



A survey on multimedia technology on teaching and learning of physics in Abuja municipal area council's secondary schools

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Abstract

This research work is a survey on multimedia technology on teaching and learning of Physics in Abuja Municipal Area Council's (AMAC) Secondary Schools. The sampled schools used for the research had a total 100 students with teaching staff number of 10, this is due to the peculiarity of the subject of the investigation as there are a few science students and also limited number of Physics teachers. The study was carried out among the senior secondary SS2 and SS3 physics students and their teachers. Descriptive survey method was adopted for this study with 8 items on the questionnaire for students and 14 items for teachers. The data gathered were further analyzed and interpreted to arrive at findings which showed that the physics teachers in FCT secondary schools were not fully utilizing the use of multimedia technology in the teaching and learning of physics, there was significant difference in academic performance of students taught with multimedia technology; findings equally revealed that there were shortfalls in availability of these multimedia materials and also observed that the activities in some of the classrooms were not designed for the multimedia technology teaching and learning experience as most of the activities were done with traditional classroom board in some of the schools. Recommendations were suggested that teachers should be retrained to enable them have full access to the knowledge of multimedia technology, the schools should be provided with adequate multimedia facilities so the students could utilize the system, and that there is a need for curriculum review to accommodate the use of the multimedia in the teaching and learning of Physics in secondary schools in AMAC, FCT, Nigeria.

Keywords: multimedia technology, communication, learning, teaching, teacher, students, education and secondary school

Introduction

The methods of teaching physics in secondary schools are facing a critical stage in their development. The traditional conception of education, which is dominated by the frontal form of work with the explicit teaching function of teachers, has clearly demonstrated its weaknesses. Over the past two decades, physics researchers and educationists have studied the effectiveness of physics education in three rather different but important aspects of learning: conceptual understanding, information transfer, and fundamental beliefs about physics. The bottom line is that regardless of how "good" the teacher could be, the standard students of a lesson traditionally taught word for word memorized facts and recipes to resolve problems and failed to get real understanding. Equally disturbing is that the undeniable fact that, despite the simplest efforts of teachers, typical students also learn that physics is boring and unrelated to understanding the planet around them.

Purpose of the Study

Globalization and technology have drastically changed the texture of education standard all over the world. It is equally believed that this will affect positively the teaching and academic output of the recipient. Likewise, there is no doubt the academic progression in Nigeria at all level has enjoyed significant increase overtime, but the same is yet to achieve positive results through the use of multimedia technologies. Averagely, just a few notable numbers of students in Abuja Municipal Area Council's Secondary Schools could be efficient in the use of multimedia technologies. This is not far from even the teachers as most of the teachers seems to show no positive interest in the use of the multimedia technology in academic exercises. The question may arise of whether the concept of multimedia technology is seen as valueless or given no significant place in the teaching and learning of physics in Abuja Municipal Area Council's Secondary Schools. Or could it be that none usage of the multimedia technologies by most teachers despite their laudable impact in teaching and learning can be attributed to the inability of most teachers on the knowledge of how to use them in teaching? This is what triggered this research study.

Review of Literature

Multimedia is that the use of computers to present and integrate text, audio, video with links and tools that allow users to navigate, interact, create, and communicate.

It is easy to conclude, based on Palmer's (2007) literature, that teachers use computers for teaching and learning.

They use the computer to teach their students, to establish a range of teaching styles, to conduct exercises, to readily provide vocal explanations, and to pique their students' interest in the subject they are teaching. The computer instills confidence in teachers in the classroom because their students do not dismiss them as obsolete or out-of-date. They demonstrate to the present generation that they are also knowledgeable about modern technology and are not behind the times. It's a rare, theoretically and empirically supported approach that seeks to describe how people utilize computers.

According to Yoon & Hoon (2009), using educational tools and multimedia technology to provide effective services in teaching and learning is critical, and the provision of multimedia technology and higher education services has had a dramatic impact on teaching and learning, especially with easy access to new innovations in educational institutions who are in a good position to take advantage of them.

Al-Shaibani and Daoud (2011) ^[1] pointed out that teachers should use active thought to organize activities and that teachers should integrate in their lessons to give access on good thinking skills and the use new strategies to better understand the topic. However, Ahamad (2012) stated that teachers need to play a fundamental role as facilitators in the teaching and learning process. For example, teachers carry out the teaching and learning process in small groups in the classroom (collaborative method). Numerous studies have shown that collaborative learning can improve the effective achievement of all round learning DeNoyelles (2013) ^[4] argues that education is essential for the preservation of the future. It's a way to start changing our values and attitudes by providing facts. The advancement of technology in education has the potential to provide answers to issues concerning the impact of technology on the educational system's reconstruction. Increased usage of computer facilities and other media, on the other hand, will result in speedier information conveyance. Furthermore, Hameed (2011) ^[6] demonstrates that some people believe a revolution is occurring in education, in the way people learn, and in the way education is delivered. In today's educational process, the usage of the Internet, multimedia, and mobility is fast evolving in teaching and learning.

As Hamid (2011) noted in his paper on the use of visual materials that: "Using pictures can be better and more useful than other materials". It is suggested that effective use of things like pictures has a positive effect and leads to better learning. He also noted that great progress has been recorded by experimental team in learning using multimedia techniques.

Multimedia in education, according to Davies and Etim (2016) ^[3], is particularly effective in teaching pupils a variety of disciplines. Multimedia is also transforming the way we communicate with one another, according to them. We improve the efficiency and understanding of how we transmit and receive messages. Using interactive CD-ROMs to teach kids about a wide range of subjects, including innovations, languages, and music, can be incredibly beneficial. The usage of media in the classroom will allow teachers to address the issue of children who learn in a different way.

Multimedia is a rich medium that adapts to many educational strategies. Multimedia has proven to have provided many educational challenges in academia and business. It is accessible from a distance and time and serves as means for a coherent educational service at all levels. Multimedia can provide the best way to communicate a concept. Basic multimedia elements are; 1. Text. 2. Graph. 3. Animation. 4. Video. 5. Audios Okonkwo (2016) investigates the impact of multimedia materials on secondary school physics teaching and learning, with a particular focus on secondary schools.

Multimedia helps teachers to offer entire knowledge to their students in one package, combining text, visuals, animation, and more to achieve specific course outcomes. Multimedia allows for more natural and intuitive connections between study material and other important topics, as well as demonstrating complex processes in a very dynamic and exciting way (Crosby and Stelovsky, 1995) ^[2].

Research design and Population

The research designs used in the study were inquiry and quasi-experimentation. This research uses interview and observation as tools. The quasi-experiment used supervised testing as a tool.

The study population comprises of 110 respondents from five (5) government secondary schools in Abuja Municipal Area Council (AMAC), they are;

1. Government Secondary School Nyanya
2. Government Day Secondary School Karu
3. Government Secondary School Karu
4. Government Secondary School Jikwoyi
5. Government Secondary School Karshi

22 respondents will be selected from each school comprises of 20 students and 2 physics teachers.

Sampling and Sampling Method

A simple randomization strategy is used by the researcher. Two graduate classes are chosen at random to be studied. Twenty (20) high school physics students (SS2 and SS3) will be chosen at random, and two (2) physics teachers from each of the five (5) schools chosen for the survey will be used.

Instrument of Data collection and Analysis

The main data collection tool used in this research was questionnaire that was prepared as a source for the collection of primary data. The interview, observation, and guided test were used as research tools. The statistical method used to analyze the collected data is a simple and independent test for the group mean, and the analysis of covariance (ANOVA) is used to validate the hypothesis at the test significance level of 0.05%,

because the person who being tested is being tested in advance. ANOVA was used to eliminate the effect of the covariate / pretest in the posttest by means of mean regression.

Discussion

The results were aggregated, digested, and a scholarly and concise discussion, including implications for the study's research aims, was developed throughout the debate. References to the recorded responses of the respondents have been made where necessary. Because it leads up to the conclusion, this section follows the research questions.

On the how they would rate their level of knowledge of multimedia technology in Science Education, the interview showed that a higher percentage of the teachers do not really have the knowledge of multimedia technology in science education. Two (2) out of ten (10) teachers are not literate, while three (3) out of ten (10) teachers are novice, three (3) out of every ten (10) teachers are on the intermediate, and Two (2) out of ten (10) teachers have advance knowledge of multimedia technology in science education. From the analysis above, just a low level of these teachers have good knowledge of multimedia technology in science education. This is to say the level of multimedia technology knowledge is so low which in adverse will affect the standard of science education.

Then, on how was this knowledge developed? Five (5) out of ten (10) teachers are self-taught, while Two (2) out of ten (10) teachers obtained their knowledge through help from colleagues, one (1) out of ten (10) developed this knowledge through work-based training and Two (2) out of ten (10) teachers obtained their knowledge through professional training. From the analysis above, a great number of these respondents gained the multimedia knowledge through self-efforts. These could be as a result of their personal development and extra efforts in the ensuring the knowledge of multimedia technology in education.

Also, on how confident they are in the teaching of Physics using multimedia technology. Five (5) out of ten (10) teachers are not confident at all in the teaching of Physics using multimedia technology, while Two (2) out of ten (10) teachers are not confident, Two (2) out of ten (10) teachers are confident and one (1) out of ten (10) teachers are very confident in the teaching of Physics using multimedia technology. This analysis clearly proves that a very few number of teachers are currently very confident in the use multimedia technologies in the teaching and learning of Physics.

Difficult of using multimedia technology in the teaching and learning of Physics. One (1) out of ten (10) teachers said it is not difficult at all to use multimedia technology in teaching and learning of Physics, while Two (2) out of ten (10) teachers said it is not difficult, Two (2) out of ten (10) teachers said it is difficult, and five (5) out of ten (10) said it is very difficult to use multimedia technology in the teaching and learning of Physics. The response from a very large number of teachers shows there it is very difficult to use multimedia technologies in the teaching and learning of physics in our secondary schools.

What has been the level of utilization of multimedia technologies in the teaching and learning of physics, seven (7) out of ten (10) teachers indicates an average level of utilization of multimedia technologies in the teaching and learning of Physics, while Two (2) out of ten (10) teachers indicates a fair level of utilization, One (1) out of ten (10) teachers shows that they have greatly utilize the multimedia technologies in the teaching and learning of Physics. This is a prove that when the full scale of this multimedia technologies is engaged in our secondary education system, it will sure enhance the standard of the system.

While, the often use of multimedia technologies in the teaching and learning of Physics. Five (5) out of ten (10) teachers indicates that they never use multimedia technologies in the teaching and learning of Physics, while Three (3) out of ten (10) teachers indicates that they uses multimedia technologies once every term, One (1) out of ten (10) teachers indicates they uses the multimedia technologies weekly, and one (1) out of ten (10) indicates daily use of multimedia technologies in the teaching and learning of Physics. The responses from the teachers shows that most of the teachers re not really engaging the full potentials of the multimedia technologies as shown from their responses above.

Do the multimedia technologies impacted positively on the teaching and learning of physics? Three (3) out of ten (10) teachers indicates an average level of multimedia technologies impacted positively on the teaching and learning of Physics, while Two (2) out of ten (10) teachers indicates a fair level of impact, Four (4) out of ten (10) teachers indicates good level of impact of multimedia technologies, and one (1) out of ten (10) teachers indicates a very good level of impact of multimedia technologies on the teaching and learning of Physics.

Also, on if there is any relative improvement in the academic performance of science students due to the use of multimedia technologies in the teaching and learning of physics.

One (1) out of ten (10) teachers strongly disagreed that there is no relative improvement in the academic performance of science students due to the use of multimedia technologies in the teaching and learning of Physics, while one (1) out of ten (10) teachers disagreed that there is no relative improvement, Four (4) out of ten (10) teachers agreed that there is relative improvement, and four (4) out of ten (10) teachers strongly agreed to the relative improvement in the academic performance of science students due to the use of multimedia technologies in the teaching and learning of physics. On the specific factors which affects the proper utilization of multimedia technologies in your school, two (2) out of ten (10) teachers interviewed indicated that there is limited access to electronics devices like projector, computer systems e.t.c, two (2) out of ten (10) teachers interviewed indicated that there is unwillingness to promote the use of multimedia technology for educational activities, two (2) out of ten (10) teachers interviewed indicated that there is lack of reliable internet facilities, two (2) out of ten (10) teachers interviewed indicated that there is maintenance cost and two (2) out of ten (10) teachers interviewed indicated that there is unstable electricity supply.

The students were asked if they have heard of the word multimedia technology, according to their responses, thirty two (32) out of one hundred (100) students strongly disagreed that they have not heard of the word multimedia tech

nology, while fifty six (56) out of one hundred (100) students disagreed, Five (5) out of one hundred (100) students agreed that they have heard the word multimedia technology, and seven (7) out of one hundred (100) students strongly agreed. This shows a very high number of students are not really exposed to the concept of multimedia technologies in the teaching and learning of Physics in secondary schools.

Finally, they were also asked if their schools were Internet connected, forty (40) out of one hundred (100) students strongly disagreed that their school is internet connected, while thirty (30) out of one hundred (100) students disagreed, twenty (20) out of one hundred (100) students agreed, and ten (10) out of one hundred (100) students strongly agreed. So many schools are not having good internet facilities thereby limiting their access to the full utilization of the concept of multimedia technologies.

Conclusion

The Government of Nigeria, through the National Education Policy (Federal Government of Nigeria, 2004), has emphasized the use of digital technology for library use, but has yet to integrated the use of multimedia technology in the educational policy of the country. Notwithstanding this position, attempts made by some schools (both public and private) in Abuja Municipal Area Council (AMAC), FCT, Nigeria, at using the multimedia in teaching and learning process has shown its emergent usefulness within the development of education.

All the five schools studied have had some basic ideas of Internet use, but the bulk of them are yet to use the multimedia technology to teaching and learning process. In some schools, especially the model school, Internet facilities were available, but the functionality of the facilities is questioned. Using the multimedia as a way of developing education within the area is beset with variety of challenges, like epileptic power supply, inadequate digital skills among teachers, The current digital divide between learners and digital objects is insufficient in schools. In spite of those shortcomings, prospects pullulate with the scholars. the long run of the multimedia's contribution to the event of education in AMAC, FCT, Nigeria, is bright, provided the challenges are properly tackled. this is applicable to the primary three levels of education—nursery, primary, and secondary.

Recommendations

The results of the research led to the following recommendations made by the researcher;

1. It is recommended to retrain teachers so that they have full access to knowledge of multimedia technology.
2. Schools should be provided with adequate multimedia facilities so that pupils can benefit from the system.
3. Curriculum review is needed to enable the use of multimedia in teaching and learning physics in secondary schools in AMAC, FCT, Nigeria. In this way, AMAC schools will become more serious about the application of multimedia in teaching and learning.

References

1. Al-Shaibani YA, Daoud JI. Thinking skills course and student's academic self-efficacy. *Aus. J. Basic Applied Sci*,2011:5:403-415.
2. Crosby ME, Stelovsky J. From multimedia instruction to multimedia evaluation. *Journal of Educational Multimedia and Hypermedia*,1995:4:147-162.
3. Davies Kelvin Udim, Eyo Akon Etim. Use of Multimedia in Teaching and Learning of Political Science in University of Uyo, Akwa Ibom State, Nigeria. *Research in Pedagogy*,2016:6(2):154-170.
4. DeNoyelles A. Analysis in virtual worlds: The influence of learner characteristics on instructional design. In Seo, K. K. (Ed.), *Using social media effectively in the classroom: Blogs, wikis, twitter, and more* Oxon, UK: Routledge, 2013, 3-18. *Encyclopedia Americana* https://en.wikipedia.org/wiki/Encyclopedia_Americana,
5. Federal Government of Nigeria, National policy on education (Federal Republic of Nigeria, 4th ed.). Abuja, Nigeria: Author, 2004.
6. Hameed SA. Effect of internet drawbacks on moral and social values of users in education. *Aus. J. Basic Applied Sci*,2011:5:372-380.
7. Yoon JS, Hoon SS. A Study on the Direction of Education to Prevent Multimedia Illiteracy. Korea: Retrieved, 2009. from <http://www.images.adobe.com> on August 1, 2013.