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EFFECT OF WEBINAR TECHNOLOGY ON STUDENTS' ACADEMIC ACHIEVEMENT IN COMPUTER SCIENCE IN FEDERAL COLLEGE OF EDUCATION, ZARIA-NIGERIA

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Abstract

The study examined the Effect of Webinar Technology on Students' Academic Achievement in Computer Science, Federal College of Education, Zaria-Nigeria. The design of the study was quasi-experiment. Specifically, the non-equivalent pre-test and post comparison group design was adopted. The population of the study consisted of all year II pre-service teachers in Federal College of Education, Zaria-Nigeria. However, 120 year II students were purposively selected. Instructional package titled "Webinar Technology Instructional Package" (WETIP) and Lecture Method Instructional Package (LEMIP) were used. The "Teacher-Made Academic Achievement Test" (TAAT) was used as instrument for data collection. The content, construct and face validity of the instrument were determined by experts and through table of specification. The reliability coefficient index was determined using Cronbach alpha formula after conducting pilot study and 0.788 was realised. The data of the study were obtained via pre-test and post-test administered to the experimental and control groups. The test score were marked over (100). The research questions were answered using means and standard deviations while the null hypotheses were tested at 0.05 alpha level of significance using two samples t-test. The study found that there is statistically significant difference between the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method; and no statistically significant difference existed between the academic achievement of male and female students taught Computer Science using webinar technology and those taught using conventional lecture method. The study recommended among others the need for teachers to be encouraged to use webinar technology in teaching computer science because as it enhances students' academic achievement.

Keywords: Academic achievement, Computer science, Gender, Technology and Webinar

Introduction

The information and communication technology (ICT) has come to stay as indispensable tool for effective curriculum delivery in higher institutions of learning. It is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computers and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. There are various definitions of ICT proffered by authorities. In this regard, Ofodu (2017) defines ICT as electronic or computerized devices, assisted by human and interactive materials that can be used for a wide range of teaching and learning as well as for personal use. E-learning is an emerging field as a promising instructional medium as well as a ripe arena in which to conduct research on its impact on teaching and learning activities. The fundamental nature of e-learning as an instructional medium differs substantially from face- to-face delivery, thereby requiring more new features for course development, online assessment, and interaction. Moodle is a software package for producing internet-based courses and websites. It is a Learning Management System (LMS) that allows for better cooperation among learners, tutors, and students (Chourishi, 2015).

Teaching and learning through Internet platforms asserts Gamage (2019) is very popular among instructors nowadays. This is not only due to the convenience and easy communication with learners but also because the platforms offer a benefit in motivating learners to prepare the lesson beforehand and revise the learned contents, as well as to inquire about any problems with the instructors. Online communication resources, among them Facebook,

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SnapChat, webinars, Twitter and YouTube, provide a free platform for people of all ages to exchange ideas and enable better communication (Coulson, 2013). Wormald (2015) tracked internet usage by adolescents, and reported an increase to 95% in 2012 from 73% in 2000. This increase in online communication has been a growing cause of concern for educators, who report that adolescents are influenced by the images they view online, and display increasing levels of anger, anxiety, and depression (Pantic, 2014). Social media sites such as Facebook and MySpace offer multiple daily opportunities for connecting with friends, classmates, and people with shared interests (Okeeffe, Clarke-Pearson, & Council on Communications and Media, 2011). The increased use of social media networks, especially among the adolescent population, has been known to have various disadvantages and risks.

One of the main forms of distance learning is webinars. Although at the moment this type is promising and effective, its use in education has not yet received proper distribution. Therefore, the issues of using webinars directly in the educational process and its impact on the effectiveness of learning are relevant. Today, there are different ideas about webinars, and numerous interpretations of the concept in question have been given. In addition, attempts have been made to analyze the features of the newest way of exchanging educational information in the context of the rapid process of general informatization of education, the growth of the diversity of ICT and the rapid introduction of innovative and pedagogical technologies. As a form of learning, the webinar has been functioning already at the end of the 1990s. At the same time, the first systematic developments on the topic began to appear recently. Let us present only a few definitions of the phenomenon under consideration. Thus, in the study by Hrastinski (2009), this technology is interpreted as an online analogue of traditional forms of education – lectures and seminars. Johnson and Schumacher (2016) believe that a webinar is an interactive lesson organized using the Internet and special software. Burton and Kitchen (2010) consider a webinar a kind of educational technology that provides interactive learning events in a synchronous mode and tools for remote collaboration of participants. According to the study by Sura, Lischalk, Leckie, Welsh and Fernandez (2017), a webinar is a new format of learning, which offers real-time classes based on modern communication technologies that ensure the transmission of audio-visual information. Cornelius (2014) believes that a webinar is a form of interactive learning sessions with listeners via the Internet using special software. Ferguson (2010) calls a webinar a virtual seminar organized using Internet technologies and representing a technology of educational cooperation, that is, group interaction of subjects of the educational process.

To summarize, the above definitions convey the idea of conducting online webinars with the transmission of audio-visual information. A prerequisite for such classes is the connection between the teacher and students. It is appropriate to interpret the technology under consideration as an interactive network form of organizing a learning session, a prerequisite for which is the areas of information and software resources. It is a lecture (seminar) on the Internet information network online. Today, researchers (Kear, Chetwynd, Williams & Donelan, 2012; Gegenfurtner, Zitt & Ebner, 2019) distinguish the following types of webinars: educational, organizational, webinars to support research, information and presentation, consulting, webinars-interviews, etc. Each of these types has its own characteristics, as well as unconditional benefits for the educational process. A well-organized information and presentation webinar will be an excellent addition to the traditional practice of presenting factual information in the form of lectures, seminars or practical exercises. McKinney (2017) points out that a remarkable feature of webinars is a rational combination of visual and audio-visual communication, verbal and nonverbal information, where the recipients are not only passive observers, but also active participants in creative educational action. During online communication, each student can ask questions to the teacher (moderator). Online polling is skilfully combined with visualized discussion, discussion, file sharing, etc. The opportunity to join the discussion creates motivation for further learning and emotional uplift that contributes to the rapid assimilation and dissemination of relevant information and optimizes well-coordinated communication between the teacher and students.

In this regard, Polanco-Bueno (2013), a prerequisite for a successful webinar is knowledge of the specifics of organizing online seminars and the ability to use advanced web technologies. It is necessary to take into account how a person, in particular a teacher and a student, functions in the "person – technical learning aids" coordinate system (computer-oriented instrumental pedagogical technologies). According to the researcher, designing a learning environment is a complex process of combining traditional pedagogical technologies and e-learning tools, elements of distance learning, as well as combined and blended learning of students in a virtual environment specially created by a teacher. Despite the fact that studies have proven that webinar enhances students' academic achievement and

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retention, very few Computer Science teachers utilize its benefit in promoting students learning. In this regard, Salihu, Mohammed and Muhammad (2020) assert that the 21st century teaching and learning is undergoing massive restructuring, remodelling and revitalization to suit the current demands and also to stand the test of time. Hence, a need for teachers at all levels to join the moving train. Many academic staff are still accustomed to traditional methods of teaching especially the lecture and didactic techniques despite the availability of learner-centered and activity-based teaching strategies that were proven by research findings to be effective in enhancing students' academic achievement and retention. This has contributed to poor academic performances among students in Computer Science in Federal College of Education, Zaria. In the light of the foregoing, this study examines the effect of webinar technology on students' academic achievement in Computer Science, Federal College of Education, Zaria-Nigeria.

Objectives of the Study

The main objective of this study is to determine the Effect of Webinar Technology on Students' Academic Achievement in Computer Science, Federal College of Education, Zaria-Nigeria. The study has the following specific objectives which are to:

i. find out the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method;
ii. determine gender differentials on academic performance of students Computer Science using webinar technology and those taught using conventional lecture method;

Research Questions

In the light of the foregoing, the following research questions are posed:

i. What is the difference between the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method?
ii. What is the difference between the academic achievement of male and female students taught Computer Science using webinar technology and those taught using conventional lecture method?

Null Hypotheses

The following null hypotheses are postulated to guide the study:

i. There is no significant difference between the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method;
ii. There is no significant difference between the academic achievement of male and female students taught Computer Science using webinar technology and those taught using conventional lecture method;

Methodology

The design of the study was quasi-experiment. Specifically, the non-equivalent pre-test and post comparison group design was adopted. The population of the study consisted of all year II pre-service teachers in Federal College of Education, Zaria-Nigeria. However, 120 year II students were purposively selected. Instructional package titled "Webinar Technology Instructional Package" (WETIP) and Lecture Method Instructional Package (LEMIP) were used. The "Teacher-Made Academic Achievement Test" (TAAT) was used as instrument for data collection. The content, construct and face validity of the instrument were determined by experts and through table of specification. The reliability coefficient index was determined using Cronbach alpha formula after conducting pilot study and 0.788 was realised. The data of the study were obtained via pre-test and post-test administered to the experimental and control groups. The test score were marked over (100). The research questions were answered using means and standard deviations while the null hypotheses were tested at 0.05 alpha level of significance using two samples t-test. According to Salihu (2022), t-test should be used for determining significant differences between two means.

Results

Research Question One: What is the difference between the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method?

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Table 1: Descriptive Statistics on the Academic Achievement of Students in Experimental and Control Groups

Treatment	N	Pre-test		Post-test		Mean Diff
		Mean	S.Dev	Mean	S.Dev	
Experimental	60	29.27	8.83	57.64	13.02	28.37
Control	60	29.23	8.94	36.89	8.89	7.71
Mean Difference		0.04		20.75		20.66

Table 1 revealed the mean academic achievement scores (pre-test and post-test) of Computer Science students taught using webinar technology and those taught using conventional lecture method. It indicated that the experimental and control groups had pre-test scores of 29.27 and 29.23 respectively. After the treatment, the post-test scores for the two groups stood at 57.64 and 36.89 for experimental and control groups respectively. Students in the experimental group had mean gain of 28.37 while those in the control group gained 7.71. The mean post-test difference between the experimental and control groups stood at 20.75 in favour of experimental group. This implied that students taught Computer Science using webinar technology outperformed their counterparts in the control group i.e. students taught Computer Science using conventional lecture method.

Question Two: What is the difference between the academic achievement of male and female students taught Computer Science using webinar technology and those taught using conventional lecture method?

Table 2: Descriptive Statistics on Academic Achievement of Students in Experimental and Control Groups Relative to Gender

Group	Gender	Mean	Std. Deviation	N
Experimental	1 male	21.68	6.390	30
	2 female	16.30	6.497	30
	Total	19.23	6.956	60
Control	1 male	16.66	5.398	30
	2 female	15.32	5.695	30
	Total	16.06	5.562	**60**
Aggregate	1 male	**18.46**	6.245	60
	2 female	**15.67**	6.001	60
	Total	17.21	6.284	**120**

Table 2 presents the means and standard deviations for the male and female NCE II students that made up the experimental and control groups as used in the study. The mean academic achievement scores of male students in the experimental group was (M=21.68, SD=6.390) while that of the female students (experimental) was (M=16.30, SD=6.497). Moreover, the mean academic achievement score of male students in the control group was (M=16.66, SD=5.398) while that of female students was (M=15.32, SD=5.695). The overall mean academic achievement score for the male students stood at (M=18.46, SD=6.245) while that of the female students was (M=15.67, SD=6.001). The overall mean difference was 2.79 in favour of the male participants.

Hypotheses Testing

Hypothesis Two: There is no significant difference between the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method;

Table 3: Summary of two Samples t-test on Experimental Control Groups

Group	N	Mean	SD	Df	t-value	Sig (2 tail)
Experimental	60	57.64	13.02	118	15.28	0.177
Control	60	36.89	8.89			

Results of two samples t-test on Table 3 shows that there is statistically significant difference between the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method. This is due to the fact that the calculated p value of 0.177 (2-tailled) is found to be less than the α=0.05 alpha level of significance while the t-calculated value of 15.28 is greater than the t-critical value of 1.96, at Df 118. Their calculated post-tests mean motivation scores were 57.64 and 36.89 for experimental and control

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groups respectively. Consequently, the null is hereby rejected.

Hypothesis Two: There is no significant difference between the academic achievement of male and female students taught Computer Science using webinar technology and those taught using conventional lecture method;

Table 4: Summary of two Samples t-test on Experimental Control Groups Relative to Gender

Gender	N	Mean	SD	Df	t-value	Sig (2 tail)
Male	60	18.46	6.25	118	0.33	0.74
Female	60	15.67	6.01			

Results of two samples t-test on Table 4 shows that there is no statistically significant difference between the academic achievement of male and female students taught Computer Science using webinar technology and those taught using conventional lecture method. This is due to the fact that the calculated p value of 0.74 (2-tailled) is found to be higher than α=0.05 alpha level of significance while the t-calculated value of 0.33 is less than the t-critical value of 1.96, at Df 118. Their calculated post-tests mean retention scores were 18.46 and 15.67 for male and female students respectively. Consequently, the null hypothesis is retained.

Discussion

The study found that there is statistically significant difference between the academic achievement of students taught Computer Science using webinar technology and those taught using conventional lecture method; and that no statistically significant difference was found between the academic achievement of male and female students taught Computer Science using webinar technology and those taught using conventional lecture method. Empirically, researchers have identified the criteria for determining the effectiveness of the methodology for preparing and conducting webinars: level of perception; levels of reproduction of the studied material over a long time and the application of the knowledge gained; increasing the information content and problematic nature of the submitted material; promptness of updating and changing content; levels of student motivation in the process of mastering new things; clarity and accessibility of the platform for the webinar. Effective teaching methods that arouse the interest of students and intensify their educational and cognitive activity during the webinar are working in pairs, discussion, "brainstorming", case-method, etc. Internet services, which offer the joint work of a group of participants in real time, help to implement interactive methods in the webinar.

Webinars give an opportunity to improve the quality of the educational process and increase student motivation by attracting teachers from other universities in the country and foreign countries. After all, it is considered good form for a university if a lecturer from Harvard, Oxford or a significant specialist or expert is giving a lecture there. As experts say, webinars allow organizing a "global brain transfer". Moreover, webinars make it possible to involve in teaching and consulting specialists of the highest level without interrupting their main activity, which makes it possible to obtain modern high-quality knowledge for students, young scientists and interested specialists.

Conclusion

The new information and communication technology for conducting webinars is very promising for organizing the educational process and increasing students' learning motivation. Research evidences have shown that webinar technology provide powerful functionality for the implementation of distance learning and has significant didactic capabilities. The overwhelming majority of classroom activities of the traditional form can be implemented by means of a webinar. Of course, this form of learning organization cannot completely replace traditional learning, but its use can significantly improve the educational process. The organization of webinars contributes to the growth of the interest of future specialists in obtaining the knowledge necessary for their future professional activities.

Recommendations

The following recommendations are put forward for the study

i. Teachers should be encouraged to use webinar technology in teaching computer science because of it enhances students' academic achievement;

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ii. Computer science teachers should endeavour and be encouraged to utilize webinar technology especially in co-educational settings since the approach has proven to be gender-friendly.

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