. (2012) concluded that assistants' facilitate inclusive practices by interacting more frequently with both exceptional and typical students together, rather than with the exceptional student alone, and that they spent significant time assisting in activities that did not include exceptional students. Heppen J. (2012) also concluded that para-educators promoted independence by limiting the amount of direct instruction they provided to exceptional students, so that students would attend to the class room teacher for their instruction.

In a series of well designed, quasi-experimental studies, Bai H. reported consistent improvements in the behavior of boys with attention deficit hyperactivity disorder (1998). In one study, Bai H. (2012) tested the effects of social skills training versus the effects of combined social skills training and continued support a trained classroom aide. This study showed that the majority of students receiving the combined set of practices (Social skills training plus classroom aide) improved over the course of the year, whereas less than half of the students in the control group or the social-skills-only group improved (in terms of disruptive behavior in class). Kotkin also examined the effects of social skills training and school-based token reinforcement components on response to provocation and frustration in aggressive boys. Repeated measures included direct observation of the boys' participants' role-plays of target skills, and teacher ratings. The data showed that boys receiving social skills training alone were able to perform in role-play but showed little improvement in natural settings. Token reinforcement improved the behavior in boys prior to social skills training, but adding a trained classroom aide resulted in greater improvement. Moreover, the improved behavior was maintained at follow-up (Bai H.et, al 2012).

Objective(s) of the Study:

1. To determine whether employing computer usage could improve the teaching of mathematics in senior secondary schools
2. To determine whether the use of computer can increase the interest of learning mathematics among students
3. To determine whether the computer usage would encourage educators in teaching mathematics.

III. STATEMENT OF THE PROBLEM

As a result of students poor performance in mathematics due to the teaching mathematics in traditional method Computer Base Instruction has become necessary to employ in the teaching learning process most especially mathematics subject. Therefore government are expect to invest heavily in information communication technology (ICT) in order to boost education context most importantly in mathematics subject for the students to gain better understanding, interest and higher level of problem solving skills.

Research Questions

1. What is the attitude of student toward the interest of computer base instruction?
2. What are the difference that are existed between the use of computer base in teaching mathematics and that of traditional method on students' performance

Research Hypothesis

H_0 : There is a significance difference between teaching mathematics using computer base and that of traditional method on students' performance.

H_1 : There is no significance difference between teaching mathematics using computer base and that of traditional method on students' performance.

Significance of the Study

The importance of this study will assist student to gain better understanding of mathematics and this would motivate the student to have audacity and skills in solving problems in mathematics and enhanced effective and efficient teaching learning process. The research will also provide and develop computer skills among teachers and students.

Scope and Limitation of the Study

This research work titled "The Effectiveness of Computer Assisted-Education in Teaching Mathematics in Secondary Schools" were limited to Yobe state secondary schools. The researcher limited this research in Yobe state

IV. METHODOLOGY

Yobe state was created on the 27th, August 1991 by the military administration of President Ibrahim Badamasi Babangida. It was carved from old Borno State and has Latitude 12.2929⁰N and Longitude 11.4390⁰E. This study is a quasi-experimental design in nature involving dependent and independent variables. Interview was carried out among the mathematics teachers and the responses were recorded. The use of computer integration project have been fragmented into selected senior secondary schools in order to test whether the use of computer base in teaching mathematics can increase the performance and interest of students as well as educators in teaching learning process. Due to the large number of senior secondary schools in the state, three senior secondary schools were selected randomly from each zones of the state whiles the state have three senatorial zones. Since the research is an experimental research, two different tests was carryout among the selected senior secondary schools students where ten students were selected randomly from each school in order to revealed whether the use of computer base in teaching mathematics would increase the interest of students instead of teaching mathematics in a traditional method. A descriptive statistics were used and frequency and percentages tables were fragmented among the data collected and T-Test were used in SPSS 22 in order to reveal the difference between the students' performance of computer base and traditional

method of teaching. Results obtained from the students performances in which both the traditional method and computer base method of teaching mathematics were employed.

V. DISCUSSION OF RESULT

Frequencies Variables=Category A Traditional Method/Computer Base

Percentiles=50.

Statistics				
		Category A	Traditional method Score	Computer base Score
N	Valid	0	10	10
	Missing	10	0	0
Percentiles	50		16.5000	28.5000

Frequency /Percentage Table

Traditional Method Score				Computer Base Method Score				
	Fr eq.	Perc ent	Cumulati ve Perc ent		Fr eq.	Perc ent	Cumul ative Perc ent t	
Valid	6.00	1	10.0	10.0	Valid	1	10.0	10.0
	9.00	1	10.0	20.0	19.00	1	10.0	20.0
	10.00	1	10.0	30.0	20.00	1	10.0	30.0
	15.00	1	10.0	40.0	25.00	1	10.0	40.0
	16.00	1	10.0	50.0	27.00	1	10.0	50.0
	17.00	1	10.0	60.0	30.00	1	10.0	60.0
	18.00	1	10.0	70.0	35.00	1	10.0	70.0
	19.00	1	10.0	80.0	37.00	1	10.0	80.0
	20.00	1	10.0	90.0	39.00	1	10.0	90.0
	21.00	1	10.0	100.0	43.00	1	10.0	100.0
Total	10	100.0		Total	10	100.0		

The table above reveals the frequency and percentages of students' performance in government day senior secondary school Damaturu in which the percentages of the students who were thought in traditional method is less than the performance of students who were thought in computer base

T-Test

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Category A	0	.	.	.
Traditional method Score	10	15.1000	5.08702	1.60866
Computer base Score	10	29.0000	9.39267	2.97022
One-Sample Test				

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Traditional method Score	9.387	9	.000	15.10000	11.4610	18.7390
Computer base Score	9.764	9	.000	29.00000	22.2809	35.7191

The T-Test revealed the difference exists between the two methods of teaching in which the computer base has 29.00 and the traditional method has 15.10. Therefore computer base is the best method of teaching basic mathematics.

FREQUENCIES VARIABLES=Category B Traditional method/ Computer base

PERCENTILES=50.

Statistics				
		Category B	Traditional method B Score	Computer Base B Score
N	Valid	0	10	10
	Missing	10	0	0
Percentiles	50		15.5000	23.5000

FREQUENCY								
Traditional Method Score					Computer Base Method			
	Fr eq .	Perce nt	Cum ulati ve Perce nt		Fr eq.	Perce nt	Cum ulati ve Perce nt	
Valid	8.00	1	10.0	10.0	Valid 18.00	1	10.0	10.0
	14.00	3	30.0	40.0	19.00	1	10.0	20.0
	15.00	1	10.0	50.0	21.00	1	10.0	30.0
	16.00	1	10.0	60.0	22.00	1	10.0	40.0
	19.00	1	10.0	70.0	23.00	1	10.0	50.0
	20.00	2	20.0	90.0	24.00	1	10.0	60.0
	22.00	1	10.0	100.0	31.00	1	10.0	70.0
	Total	10	100.0		32.00	1	10.0	80.0
					39.00	1	10.0	90.0
				42.00	1	10.0	100.0	
				Total	10	100.0		

The table above reveals the frequency and percentages of students' performance in government senior science secondary school Potiskum in which the percentages of the students who were thought in traditional method is less than

the performance of students who were thought in computer base.

T-Test

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Category B	0	.	.	.
Traditional method B Score	10	16.2000	4.13118	1.30639
Computer Base B Score	10	27.1000	8.43867	2.66854

One-Sample Test						
	Test Value = 0					
	t	d f	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Low er	Upp er
Traditional method B Score	12.401	9	.000	16.20000	13.2447	19.1553
Computer Base B Score	10.155	9	.000	27.10000	21.0633	33.1367

The T-Test revealed the difference exists between the two methods of teaching in which the computer base has 27.00 and the traditional method has 16.20. Therefore computer base is the best method of teaching basic mathematics.

Frequencies Variables=Category C Traditional method/ Computer base

Percentiles=50.

Statistics				
		Category C	Traditional method C Score	Computer base C Score
N	Valid	0	10	10
	Missing	10	0	0
Percentiles	50		13.0000	24.0000

Frequency /Percentage Table

Traditional Method Score				Computer Base Score				
	Fr eq .	Perce nt	Cum ulati ve Perce nt		Fr eq .	Perce nt	Cum ulati ve Perce nt	
Valid	7.00	1	10.0	10.0	Valid 17.00	1	10.0	10.0
	10.00	2	20.0	30.0	18.00	1	10.0	20.0
	11.00	1	10.0	40.0	20.00	1	10.0	30.0
	12.00	1	10.0	50.0	21.00	1	10.0	40.0
	14.00	1	10.0	60.0	24.00	2	20.0	60.0

15.00	1	10.0	70.0	25.00	1	10.0	70.0
17.00	1	10.0	80.0	26.00	1	10.0	80.0
19.00	1	10.0	90.0	32.00	1	10.0	90.0
20.00	1	10.0	100.0	38.00	1	10.0	100.0
Total	10	100.0		Total	10	100.0	

The table above reveals the frequency and percentages of students' performance in government senior science secondary school Gashua in which the percentages of the students who were thought in traditional method is less than the performance of students who were thought in computer base

T-Test

One-Sample Statistics						
	N	Mean	Std. Deviation	Std. Error Mean		
Category C	0 ^{a,b}	.	.	.		
Traditional method C Score	10	13.5000	4.24918	1.34371		
Computer base C Score	10	24.5000	6.43342	2.03443		
One-Sample Test						
	Test Value = 0					
	T	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Traditional method C Score	10.047	9	.000	13.50000	10.4603	16.5397
Computer base C Score	12.043	9	.000	24.50000	19.8978	29.1022

The T-Test revealed the difference exists between the two methods of teaching in which the computer base has 24.00 and the traditional method has 13.50. Therefore computer base is the best method of teaching basic mathematics.

VI. DISCUSSION OF MAJOR FINDINGS

The frequency and percentages of students' performance in government day senior secondary school Damaturu in which the percentages of the students who were thought in traditional method is less than the performance of students who were thought in computer base. The T-Test revealed the difference exists between the two methods of teaching in which the computer base has 29.00 and the traditional method has 15.10. Therefore computer base is the best method of teaching basic mathematics.

The frequency and percentages of students' performance in government senior science secondary school Potiskum in which the percentages of the students who were thought in traditional method is less than the performance of students who were thought in computer base. The T-Test revealed the difference exists between the two methods of teaching in which the computer base has 27.00 and the traditional method has 16.20. Therefore computer base is the best method of teaching basic mathematics.

The frequency and percentages of students' performance in government senior science secondary school Gashua in which the percentages of the students who were thought in traditional method is less than the performance of students who were thought in computer base. The T-Test revealed the difference exists between the two methods of teaching in which the computer base has 24.00 and the traditional method has 13.50. Therefore computer base is the best method of teaching basic mathematics.

Over all, this result is in agreement with the one obtained by Gross T. J., and Dugon G. (2013) where they evaluated the effectiveness of using computer based instructional technique in teaching and learning mathematics at high school. It is imperative that this approach will go a long way in easing the process of teaching and learning mathematics at different level of education. Joseph B. (2014)assert that, conventional teaching and learning method is no longer cost effective and error free. He maintains that for easy and hinge free teaching, model approaches have to be adopted. Hence, with the current situation globally computer based teaching should be given due consideration looking at the increasing outbreak of communicable diseases such as Covid-19 etc.

This study has clearly revealed to us that frequent use of conventional approach of teaching is not the way forward. Employing computer-based teaching will go a long long way in handling the challenges of teaching and learning mathematics at different level.

CONFLICT OF INTEREST

There was no serious conflict of interest in the work from the start to the end. However, trace of constructive argument has been the subject of improving the research work.

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