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EFFECT OF INTEGRATING OF MULTIMEDIA IN TEACHING AND LEARNING OF COMPUTER STUDIES ON SECONDARY SCHOOLS STUDENTS' ACHIEVEMENT AND INTEREST

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Abstract
The purpose of this study is to ascertain the effect of integrating of multimedia in teaching and learning of computer studies on secondary schools students' achievement and interest. Two research questions were formulated to guide the study while four null hypotheses were tested at p<.05. The study used pre-test, post-test quasi experimental design. The study area was Enugu Education Zone of Enugu State, Nigeria. The population for the study comprised all the 6,482 SSII students in the 30 secondary schools in Enugu Education Zone. 378 students were purposively sampled from 4 coeducational schools that had some computer facilities. Two instruments known as Computer Achievement Test (CAT) and Computer Interest Inventory (CII) were developed by the researcher and validated by two experts from computer education from Enugu State University of Science and Technology (ESUT) and one other from measurement and evaluation from same institution. Pearson Product Moment Correlation Coefficient was used to determine the reliability of the CAT which yielded a reliability coefficient of 0.87, while Cronbach Alpha was used to determine that of CII. This yielded a reliability coefficient of 0.82. Mean and standard deviation were used for answering the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses. Results of analyses showed that students taught computer studies by integrating multimedia in the teaching process recorded higher achievement and interest than those taught without the integration of multimedia. ANCOVA test revealed that there was no significant difference in the achievement and interest of male and female students in the experimental group. Based on the findings, it was recommended that computer facilities should be provided in schools so as to serve as aids for teaching and learning, and workshops, conferences or seminars should be organized by Ministry of Education and other education administrators on the need for integration of multimedia in teaching process in order to enhance both male and female students' achievement and interest.

Keywords: Multimedia, Achievement, Interest.

Introduction
Teaching and learning has metamorphosed from the traditional method to other technology-based approaches. This is more so since the advent of computer and information technologies. Computers have turned out to be one of the technologies with the most remarkable impact on teaching and learning. The computer has become so versatile that it has made impacts in virtually every field of human endeavor, especially education. The list of applications of computers to education is almost limitless as innovative computer-based approaches to teaching and learning have been developed, and more are still in the process of development. One way in which computers have been used to support teaching and learning is by the integration of multimedia.

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Multimedia is defined by Wikipedia (2019) as content that uses a combination of different content forms such as text, audio, images, animations, video and interactive content. Multimedia contrasts with media that use only rudimentary computer displays, such as text-only or traditional forms of printed or hand-produced material. In education, multimedia is used to produce computer-based training courses (popularly called CBTs) and reference books like encyclopedia and almanacs. A CBT lets the user go through a series of presentations, text about a particular topic, and associated illustrations in various information formats. Edutainment is the combination of education with entertainment, especially multimedia entertainment. Multimedia "provides a means to supplement a presenter's efforts to garner attention, increase retention, improve comprehension, and to bring an audience into agreement", which consequently results in people remembering 20% of what they see, 40% of what they see and hear, but about 75% of what they see and hear and do simultaneously (Lindstrom, 2004). The use of multimedia in teaching and learning enables teachers to stimulate final outcomes and assist students in applying knowledge learned from textbooks, thereby compensating for the deficiency of traditional teaching methods.

Besides being a powerful tool for making presentations, multimedia offers unique advantages in the field of education. For instance, text alone simply does not allow students to get a feel of any of Shakespeare's plays. In teaching biology, an instructor cannot make a killer whale come alive in a classroom. Multimedia enables us to provide a way by which learners can experience their subject in a vicarious manner. The key to providing this experience is having simultaneous graphic, video and audio, rather than in a sequential manner. The appeal of multimedia learning is best illustrated by the popularity of the video games currently available in the market. These are multimedia programmes combining text, audio, video, and animated graphics in an easy-to-use fashion.

Multimedia provides students with an alternate means of acquiring knowledge designed to enhance teaching and learning through various mediums and platforms. This technology allows students to learn at their own pace and gives teachers the ability to observe the individual needs of each student. The capacity for multimedia to be used in multi-disciplinary settings is structured around the idea of creating a hands-on learning environment through the use of technology (Malik & Agarwal, 2012).

From multimedia learning (MML) theory, Roberts (2016) has developed a large group lecture practice using PowerPoint and based on the use of full-slide images in conjunction with a reduction of visible text (all text can be placed in the notes view' section of PowerPoint). The method has been applied and evaluated in nine disciplines. In each experiment, students' engagement and active learning has been approximately 66% greater, than with the same material being delivered using bullet points, text and speech, corroborating a range of theories presented by multimedia learning scholars like Sweller and Mayer (Roberts, 2017). Other researchers like Su (2008) investigated the effects of multimedia applications on science achievement with the help of educational software. The results revealed that the use of multimedia applications contributed to student learning and positively affected their attitudes towards science. In their study with 8th graders, Ardac and Akaygun (2004) found that students who were taught science with multimedia materials were more successful compared to students who were taught with traditional methods.

Computer studies is the study of the theory, design, use and analysis of computer devices (Adigun, Onihunwa, Irunokhai, Sada & Adesina, 2015). This entails knowing the computer itself, its operation, what it can do, how it can do it and why it is doing it. These form the

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basis of computer studies curriculum in secondary schools. Therefore, computer studies, a recently introduced subject in the senior secondary school curriculum in Nigeria, introduces students to Information and Communication Technologies (ICT) which is of utmost importance and therefore needs to be given adequate attention particularly as it concerns its teaching/learning. This is necessary because of its unquantifiable significance towards introducing students to the world of computers and their applications on a wider scope. Considering the nature of this subject, it is the opinion of the researcher that the best approach to teaching it needs to be modified by such measures as integrating multimedia, rather than the use of lecture method most times. This is because the subject is anchored on contemporary technologies and their applications, hence, lecture method may not suffice in delivering such lessons.

A study by Ikwuka (2010) has shown that learners are motivated when their learning is supported by technology, which in turn leads to increased understanding. Njoku and Eze-Odurukwe (2015) indicated that students' academic achievements are greatly improved when taught with computer animations. Queen (2012) observed that the use of ICT in education results in increased effectiveness of educational process; and use of technology in training, results in increased productivity through enhanced human capacity.

Academic achievement is the outcome of education; the extent to which a student, teacher or institution has achieved their educational goals; and this is commonly measured by examinations or continuous assessment (Udim &Etim, 2016). It can also be defined as the learning outcomes of the child. This includes the knowledge, skills and ideas, acquired and obtained through their course of study within and outside the classroom situation (Danjuma, 2015). Abande (2010) opined that interest is a state of curiosity or concern about something or the attention given to something. Magnus (2008) further stated that interest encompasses the positive, pleasant feelings an individual has when trying to study a subject-matter. If a student shows a higher interest in a course, this will help him to put in more time, effort and energy in learning which will in turn lead to higher or better achievement (Godpower-Echie & Ihenko, 2017). Olaf, Jurgenand Kai (2010) submitted that high achievers showed more interest than low achievers.

Academic achievement is an indication of level of retention ability of the students. However, retention is the ability to reproduce the learnt concept when the need arises. Hornby (2000) defines retention as the ability to remember experiences and things learnt. According to Gatlin in Umar, Idris, Audu, Arah, Yusuf, and Beji (2016), for knowledge to be retained for a long time by the learners, the teachers must use effective instructional techniques that involves the use of multimedia in the classroom. Osemmwinyen (2009) found that student's achievements and retention could be aroused and retained through the use of an appropriate instructional media like multimedia. Moreover, Aloraini (2012) confirmed that multimedia instruction increases student's retention level. It is yet to be determined if these trends will be reproduced in the area of this study when students are taught computer studies with multimedia.

Available literatures have indicated that students' interest is very much related to students' achievement and the technique employed by the teacher in the process of teaching and learning. Onuora (2002) in Smith (2005), pointed out that no real education may take place without interest. In other words, interest is able to compel attention and foster achievement. Onoh and Nnabuike (2007) defined interest as the attraction that forces a child to learn. It is the quality which arouses concern or curiosity which holds a child's attention on an object.

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Eze (2006) defined it as the feeling of intentness, concern or curiosity about an object. Sharp (2005) revealed that interest is inward state of the mind towards something and that outward pressure can increase the desire in learning. It appears that one way of awakening and sustaining such interest in computer studies is through the use of multimedia, since it appeals to a variety of senses. In line with this assertion, findings from the study of Umar, Idris, Audu, Arah, Yusuf, and Beji (2016) revealed that multimedia instruction is more effective in improving student's achievement and retention in auto-mechanics than conventional method. There is therefore the need to establish the effect of integration of multimedia on students' interest in computer studies.

Research Questions

The following research questions guided the study:

1. What are the mean achievement scores of students taught computer studies by integrating multimedia in the teaching process and those taught without it?
2. What are the mean interest scores of students taught computer studies by integrating multimedia in the teaching process and those taught without it?

Research Hypotheses

Ho1. There is no significant difference between the mean achievement scores of students taught computer studies by integrating multimedia in the teaching process and those taught without it?

Ho2. There is no significant difference between the mean interest scores of students taught computer studies by integrating multimedia in the teaching process and those taught without it?

Methodology

The purpose of the research was to examine the effect of integrating multimedia in teaching and learning of computer studies on secondary schools students' achievement and interest. The study used pre-test, post-test quasi experimental design. The study area was Enugu Education Zone of Enugu State, Nigeria. The population for the study comprised all the 6,482 SSII students in the 30 secondary schools in Enugu Education Zone. 378 students were purposively sampled from 4 coeducational schools that had some computer facilities. The experimental group was taught computer studies by integrating PowerPoint slides in line with lesson procedure prepared by the researcher while the control group was taught using the expository method.

Two instruments known as Computer Achievement Test (CAT) and Computer Interest Inventory (CII) were developed by the researcher and validated by two experts from computer education from Enugu State University of Science and Technology (ESUT) and one other from measurement and evaluation from same institution. CAT contained two sections. Section "A" contained demographic information of the respondents, while section "B" contained a 30 multiple choice questions which respondents are expected to answer by completing the indicating correct answers. CII contain 20 items. Pearson Product Moment Correlation Coefficient was used to determine the reliability of the CAT which yielded a reliability coefficient of 0.87, while Cronbach Alpha was used to determine that of CII. This yielded a reliability coefficient of 0.82. Mean and standard deviation were used for answering the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses. . All the analyses were done with the Statistical Package for Social Sciences (SPSS).

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Research Question 1: What are the mean achievement scores of students taught computer studies by integrating multimedia in the teaching process and those taught without it?

Table 1:

Mean Achievement Scores and Standard Deviations of Students Taught Computer Studies by Integrating Multimedia in the Teaching Process and those taught without integrating multimedia in the teaching process

Groups	Number	Pre-test		Post-test	
		Mean ($\bar{x}$)	Standard Deviation (s)	Mean ($\bar{x}$)	Standard Deviation (s)
Experimental Group	192	40.31	2.68	61.58	2.97
Control Group	186	41.98	3.46	47.92	1.90
Total	**378**				

Results in Table 1 show that the mean achievement scores of students in the experimental and control groups were 40.31 and 41.98 respectively, at pretest. The values of the standard deviation were 2.68 and 3.46 for the experimental and control groups respectively. At the post-test, the experimental group had mean achievement score and standard deviation of 61.58 and 2.97 respectively while the control group had 47.92 and 1.90 respectively. This indicates that increase in achievement was higher in the experimental group than in the control group.

Research Question 2: What are the mean interest scores of students taught computer studies by integrating multimedia in the teaching process and those taught without it?

Table 2:

Mean Interest Scores and Standard Deviations of Students Taught Computer Studies by Integrating Multimedia in the Teaching Process and those taught without integrating multimedia in the teaching process

Groups	Number	Pre-test		Post-test	
		Mean ($\bar{x}$)	Standard Deviation (s)	Mean ($\bar{x}$)	Standard Deviation (s)
Experimental Group	192	2.44	0.26	2.60	0.31
Control Group	186	2.43	0.28	2.45	0.73
Total	**378**				

Results in Table 2 show that the mean interest scores of students in the experimental and control groups were 2.44 and 2.43 respectively, at pretest. The values of the standard deviation were 0.26 and 0.28 for the experimental and control groups respectively. At the post-test, the experimental group recorded mean interest score and standard deviation of 2.60 and 0.31 respectively while the control group recorded 2.45 and 0.73 respectively. This indicates that increase in interest was higher in the experimental group than in the control group.

Hypothesis 1: There is no significant difference between the mean achievement scores of students taught computer studies by integrating multimedia in the teaching process and those taught without integrating multimedia in the teaching process.

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Table 3:

Analysis of Covariance on the Mean Achievement Scores of Students Taught Computer Studies by Integrating Multimedia in the Teaching Process and those Taught without Integrating Multimedia in the Teaching Process

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	17652.995[a]	1	17652.995	113.728	.000	Rejected
Intercept	43898.592	1	43898.592	282.813	.000	
GROUP	17652.995	1	17652.995	113.728	.000	
Error	58363.290	376	155.222			
Total	1213534.000	378				
Corrected Total	76016.286	377				

Results in Table 3 show the Analysis of Covariance (ANCOVA) on the mean achievement scores of students taught computer studies by integrating multimedia in the teaching process and those taught without integrating multimedia in the teaching process. The results showed that group (experimental and control) as main effect, gave an f-value of 113.728 and was significant at 0.00. Since 0.00 is less than 0.05, it means that at 0.05 significant level, the f-value was significant. Hence, Hypothesis 1 was not accepted as stated. It is therefore, concluded that there is significant difference between the mean achievement scores of students taught computer studies by integrating multimedia in the teaching process and those taught without integrating multimedia in the teaching process. The difference is significant in favour of students in the experimental group.

Hypothesis 2: There is no significant difference between the mean interest scores of students taught computer studies by integrating multimedia in the teaching process and those taught without integrating multimedia in the teaching process.

Table 4:

Analysis of Covariance on the Mean Interest Scores of Students Taught Computer StudiesbyIntegrating Multimedia in the Teaching Process and those Taught without Integrating Multimedia in the Teaching Process

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	2.381[a]	1	2.381	7.668	.006	Rejected
Intercept	195.741	1	195.741	630.528	.000	
GROUP	2.381	1	2.381	7.668	.006	
Error	116.725	376	.310			
Total	2531.113	378				
Corrected Total	119.106	377				

Results in Table 4 show the Analysis of Covariance (ANCOVA) on the mean interest scores of students taught computer studies by integrating multimedia in the teaching process and those taught without integrating multimedia in the teaching process. The results showed that group (experimental and control) as main effect, gave an f-value of 7.668 and was significant at 0.006. Since 0.006 is less than 0.05, it means that at 0.05 significant level, the f-value was significant. Hence, Hypothesis 2 was not accepted as stated. It is therefore, concluded that there is significant difference between the mean interest scores of students taught computer studies by integrating multimedia in the teaching process and those taught without integrating

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multimedia in the teaching process. The difference is significant in favour of students in the experimental group.

Discussion of Findings

The study examined the effect of gender on computer students' achievement and interest by integrating multimedia in the teaching process. The findings of this study revealed that students taught by integrating multimedia in the teaching process achieved higher scores than their counterparts in the control group. ANCOVA test further shows that the difference was significant in favour of students in the experimental group. This finding agrees with Ardac and Akaygun (2004), Ikwuka (2010) and Njoku and Eze-Odurukwe (2015) who found that students who were taught science with multimedia materials were more successful compared to students who were taught with traditional methods. However, the finding is in contrast with Montazemi (2006), Rasch and Schnotz (2009) and Guan (2009), who observed poor achievement of students taught with multimedia.

The results of the study also revealed that students taught by integrating multimedia in the teaching process recorded higher interest scores than their counterparts in the control group. ANCOVA test further shows that the difference was significant in favour of students in the experimental group. This finding agrees with the findings of Shah and Khan (2015) who observed that multimedia improves students' interest. This study shows that the integration of multimedia in the teaching process is superior to the use of traditional method in fostering achievement and interest of students in computer studies.

Conclusion

It is evident from the findings of this study that the integration of multimedia in the teaching process is an effective strategy for boosting the achievement and interest of students in computer studies. This implies that multimedia-integration strategy is very rewarding for students in terms of achievement and interest. There is, therefore, the need to introduce this innovation in computer education. By so doing, there is no doubt that students' achievement and interest in the subject will record significant improvement.

Recommendations

1. Computer facilities should be provided in schools so as to serve as aids for teaching and learning.
2. Workshops, conferences or seminars should be organized by Ministry of Education and other education administrators on the need for integration of multimedia in teaching process in order to enhance students' achievement and interest.

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