

EFFECT OF USE INTERACTIVE LEARNING MEDIA ENVIRONMENT-BASED ON ACADEMIC PERFORMANCE OF BASIC SCIENCE AND TECHNOLOGY STUDENT

Bawa, Saratu
Department of Science Education
School of Science and Technology Education
Federal University of Technology, Minna
Corresponding E-mail: sarabawa@futminna.edu.ng (Tel: +2347056590755)

Abstract: *The study adopted a quasi-experimental research design. The research was guided by four research questions and four null hypotheses were tested at 0.05 level of significance. The target population was all Senior Secondary School 2 Basic Science and Technology students in Bosso Local Government which 617 (324 males and 2,913 females) in the 2020/2021 academic session. Purposive sampling technique was used to select six senior secondary schools that was used for the study out of 2 senior secondary schools in the 2 Secondary school in Bosso Local Government Area of Niger State. Simple random sampling technique was used to randomly assign the schools into two groups. Two instrument was used for data collection in this study. They included: Basic Science and Technology Achievement Test (BSTAT) and Interactive Learning Media Environment-based. Pearson product moment correlation coefficient was used to determine the internal consistence and reliability coefficient index and this gave $r = 0.872$. The research questions were answered using mean and standard deviation while the hypotheses one, two, three and four was tested using T-test with Statistical Package for Social Sciences (SPSS) version 21. The finding of the study revealed that students taught Basic Science and Technology using Interactive Learning Media Environment-based, performed better than those taught using conventional method. There was statistically significant difference in the achievement scores of Basic Science and Technology students taught using Interactive Learning Media Environment-based and conventional instructional strategies at 0.05 level of significance, and there was no statistically significant difference in the achievement and retention test scores of male and female Basic Science and Technology students when taught using Interactive Learning Media Environment-based. The researcher there by recommends that teachers should be encouraged to use Interactive Learning Media Environment-based to teach Basic Science and Technology in secondary schools since it has been proven to be effective for learning most especially in teaching Basic Science and Technology and curriculum developers should incorporate the use of instructional facilities like Interactive Learning Media Environment-based at all level of education so as to improve students' academic performances and retention.*

Keywords: *Interactive Learning, Media Environment-based, Academic Performance, Basic Science and Technology, and Student.*

Introduction

A good learning and teaching process will affect the learning objectives and also be able to provide satisfying results for student learning outcomes. One way to strive for it is to do innovative learning for example by using learning media. According to Gerlach, media is not just a tool or material, but also a thing that allows students to gain knowledge (Asyhari and Silvia, 2016). The use of learning media in learning will facilitate students in processing information, for an example the ability to remember someone if viewed from the learning process obtained will be able to produce a different percentage of the knowledge obtained if there are tools or tools during the learning process (Davis and Summer, 2015).

In addition, the environment and learning facilities in schools also affect student achievement so diversity in the learning process is needed for example by utilizing the function of learning media (Gietz and McIntosh, 2014). In accordance with current developments, one of the learning media that can be used by students in the 4.0 era is a technology-based media one of which is interactive learning media. Interactive learning media is a combination of images, animation, video, and sound in the software that allows users to interact directly (Novitasari, 2016). In addition,

interactive learning media have functioned as portability, a link in the learning process, social interaction, increasing sensitivity, and can be designed for individual learning (Naismith, et al.; 2006). There is also the function of interactive learning media can be known from various types of learning media, for example, web-based has a function to share data, audiotapes function to get information obtained from the source of the messenger in the audiotapes, videotapes have almost the same function as audiotapes, only in the form of videos, and many other functions are tailored to the needs and types of media presented (Lee and Owens, 2004).

The function of the interactive learning media is also adapted to the needs of students who are inseparable from technology, especially students learning subject is the age of multitasking millennial generation so that if linked in teaching and learning activities will greatly support the independence of students in solving problems presented in learning, especially those that are so the teacher can be helped (Lati, et al., 2012). This is very much in accordance with science learning which requires a process of learning to solve various problems that are scientific.

Science learning provides space for students to think scientifically and always related to the environment in the teaching and learning process. It will be very interesting if it is associated with technology, for example, teaching and learning activities will be simplified in the use of technology. In addition, another positive thing that can be taken is the use of technology, so it is expected to be one of the solutions to overcome problems related to the environment due to the negative impact of the development of the technology itself (Purwanto, 2012). With this, the teacher can utilize existing environment-based interactive learning media. So that learning is retained.

Research evidence shows that learning media could bring about improvement in students' achievement, speeds up learning rate, enhances better retention, and encourages the development of better attitude. However, the study will determine the effect of Interactive Learning Media Environment-based on Academic Performance of Basic Science and Technology Students.

Purpose of the Study

1. determine the differences in the mean achievement scores of students taught basic science and technology using Interactive Learning Media Environment-based and those taught using conventional method.
2. determine the differences in the mean retention scores of taught basic science and technology using interactive learning media environment-based and those taught using conventional method.

Research Questions

The specific objectives of the study are to:

1. what is the differences in the mean achievement scores of students taught basic science and technology using Interactive Learning Media Environment-based and those taught using conventional method.
2. what is the differences in the mean retention scores of taught basic science and technology using interactive learning media environment-based and those taught using conventional method.

Research Hypothesis

1. There is no significant difference between the mean achievement scores of students taught Basic Science and Technology using Interactive Learning Media Environment-based and those taught using conventional method.
2. There is no significant difference between the mean retention scores of students taught Basic Science and Technology using Interactive Learning Media Environment-based and those taught using conventional method.

Methodology

The research design adopted for this study is Quasi-experimental research design. The population of the study consist of all the 9,789 (5,112 males and 4, 279 females) junior secondary school Basic Science and Technology students in Bosso Local Government in the 2020/2021 academic session. Purposive sampling technique was used to select two (2) junior secondary schools that was used for the study out of six junior secondary. Simple random sampling technique was used to randomly assign the schools into two groups. Basic Science and Technology Achievement Test (BSTAT) was used as the instrument for data collection. After the validation of the instruments, the modified questionnaire was trial tested using JSS2 economics students from Maikunkele Day Secondary School that was part of the population but not part of the sample size. Test-retest reliability was used to determine the structured questionnaire and data generated from the pilot study using BSTAT and it was analysed using Pearson product moment correlation coefficient was used to determine the internal consistence and reliability coefficient index and this gave $r = 0.872$.

Basic Science and Technology Achievement Test (BSTAT) was administered on the students in all the selected schools as pretest with the assistance of the research assistants. The main objective of administering the pretest was to ascertain the entry academic ability of the students in Basic Science and Technology before the commencement of the experiment. The data obtained from the administration of BSTAT at the pre-test was collated, marked and subjected to data analysis. The research questions were answered using mean and standard deviation while the hypotheses one, two, three and four was tested using T-test with Statistical Package for Social Sciences (SPSS) version 21.

Results

Table 1: Mean and Standard Deviation of Achievement Score of Interactive Learning Media Environment-based and those taught using conventional method

Group	N	Pre-test		Post-test		Mean Gain
		\bar{X}	SD	\bar{X}	SD	
Interactive Learning Media Environment-based	58	27.60	11.73	45.35	6.95	17.75
conventional method	60	24.02	9.69	33.87	8.46	9.85

Table 1 reveals the Mean achievement score and Standard Deviation of students taught basic science and technology using Interactive Learning Media Environment-based and conventional method. Experimental Group (Interactive Learning Media Environment-based) had the highest Mean achievement score of 45.35 with Standard Deviation of 6.95. The Control Group (Conventional Method) Mean achievement score of 33.87 with Standard Deviation of 8.46. There was a Mean gain of 17.75 and 9.85 for Experimental groups and control group respectively. This implies that Basic Science and Technology students taught with Interactive Learning Media Environment-based had higher mean achievement score as compared to those taught conventional method.

Table 2: Mean and Standard Deviation of Score of interactive learning media environment-based at Post-test and Retention

Group	N	Post-test		Retention		Mean Difference
		\bar{X}	SD	\bar{X}	SD	
Interactive Learning Media Environment-based	58	46.65	6.52	45.07	11.83	- 1.58
Control	60	44.04	7.19	37.31	13.07	- 6.73

Table 2 reveals the Mean retention score and Standard Deviation of students taught basic science and technology using, Interactive Learning Media Environment-based. Table 4.3 showed that the Mean retention score of the two groups at post-post-test differ. Interactive Learning Media Environment-based had the highest Mean retention score of 45.07 with Standard Deviation of 11.83, while the Control group had Mean retention score of 37.31 with Standard Deviation of 13.08. There were Mean differences of 1.58 for Interactive Learning Media Environment-based, 6.73 for conventional.

Table 3: T-test Posttest Scores of Interactive Learning Media Environment-based and Control Group

Participants	N	\bar{X}	SD	t-cal	Df	p-value
Interactive Learning Media Environment-based	58	45.35	6.95			
Control	60	33.87	8.46	28.52	116	0.00

Table 3 shows the mean scores for Interactive Learning Media Environment-based test scores of Basic Science and Technology students taught using Interactive Learning Media Environment-based and conventional instructional strategies. Scientific reasoning ability test scores $X = 45.35$, $Sd = 6.95$ and the mean for conventional instructional strategies $X = 33.87$, $Sd = 8.46$. The table show that $t\text{-cal} = 28.52$, $df = 116$, with $p = 0.00$. Since $p < 0.05$, hypothesis one is hereby rejected. Therefore, there was statistically significant difference in the achievement scores of Basic Science and Technology students taught using Interactive Learning Media Environment-based and conventional instructional strategies.

Table 4: T-test Analysis of mean retention scores of students taught Basic Science and Technology using Interactive Learning Media Environment-based and those taught using conventional method.

Participants	N	\bar{X}	SD	t-cal	Df	p-value
Interactive Learning Media Environment-based	58	45.07	11.83			
Control	60	37.31	13.07	1.56	116	0.01

Table 4 shows the mean scores for scientific reasoning ability test of secondary school Biology students based on school location when taught respiration using 5Es learning-cycle. Urban schools $X = 45.07$, $SD = 11.83$ and the mean for rural schools $X = 37.31$, $Sd = 13.07$, $t\text{-cal} = 1.56$, $df = 116$, with $p = 0.11$. Since $p < 0.05$, hypothesis three is hereby accepted. Therefore, there was statistically significant difference in the achievement score of Basic Science and Technology students taught Basic Science and Technology using Interactive Learning Media Environment-based and Control.

Discussion of Findings

Finding revealed that there was significant difference in the Mean achievement score of students taught Basic Science and Technology using Interactive Learning Media Environment-based, Interactive Learning Media Environment-based and conventional.

This finding could be as a result of the fact that Interactive Learning Media Environment-based are known as integration between amusement and education using various multimedia and improve many skills for children such as, strategic planning, analytical skills, working within a team and decision making. Interactive Learning Media Environment-based give users important skills like working within a team, creativity, the ability to explore, and interactivity (Schrader & Bastiaens,

2012). The finding also corroborates with the finding of Okolo and Oluwasegun (2020) who conducted a study on the effect of Computer- Simulation on Achievement and Interest in Cell Division Among Male and Female Secondary School Students in Abuja, Nigeria. The findings of their study revealed the edge in the use Computer- Simulation Packages in teaching.

The findings of the study are in line with Anunobi *et al.* (2017) who investigated the effects of Interactive Learning Media Environment-based on the achievement of students in the Basic Science and Technology among senior secondary schools in Minna, Nigeria. The authors findings elaborate the importance of Interactive Learning Media Environment-based to the student achievement

It was found that there was significant difference in the Mean retention score of students taught Basic Science and Technology using Interactive Learning Media Environment-based and conventional method. And that there was no significant difference in the Mean retention score of male and female students taught Basic Science and Technology using Interactive Learning Media Environment-based. These could be as a result of the fact that Interactive Learning Media Environment-based boost students creativity and cooperation. Access to Interactive Learning Media Environment-based can help motivate students and create a distinctive context for their learning experience. Based on a true story- the incorporation of video in the classroom, it has allowed Broadmeadows students and teachers to help in broadcasting school announcements, use pre-recorded classes to overcome teacher shortages and influence Internet-based digital video to enhance self-directed learning (Mendoza *et al.*, 2015).

The above finding agrees with the finding of Selvi and Çosan (2018) who investigated the effects of using scientific educational games in teaching Kingdoms of Living Things on students' academic achievement and retention of knowledge. The authors findings unveiled the significance Interactive Learning Media Environment-based to the academic performance of the students.

Conclusion/Recommendations

Interactive Learning Media Environment-based are known as integration between amusement and education using various multimedia and improve many skills for children such as, strategic planning, analytical skills, working within a team and decision making. Based on the findings, it can be concluded Interactive Learning Media Environment-based is effective Interactive Learning Media Environment-based that can enhance academic achievement and retention of secondary school students in Basic Science and Technology. This implies that the Interactive Learning Media Environment-based is adequate and effective for both gender, for enhance academic performance and retention. Based on the findings, the following recommendations were made: Teachers should be encouraged to use Interactive Learning Media Environment-based to teach Basic Science and Technology in secondary schools since it has been proven to be effective for learning most especially in teaching Basic Science and Technology; Curriculum developers should incorporate the use of instructional facilities like Interactive Learning Media Environment-based at all level of education so as to improve students' academic performances and retention. School authorities should regularly organise hands-on and professional training programmes and retreat for teachers to teach them how to effectively use Interactive Learning Media Environment-based.

References

- Asyhari. A.. & Silvia. H. 2016. Pengembangan Media Pembelajaran Berupa Buletin dalam Bentuk Buku Saku untuk Pembelajaran IPA Terpadu. *Jurnal Ilmiah Pendidikan Fisika Al-Biruni*. 5(1). 1-13.
- Davis. B.. & Summers. M. 2015. Applying Dale's Cone of Experience to increase learning and retention: A study of student learning in a foundational leadership course. *Qscience proceedings*. 6.

- Galishnikova. E. M. 2014. Language learning motivation: A look at the additional program. *Procedia-Social and Behavioral Sciences*. 152. 1137-1142.
- Gietz. C.. & McIntosh. K. 2014. Relations between student perceptions of their school environment and academic achievement. *Canadian Journal of School Psychology*. 29(3). 161-176.
- Lati W.. Supasorn. S.. andPromarak. V. 2012. Enhancement of Learning Achievement and Integrated Science Process Skills Using Inquiry Learning Activities of Chemical Reaction Rates. *Procedia Social and Behavioral Sciences*. 46. 4771-4475.
- Lee. W. W.. & Owens. D. L. 200). *Multimedia-based instructional design: computer-based training. web-based training. distance broadcast training. performance-based solutions*. John Wiley & Sons.
- Naismith. L.. Lonsdale. P.. Vavoula. G.. and Sharples. M. 2006. *Literature Review in Mobile Technologies and Learning*. Technial Report. University of Birmingham at Futurelab.
- Novitasari. D. 2016. Pengaruh penggunaan multimedia interaktif terhadap kemampuan pemahaman konsep matematis siswa. *FIBONACCI: Jurnal Pendidikan Matematika dan Matematika*. 2(2). 8-18.
- Purwanto. A. 2012. Pengaruh Paket Pembelajaran Pendidikan Lingkungan Hidup Dan Gaya Kognitif Terhadap Kemampuan Memecahkan Masalah Lingkungan (Studi Eksperimen Pada Jurusan Kimia. Fmipa Universitas Negeri Jakarta). *Jurnal Ilmiah Pendidikan Lingkungan dan Pembangunan*. 13(1). 55-68.
- Rachmadtullah. R.. Zulela. M. S.. & Sumantri. M. S. 2019. Computer-based interactive multimedia: a study on the effectiveness of integrative thematic learning in elementary schools. *Journal of Physics: Conference Series*. 1175(1). 12028. IOP Publishing.
- Reich. A. 2015. Is the road to effective assessment of learning outcomes paved with good intentions? Understanding the roadblocks to improving hospitality education. *Journal of Hospitality. Leisure. Sport & Tourism Education* . 18. 21-23.
- Sugiyono. 2015. *Metode Penelitian Pendidikan: Pendekatan. Kuantitatif. Kualitatif. dan R&D*. Bandung: Alfabeta.