

AN ANALYSIS OF THREE MODES OF MOBILE INSTRUCTIONAL PACKAGE ON MATHEMATICS STUDENTS' INTEREST IN COLLEGES OF EDUCATION, IN NORTH-CENTRAL NIGERIA

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ABSTRACT

This study investigated an analysis of three modes of mobile instructional package on mathematics students' interest in colleges of education, in North-Central Nigeria. The study adopted descriptive survey design. The target population for the study was 1625 NCE one mathematics students in North-Central Nigeria. Multi-stage sampling was used to sample the schools and students for the study. A random sample of 120 students (75 male and 45 female) were selected from three randomly selected Colleges of Education, in North-Central Nigeria. Three schools were assigned to Mathematics Mobile Instructional Package respectively. The research was guided by two research questions and two null hypotheses tested at 0.05 level of significant. The researchers examined the interest of mathematics students on developed three modes of mathematics mobile instructional package using mathematics mobile instructional package interest questionnaire (MMIPQ). A pilot study was carried out to test reliability of the research instrument. A reliability coefficient of 0.91 was obtained using CrombachApha on Mathematics Mobile Instructional Package Interest Questionnaire (MMIPIQ). 30 items mathematics mobile instructional package interest questionnaire (MMIPIQ) was administered to determine the interest of students on the (MMIP). The data collected from the administration of the research instrument (MMIPIQ) were analyzed using SPSS version 20.0. The mean and standard deviation were used to answer the research questions while (ANOVA) statistics was used to test the research hypotheses. The findings of the study revealed that there was significant difference in the mean interest and gender of mathematics students on Mathematics Mobile Instructional Package among others. Based on the findings, the study recommends among others that students should be encouraged to use Mathematics Mobile Instructional Package (MMIP) for teaching and learning of mathematics, and that mathematics mobile instructional package (MMIP) should be encouraged in schools for teaching mathematics.

Keyword: Mathematics Mobile Instructional Package, Video-only, Audio-with-Text, Text- only, Gender.

Introduction

The position of Mathematics in the modern period of technological development in the world is wide and profound. In accordance with this reasoning (Okigbo, 2012) emphasized the importance of Mathematical knowledge as the science that deals with the logic of shape, quantity and arrangement. Mathematics is all around us, in everything we do. It is the building block for everything in our daily lives, including mobile devices, architecture, art, money, engineering and even sports. Since the beginning of recorded history, Mathematics discovery has been at the forefront of every civilized society and in use in most primitive of cultures. The needs of Mathematics arose based on the need of the society. Primitive tribes needed, little more

than the ability to count, but also relied on Mathematics to calculate the position of the sun. Mathematics is an old, broad and deep discipline (field of study). People working to improve Mathematics education need to understand “what is Mathematics”, Mathematics education is referred to as the practice of teaching and learning of Mathematics in a way of solving problems involving learning the Algorithms and formulas necessary for computations (Okeke, 2011). It is a platform to learn and teach Mathematics with better way, students learn in different ways. The way in which a person learns has a lasting impact on how learning is experienced over time.

Mathematics is for life and we do Mathematics in one way or the other in our daily activities. The knowledge of Mathematics is required now than ever especially with the current issue of science and technological advancement and attainment of the Millennium Development Goals (MDGS). It is on this ground that the Federal Government of Nigeria accorded prominence to the teaching and learning of Mathematics in schools. Mathematics occupies a central place in our school curriculum as it is made a compulsory subject for all learners in both primary and secondary schools as contained in the National Policy on Education (FRN, 2014). Every career a child may choose to pursue in life are full of things that requires application of Mathematical knowledge and skills.

Major aim of teaching and learning process is achievement in terms of grades, that is if student learn well with best teaching methods, they will score high achievement as it is sole measure of learning in many cases. To achieve this target, teachers use diverse teaching methods, including lecture, discussion, field trip and demonstration. Among all the most widely accepted and practiced is lecture method (Harman & Nguyen, 2010). Albeit of its popularity, it also faces criticism by many researchers stating leading towards assumption that it does not help in deep understanding of the concepts. This has resulted in more emphasis on teaching through diverse methods in order to improve learning and understanding. One of these is three modes of mathematics mobile instructional package strategy, which presumes that if students develop interest toward using it in learning of trigonometry aspect of mathematics it may result in more understanding of the concept in both state and federal schools.

Mobile learning is a tool that assists students learn and promote higher achievement and interest (Derick, Dani& Deb 2012). In other word, Aicha (2014) opined that mobile-learning helps students to have high achievement and attitude compared to face to face teaching. Despite the above evidences in respect to the importance of mobile-learning, the state of the art remains that in Nigeria that this teaching strategy had not been fully utilized in enhancing the students’ achievement in mathematics that is the use of mobile-learning as an educational tools in educational setting.

Mobile learning in teaching and learning of mathematics in colleges of education, is needed in present digital in Nigeria, there is need to integrate modes of mobile instructional package which are video-only, Audio-with-text and text-only. Video is defined here as digitally recorded content that has sound and motion that can be stored or delivered live, and can be streamed to a variety of devices. It may or may not have the lecturer visible and can include an animated film, or a demonstration. Video in education is one element of those ‘distributed interactions’ and the role that video plays within education, and how that role develops will be explored further? Audio with text is the combination of audio recorded with text simultaneously play together for students to learn trigonometry aspect of mathematics while text only involve display text of mathematics content in the student mobile phone with detailed explain explanation of solution procedure. Various study carried out by researchers on study interest in mathematics and modes of delivery instruction in mathematics by Aiso, Kristina and Franziska (2005) who investigated mathematics achievement and interest in mathematics

from a differential perspective. It was revealed that Interest in mathematics could be regarded a predator for mathematics achievement moreover.

In another study by Safiyeh and Ali (2014) who carried out survey study on effective factors increasing the students' interest in mathematics in the opinion of mathematics teachers of school of Zahedan. The result revealed that activities of students while teaching, modes of delivery and previous mathematics teachers' behaviors, have had much impact on interest of the students towards mathematics. Eze (2006) investigates study on effects of Geo-board on junior secondary school students Achievement and interest in Geometry. The result showed that Geo-board improved achievement and interest of students in geometry.

Yasemin (2011) carried out the study on gender differences in using social networks. The results revealed that significant differences were found between genders in favor of male.

Aim and Objectives of the Study

The aim of this research is to investigate the effects of three modes of mobile instructional package on interest of mathematics students in colleges of education, in North-Central Nigeria

The specific objectives are to:

- 1 Determine the interest of COE mathematics students exposed to three modes of Mathematics Mobile Instructional Package.
- 2 Determine the interest of mathematics students exposed to three modes of Mathematics Mobile Instructional Packages based on gender.

Research Questions

The following research questions were raised to guide the study:

- 1 What is the mean interest of COE mathematics student's after exposed to three modes of Mathematics Mobile Instructional Package?
- 2 What is the mean interest of mathematics student's after exposed to three modes of Mathematics Mobile Instructional Packages based on gender?

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

- H₀₁** There is no significant difference in the mean interest of COE mathematics student's after exposed to three modes of Mathematics Mobile Instructional Package.
- H₀₂** There is no significant difference in the mean interest of mathematics student's after exposed to three modes of Mathematics Mobile Instructional Packages based on gender.

Methodology

The research adopted the descriptive survey design. The population of the study comprises all NCE mathematics students in North Central Nigeria and target population was NCE one mathematics student. 120 students were randomly selected from three colleges of education in North Central Nigeria for the study. The Instruments for the study is Mathematics mobile instructional package interest questionnaire (MMIPIQ). The MMIPIQ comprises of 30 item questionnaire. Three modes of mathematics mobile instructional package comprises of Video-Only, Audio-with-Text and Text-Only Mathematics Instructional Package. The Mathematics Mobile Instructional Package Interest Questionnaire (MMIPIQ) and Mathematics Mobile Instructional Package (MMIP) was validated by three experts in mathematics education, education technology and computer science in both university and college of education, because research was carried out in colleges of education. All the groups were given questionnaire before and after using Mathematics Mobile Instructional Package (VOMMIP), also gender was considered as moderating variable. The questionnaire was administered on the groups during four weeks of the study. Mean and standard deviation were used to answer research

questions and ANOVA was used to analyze research hypotheses. Conclusion it was established that there was significant difference in the mathematics students' interest after using Mathematics Mobile Instructional Package (MMIP) also there was significant difference in the mean interest of mathematics students exposed to three modes of Mathematics Mobile Instructional Packages based on gender.

Presentation of results

Research Question1:What is the mean interest of COE mathematics students after exposed to three modes of Mathematics Mobile Instructional Package?

Table1: The Mean and Standard Deviation of Interest of COE Students after exposed to Mathematics Mobile Instructional Package (Video-Only, Audio-with-text and Text-Only)

MODES	N	MEAN	SD
Video Only	40	111.25	17.88
Audio-with-Text	40	107.00	17.21
Text Only	40	94.93	20.73

Table 1: shows the mean and standard deviation of the mean interest after exposed to Video Only, Audio+Text and Text Only Mathematics Mobile Instructional Package. The result revealed the mean and standard deviation of Video Only are $\bar{X} = 111.25$, $SD = 17.88$ respectively. Similarly, the mean and standard deviation of Audio-with-Text are $\bar{X} = 107.00$, $SD = 17.21$ respectively on the other hand mean and standard deviation of Text-Only are $\bar{X} = 94.93$, $SD = 20.73$ respectively. The results also revealed that Video-Only had the highest mean of 111.25 compare to Audio-with-Text and Text-Only.

Table 2: Mean and Standard Deviation of Interest of Male and Female Student exposed to Mathematics Mobile Instructional Packages

MODES(VO, A+T and TO)	N	MEAN	SD
Male	75	107.73	16.27
Female	45	93.49	22.67

Table 4.3 shows the mean and standard deviation of the male and female mathematics mobile instructional package interest. From the result, it can be seen that mean score of male are $\bar{X} = 107.73$, $SD = 16.27$ and female $\bar{X} = 93.49$, $SD 22.67$. Also the result revealed that male had higher mean than female counterpart.

Pre-Inventory Analysis

Table 3: Shows the analysis of Interest of COE Students before using Mathematics Mobile Instructional Package Video Only, Audio-with-text and Text-Only

	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	15.200	2	7.600	0.21	0.81
Within Groups	4143.925	117	35.418		
Total	4159.125	119			

***: Significant at 0.05**

Table 3: shows that F.cal (0.21) is less than p-value .81 at 0.05 level of significance ($p > 0.05$). This revealed that no significant effect on the mean interest rating of students before using mathematics mobile learning

using (Video Only, Audio-with-Text and Text-Only). Hence, ANOVA was used for the analysis of hypotheses.

Hypothesis One: There is no significant difference in the mean interest of COE mathematics student's after exposed to three modes of Mathematics Mobile Instructional Package.

Table4: Shows the analysis of Interest of COE Students after using Mathematics Mobile Instructional Package Video Only, Audio-with-text and Text-Only

	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	5738.317	2	2869.158	8.22	0.00
Within Groups	40804.275	117	348.754		
Total	46542.592	119			

Table 4: shows that F.cal (8.22) is less than p-value 0.00 at 0.05 level of significance ($p < 0.05$). This revealed that there was significant difference in the mean interest rating of students after using mathematics mobile learning using (Video-Only, Audio-with-Text and Text-Only). The null hypothesis was rejected; therefore there was significant difference in the mean interest of mathematics students after exposed to three modes of Mathematics Mobile Instructional Packages.

Hypothesis Two: There is no significant difference in the mean interest of mathematics students exposed to three modes of Mathematics Mobile Instructional Packages based on gender.

Table5: ANOVA Analysis of Interest of Gender of COE Students exposed to three Modes of Mathematics Mobile Instructional Packages Based on Gender.

	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	5706.681	1	5706.681	15.94	0.00
Within Groups	42221.911	118	357.813		
Total	47928.592	119			

*: Significant at 0.05

Table 5: shows that F.cal (15.94) is less than p-value 0.00 at 0.05 level of significance ($p < 0.05$). This revealed that there was significant difference in the mean interest of mathematics students exposed to three modes of Mathematics Mobile Instructional Packages based on gender. The null hypothesis was rejected; therefore there was significant difference in the mean interest of mathematics students exposed to three modes of Mathematics Mobile Instructional Packages based on gender.

Discussion of Results

The result of testing research hypothesis one on ANOVA Table 4 proved there was significant difference in the interest of mathematics students after using Mathematics Mobile Instructional Package. Therefore, hypothesis one was rejected. Hence. This is in support of Aiso, Kristina and Franziska (2005) who investigated mathematics achievement and interest in mathematics from a differential perspective. It was revealed that Interest in mathematics could be regarded a predictor for mathematics achievement moreover. Also agreed with findings of Safiyeh and Ali (2014) who carried out survey study on effective factors increasing the students' interest in mathematics in the opinion of mathematics teachers of school of Zahedan. The result revealed that activities of students while teaching, modes of delivery and previous mathematics teachers' behaviors, have had much impact on interest of the students towards mathematics.

Also concur with the research of Eze (2006) who investigates study on effects of geo-board on junior secondary school students' achievement and interest in geometry. The result showed that Geo-board improved achievement and interest of students in geometry.

The result of testing research hypothesis two on ANOVA Table 5 shows there was significant difference in the mean interest of mathematics students exposed to three modes of Mathematics Mobile Instructional Packages based on gender. This is in agreement with findings of Yasemin (2011) who conducted study on gender differences in using social networks. The results revealed that significant differences were found between genders in favor of male

Conclusion

- 1 Student's interest could influence students achievement towards learning, irrespective of the delivery medium used.
- 2 Mathematics Mobile Instructional Package can serve as learning platform to learn Mathematics at students pace.

Recommendations

- 1 Mathematics mobile instructional package should be used in teaching and learning of mathematics in Colleges of Education in North-Central Nigeria.
- 2 Colleges of Educations student should adopt usage of Mathematics mobile instructional package to improve on the concept that is difficult for them.

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