INFLUENCE OF MULTIMEDIA IN TEACHING AND LEARNING OF MATHEMATICS IN COLLEGES OF EDUCATION IN OYO STATE

SANGONIYI Sunday Oloruntoyin
Department of Mathematics, Emmanuel Alayande College of Education, Oyo

Abstract
This study investigated the influence of multimedia in teaching and learning of Mathematics in Emmanuel Alayande College of Education and Federal College of Education (Special), Oyo State, Nigeria. This study adopted a descriptive research design of the survey type. The sample consists of one hundred and seventy five (175) students from Emmanuel Alayande College of Education, Oyo; and one hundred and twenty five (125) students from Federal College of Education (Special), Oyo. A researcher-designed questionnaire was used with pilot tested reliability coefficient of r = 0.78 obtained through test re-test method. Two research questions were answered using frequency counts and means. Based on the findings of this study, it was found that the usage of multimedia in teaching and learning of Mathematics enhanced students' understanding of Mathematics in colleges of education in Oyo State and usage of multimedia in teaching and learning of Mathematics enhanced students' interest in Mathematics in colleges of education in Oyo State. Hence, it was concluded that the use of multimedia has influence on and arouses students' interest which makes the teaching and learning of mathematics more effective in the colleges of education in Oyo State. Moreover, teaching and learning process become easier and interesting when the use of multimedia is facilitated judiciously. It was recommended that seminars should be conducted for both lecturers and students in college of education in Oyo on the use of multimedia for effective teaching and learning of Mathematics.

Introduction

The unquantifiable roles played by Mathematics in human daily activities cannot be over emphasized. It facilitates thinking and organizing a logical prove via the power of human mind by challenging intellectual curiosity to determine whether an idea is true or not. Mathematics is recognized as the mother of all subjects and can also be regarded as the queen of all sciences, such as Chemistry, Physics, Biology, Economics and other science related disciplines. Its importance cut across the banking system, measurements in fashion, carpentry, technical economics and other related disciplines.

Agwagah (2001) attested mathematics to be a pivot on which other sciences revolve and it serves as means of sharpening man's reasoning ability and development of personality. The role of mathematics to national growth and technological advancement cannot be over stressed.

Lawrence and Kolawole (2007) opined that mathematics is the key language

of science and technology on which the achievement of any meaningful economic development lies upon. This implies that mathematics is the foundation of science without which meaningful economic development cannot be attained.It was attested that Mathematically-based hi-technology and internet super highways contribute in no small measure in the growth and development of any nation in order to make meaningful achievement.

Mathematics is one of the core subjects in Nigerian educational institutions and it is one of the basic requirements for gaining admission into Nigerian tertiary institutions irrespective of any choice of course. Enu, Agyman and Nkum (2015) averred that activity based learning in mathematics using manipulative materials produces greater achievement than when such are not used. This assertion indicated that students enjoy attending classes that utilizes multimedia presentations because they find the use of these devices more interesting and exciting for effective teaching and learning.

Chunjian (2009) refers to multimedia as encompassing texts, graphics, image video, animation and sounds dealt with and controlled through computer systems. There are diverse opinions of scholars on multimedia but the concept refers to computer controlled devices that combine sound, images and texts. Through multimedia, real life situations are brought into the classroom. Multimedia means that computer information can be represented through audio, graphics, image, video and animation in addition to traditional media (text and graphics). Multimedia has become an inevitable part of any academic or social presentation. It has found a variety of applications right from entertainment to education. Multimedia finds its application in various areas but not limited to, advertisements, art, education, entertainment, engineering, medicine, mathematics, business, scientific research and spatial / temporal applications.

A well-designed multimedia helps learners build more accurate and effective mental models than they do from text alone. Enu, Agyman, and Nkum (2015) further posited that the use of instructional materials by teachers improves students' achievement and attitudes. The influence of multimedia on undergraduates' performance studied by Oshinaike and Adekunmisi (2012) found that majority of the lecturers did not make use of the multimedia resources in teaching the students. However, a good number of lecturers make use of multimedia for lecture preparations, paper presentations, researches and publications. Umoh and Akpan (2014)'s examination of the challenges of blended e-learning tools in mathematics indicated that the use of blended e-learning compliment the conventional teaching and learning, thereby improved students' comprehension of mathematical concepts.

According to Schiefele (1991) interest is a content-specific motivation of characteristics composed of intrinsic feeling-related and value-related initiatives with an organized force. The author further conceptualized interest as individual and situation interest. Individual interest is understood as a long-term direction of an individual towards a type of object, activity or area of knowledge. Individual interest has personal significance and is usually

associated with high level of significance and value, positive emotions and increased reference value (Krapp, Hidi & Rerninger, 2004).

Schiefele (1991) posited that the basis of situational interest is an external locus and it is defined as an emotional state brought about by situational stimuli. Renninger (1992) therefore classifies interest in schooling as situational because it increases attention, concentration, willingness to learn and acquire knowledge. This implies that the term interest is attitudinal construct to determine state of likeness or dislike towards a concept.

The indispensable role of attitude in the learning of Mathematics has gathered the attention of educational researchers and Mathematics educators for a very long time. Empirical evidence on the relationship between teacher interest which has to do with attitudinal constructs and students' academic performance in Mathematics revealed that teachers' positive attitude facilitate students' improved performance (Mensah, Okyere & Kuranchie, 2013). A non-challant attitude of some teachers coupled with less students' interest has been attributed to students' poor academic performance. Ebem (2012) and Iqbal & Muhammad (2015) study of the impact of multimedia-aided teaching on students' academic achievement and attitude. The findings revealed that the use of multimedia-aided technologies arouses students' interest towards learning and was more effective in influencing instruction.

Ogochukwu (2010) investigated the enhancement of students' interest in mathematics via multimedia presentation. The results showed that multimedia presentations facilitate students' understanding and enthusiasm to learning. However, Malik and Agarwal (2012) posited that the use of multimedia as a new educational technology tool distracts students' interest and attention in the classroom especially when connected to the internet. Therefore, this study intend to determine students' interest towards the use of multimedia in teaching and learning based on the moderating effect of school type for improved performance of Mathematics students in Colleges of Education in Oyo State.

Statement of the Problem

Students' low performance in mathematics over the years has been a concern to lecturers in Nigeria tertiary institutions (including colleges of education). To Ali (2013), a considerable number of students graduate with low grade from mathematical sciences while some that are figure phobia do not stay to the end of allotted years of programme. Also, the Institute of Education, University of Cape Coast (U.C.C) Chief Examiners' report in Enu, Agyman and Nkum (2015) was that poor performance of students in mathematics was experienced in the first semester examination for Colleges of Education in Ghana. The reports indicated that 32.9% of the candidates had the grades D or D+ and 20.9% failed in the subjects.

Sharma (2013) stated that when students were taught through, both direct conventional method & interactive multimedia method, it was found that the acquired retention was better in case of interactive multimedia method. Some students consider mathematics as a boring

subject, thereby losing interest in the topics discussed during instruction. Wasike (2013) found that interest to learning is partially responsible for female students' low performance in Mathematics and Sciences.

To this end, having considered the problems associated with teaching and learning of Mathematics in colleges of education, there is the need for a study that has to do with incorporation of multimedia in teaching and learning of Mathematics in Colleges of Education. Thus, this study was set to determine the influence of multimedia on teaching and learning of Mathematics in Colleges of Education in Oyo State.

Objectives of the Study

The study was set out to investigate the influence of multimedia in teaching and learning of Mathematics in Colleges of Education in Oyo State. Specifically, the study set out to:

I. Examine the influence of the use of multimedia in facilitating teaching and learning of Mathematics in Colleges of Education in Oyo State.
ii. Investigate the use of multimedia in enhancing colleges of education students' academic performance in Oyo State.
iii. Determine the use of multimedia in arousing students' learning interest in Mathematics in colleges of education in Oyo State.

Research Questions

The following questions were raised for the study:

1. Does usage of multimedia enhance students' understanding of Mathematics in colleges of education in Oyo State?
2. Does usage of multimedia enhance students' interest in Mathematics in colleges of education in Oyo State?

Methodology

Research Design

A descriptive research design of survey type was employed in this study. This was employed by the researcher so as to have a fair representation of the sample needed from the population.

Population of the Study

The population of this study consists of all the Mathematics students in colleges of education in Oyo State.

Sample and Sampling Techniques

The sample for the study represented a total of three hundred (300) respondents randomly drawn from department of Mathematics in the two selected colleges of education (Emmanuel Alayande College of Education and Federal College of Education (Special) in Oyo State. A total of one hundred and seventy five (175) students were randomly selected from a population of two hundred and eighty three (283) students at Emmanuel Alayande College of Education, Oyo and one hundred and twenty five (125) students from a population of two hundred and one (201) students at Federal College of Education (Special), Oyo during the 2015/2016 academic session.

Validation of the Instrument

The research instrument was validated by two experts, one from the departments of Educational Technology and the other from the departments of Test and Measurement for face and content

validation. The instrument was trial tested on twenty five (25) students at the Best Legacy College of Education, Ogbomoso. The reliability coefficient of r = 0.78 was obtainedusing Crombach Alpha at 0.05 level of significant.

Instrumentation

Researcher-designed questionnaireentitled: Multimedia Usage Questionnaire (MUQ) was the instrument used to gather relevant data for the study. The instruments were validated by experts in the department of Test and Measurement, specifically in Emmanuel Alayande College of Education, Oyo. Test retest was carried out to establish the reliability of the instruments used for the study. Instruments were administered on the respondents with the aids of four (4) research assistants. The data collected were analysed using descriptive statistics (mean).

Results and Discussion of Findings

Research Question One

Does usage of multimedia enhance students' understanding of Mathematics in colleges of education in Oyo State?

Table 1 : *Students' Response on the Use of Multimedia for Learning*

S/N	Items	SA	A	D	SD	Mean ($\bar{}$	Standard deviation
1	The use of multimedia enables me to always have high understanding of the topics of discussion.	90	100	60	50	2.77	1.05
2	Multimedia enhances concentration when it is used for teaching and learning of mathematics.	132	86	58	24	3.09	0.97
3	I always felt composed when multimedia is used for teaching and learning.	180	100	20	0	3.53	0.61
4	The use of multimedia for teaching makes me attend lectures regularly.	111	120	50	19	3.08	0.88
5	The use of multimedia in teaching and learning of mathematics makes the lectures not to be bored.	107	94	43	56	2.84	1.11
	Total / Grand mean score	**620**	**500**	**231**	**149**	**3.06**	**0.98**

Decision mean is 2.5

In Table 1, item 1 revealed that the use of multimedia enable students to have high understanding of the topics taught by the lecturers with a mean score of 2.77. The mean value of 3.09 of item 2 showed that multimedia enhances concentration for teaching and learning of mathematics. Item 3 depicted that students always felt composed when multimedia were used for teaching and learning with mean score of 3.53. The mean score of 3.08 in item 4 revealed that the use of multimedia for teaching made students to regularly attend lectures and the use of multimedia in teaching and learning of mathematics makes the lectures not to be bored with a mean score of 2.84. Considering the decision mean (bench mark) of 2.5 for this analysis,

students' responses on each of the item in Table 1 on the use of multimedia for learning was higher than the decision mean. Subsequently, the grand mean score for all the items in Table 1 was 3.06 depicting a high acceptance of the use of multimedia for pedagogical experiences. The implication is that the use of multimedia enhances students' understanding of Mathematics in colleges of education in Oyo State.

Research Question Two

Does usage of multimedia enhance students' interest in Mathematics in colleges of education in Oyo State?

Influence of Multimedia on Colleges of Education Students' Academic Performance in Mathematics with respect to Interest

S/N	Items	SA	A	D	SD	Mean (⁻	Standard deviation
6	I do have interest in mathematics lecturers that uses multimedia for teaching.	170	100	20	10	3.43	0.76
7	Using multimedia for teaching _____ _	130	98	48	24	3.11	0.94
8	I like the classes where multimedia is used for teaching of mathematics.	88	192	8	12	3.19	0.67
9	The use of multimedia for teaching makes the class interesting to the students.	103	97	57	43	2.87	1.04
10	The use of computer system for teaching and learning often arouses my interest to like mathematics the more.	131	89	50	30	3.07	1.00
	Total / Grand mean score	**622**	**576**	**183**	**119**	**3.13**	**0.91**

Decision mean is 2.5

In Table 2, item 6 revealed that the students do have interest in mathematics lecturers that uses multimedia for teaching with a mean score of 3.43. The mean value of 3.11 of item 7 indicated that the use of multimedia for teaching mathematics arouses students' interest. Item 8 depicted that students like the classes where multimedia is used for teaching of mathematics with mean score of 3.19. The mean score of 2.87 in item 9 revealed that the use of multimedia for teaching makes the class interesting to the students and also, the use of computer system for teaching and learning often arouses students' interest to like mathematics the more with the mean score of 3.07. Since the grand mean of 3.13 on students' responses on each of the items in Table 2 on the use of multimedia for teaching and learning of Mathematics in arousing students' interest was greater than the decision mean (2.5), it depicts high acceptance of the use of multimedia in arousing students interest in Mathematics learning which is an evidence that the use of multimedia for teaching and learning of

Mathematics enhances students' interest in Mathematics in colleges of education in Oyo State.

This study agreed with Enu, Agyman, and Nkum (2015) that activity based learning in mathematics using manipulative materials produces greater achievement than when they are not used. This study agreed with Mensah, Okyere and Kuranchie (2013) that the relationship between teachers' interest and students' academic performance in Mathematics indicated that teachers' positive attitude facilitates students' improved performance. The study revealed that teacher's attitude arouses students' interest towards learning of mathematics and regularly attend to class instruction. Also, Ogochukwu (2010) was of the view that students prefer multimedia presentation to the traditional classroom instructional method which means that multimedia presentations improve students' understanding, enthusiasm, class attendance and satisfaction.

However, the findings of this study contradicted Hilton and Christensen (2002) that a high-level multimedia lecture presentation does not improve students' learning and attitudes towards instruction that entail manipulation of figures compared to a lecture presentation using overhead transparencies.

Conclusion

Based on the findings of this study, it was seen that usage of multimedia in teaching and learning of Mathematics enhanced students' understanding of Mathematics in colleges of education in Oyo State and usage of multimedia in teaching and learning of Mathematics enhanced students' interest in Mathematics in colleges of education in Oyo State. Hence, it was therefore concluded that the use of multimedia has influence and arouses students' interest which makes the teaching and learning of mathematics more effective in colleges of education in Oyo State.

Recommendations

Base on the findings of this study, the following recommendations were made;

The usage of multimedia in colleges of education should be given outmost importance so as to improve students' academic performance.

Lecturers and students in college of education should cultivate positive interest towards the use of multimedia for effective teaching and learning of Mathematics in Oyo State.

References

Agwagah, U. N. V. (2001). Making mathematics education self-reliant. *Journal of Science and Computer Education,* 1(3), 37-46.

Chunjian, Z. (2009). Application of multimedia in English Teaching and learning. *Journal of Technology for Teaching and Learning English (ELT) 3(6)12-19.*

Ebem, D.U. (2012). Multimedia based pedagogy on Mathematics in senior secondary schools: The case study of Enugu State, Nigeria. *African Journal of Computing & ICT*, 5(2), 31-34.

Enu, J., Agyman, O. K. & Nkum, D. (2015). Factors influencing students' Mathematicsperformance in some selected colleges of educationin Ghana,*International Journal of Education Learning and Development,*3(3), 68-74.

Hidi, S., Renninger, K.A., & Krapp, A. (2004). Interest, a motivational variable that combines affective and cognitive functioning. In Dai,D.Y. & Sternberg,R.J. (Eds.), *Motivation, emotion and cognition: Integrative perspectives on intellectual functioning and development*, 2(5), 89–115.

Hilton, S. C. & Christensen, H. B. (2002). Evaluating the impact of multimedia lectures on student learning and attitudes. In Phillips,B.(Ed.), Developing a Statistically Literate Society. *Proceedings of the Sixth International Conference on Teaching of Statistics*, 1-6. Cape Town: International Statistical Institute.

Iqbal, S. & Muhammad, K. (2015). Impact of multimedia aided teaching on students'academic achievement and attitude at elementary level. *US-China Education Review*, 5(5), 349-360.

Krapp, A., Hidi S.& Renninger, K. A. (1992). Interest, learning and development. In Renninger S., Hidi A., Krapp (Eds.), The role of interest in learning and development, *European Journal of Psychology of Education,*14(1), 3–25.

Lawrence, I. A. & Kolawole, O. U. (2007). Mathematics education for dynamic economy in Nigeria in the 21st Century. *Journal of Social Sciences*, 15(3), 293-296.

Malik, S. & Agarwal, A. (2012). Use of multimedia as a new educational technology tool–a study. *International Journal of Information and Education Technology, 2(5), 468 – 471*.

Mensah, J. K., Okyere, M. & Kuranchie, A. (2013). Student attitude towards Mathematics and performance: Does the teacher attitude matter? *Journal of Education and Practice,* 4(3), 132-139.

Ogochukwu, N. V. (2010). Enhancing students' interest in mathematics via multimedia presentation. *African Journal of Mathematics and Computer Science Research,* 3(7), 107-113.

Oshinaike, A. B. & Adekunmisi, S. R. (2012). Use of multimedia for teaching in Nigerian University system: A case study of University of Ibadan.*Library Philosophy and Practice* (e-journal). Retrieved from http://digitalcommons.unl.edu/libphilprac.

Renninger, K. A. (1992). Individual interest and development: Implications for theory and practice. In Renninger, K., Hidi,S.&Krapp,A. (Eds). The role of interest in learning and development, *The American Journal of Psychology,* 1(2), 3-36.

Schiefele, U. (1991). Interest, learning and motivation. *Journal ofEducational Psychology,* 26, 299 – 323.

Sharma, D. (2013). Role of interactive multimedia for enhancing students' achievement and retention. *International Women Online Journal of Distance Education*, 2(3), 12-22.

Umoh, J. B. & Akpan, E. T. (2014). Challenges of blended e-learning tools in Mathematics: Students' perspectives, University of Uyo.*Journal of Education and Learning,* 3(4), 60 – 70.

Wasike, A. (2013). Effects of attitudes of female students on the performance in mathematics in various types of secondary schools in Teso District, Kenya. *Journal of Education and Practice*, 4(5), 148 – 160.