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The Impact of Asynchronous Instructional Platform on Motivation and Academic Achievement of Students' in Technical Education

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Abstract:

The impact of Asynchronous instructional platform on the academic achievement and motivation of students' of technical education was investigated in this research. Quasi-experimental research design was adopted. Three research questions were formulated to guide the study. The population of the study comprised of 1250 students offering technical education from the tertiary institutions under study. The instruments used for data collection were Technical Education Cognitive Achievement Test (TECAT) and Technical Education Motivational Test (TEMT). Similarly, a 12 item questionnaire was developed and subjected to face validity by three experts. The instruments for data collection were subjected to face and content validity while Kuder-Richardson (KR-21) was used to establish the stability of the achievement test, which after the final analysis resulted in a reliability coefficient of 0.92. The study revealed that asynchronous instructional approach was very effective in improving students' achievement and stimulating their interest in learning. On the basis of these findings, the study recommends among others that School authority should encourage Teachers to adopt innovative eLearning platforms such as the Asynchronous instructional platform. It was also recommended that the Students should be given adequate orientation on the importance, use and need of e-learning in the school system.

Keywords: Asynchronous, instructional platform, academic achievement, motivation, technical education, students

1. Introduction

Teaching and learning process in the present generation is no longer solely confined to the classroom or school days. Advancement in technology has now made it possible for education to be distributed when, where and how the teachers and learners desired without necessarily remaining under the same roof, in the same traditional environment. Perhaps, it is in support of this assertion that Adamu and Nathaniel (2019) affirmed that the advent and subsequent transformation of Information and Communication Technology (ICT) has now made it possible for the 21st century teachers to interact with their students beyond the confines of the conventional four corners of the classroom using e-learning medium.

According to Ogbonna, Ibezim and Obi (2019) one of the popular e-learning platforms where this is achieved is known as the Asynchronous instruction. Asynchronous instruction platform is defined by Dada, Alkali and Oyewola (2019) as a type of e-learning platform that makes learning available as soon as or whenever it is required. Asynchronous e-learning gives the learners greater flexibility in term of learning time, content and process. Many of the present e-learning systems offer asynchronous learning environments because they are easy to set up and are cheaper than synchronous e-learning methods. Perhaps, it is in this regard that Raymond, Atsumbe, Okwori, Jebba (2016) asserted that Asynchronous instruction is becoming the popular teaching and learning e-learning platform which teachers can use to interact with their students beyond the confines of the conventional four corners of the classroom. This view also agrees with that of Adamu and Natahniel (2017) that Asynchronous instruction is a student-centered teaching method that uses e-learning resources to facilitate information sharing outside the constraints of time and place among a network of people.

One of the unique characteristics of the Asynchronous instruction according to Dada, Alkali and Oyewola (2019) is that instructional delivery does not take place simultaneously. In this case, the teacher may deliver the instruction via video, computer, or other means, and the students respond at a later time. For example, instruction may be delivered via the Web or videotapes, and the feedback could be sent via e-mail messages. Smith (2009) gave examples of asynchronous instruction packages to include the use of eLearning applications such as hypertext documents, wikis, blogs, email, discussion boards, audio and video conferencing as well as the use of social media networking such as Facebook, WhatsApp, etc. Other examples of asynchronous instruction technology includes DVD, CD Rom, video tape, Moodle and Youtube.

For whichever type of asynchronous technology tool, one major consideration is the convenience and personal scheduled of the participants. According to Obasai, Eludire and Ajao (2013) the learners' convenience and personal schedule are cardinal to asynchronous tools. Thus, one of the important element of the asynchronous instruction is that teaching and learning process can take place at different time and at different place. In other words, students scheduled their activity at their own time, place and pace. Consequently, the use of this innovative teaching methodology is capable of motivating the interest of the students in learning.

To buttress this assertion, Bhatia (2003) opined that once interest is aroused through motivation, learning is facilitated. Scholars have therefore shown renewed interest in motivation as a construct for describing and explaining processes and outcomes of various educational settings (Kumazhege, 2016). Perhaps, it is in this regard that Scholars have equally been advocating for innovative and motivational teaching methodologies which is not only capable of stimulating the interest of students to learn but equally ensuring effective teaching and learning. According to Higley (2013), literatures have shown that the use of familiar e-learning medium such as Asynchronous instructions helps to stimulate attention and maintain students' interest in both theories and concepts under discussion. Thus, the use of Asynchronous instruction can make the class intrinsically interesting and enjoyable as it provides a platform that will stimulate and motivate the students' interest in learning as they will be able to interact and review the lectures over and over thus ensuring overall improvement in the level of academic achievement of the students.

Academic achievement is concerned with the students' performance as measured by examination within the context of a course of study. Atsumbe (2013) noted that achievement is the outcome of education which involves the determination of the degree of attainment of the learner in tasks, courses or programmes to which the learner is sufficiently exposed. Achievement can therefore be inferred as the behaviour which student exhibits within a given time range or at the end of a given period of time. Achievement is therefore an important educational variable because it is concerned with the terminal behavior of a student at the end of a given period of time or even within a given time range. This view was also shared by Gali (2003) who highlighted that achievement is concerned with the assessment of terminal or criterion behavior which involves the determination of students' performance with respect to specific standard. The importance of achievement stems out of the fact that it gives result which enables teachers to obtain information on the extent to which a student has attained the criterion performance. This information can be used to determine the relative position or rank of the students with respect to their performance test.

Consequently, it is expected that by adopting the asynchronous mode of instructional delivery, teaching and learning can become more flexible, realistic and interactive which are all essential ingredients to improvement in the academic achievement of the students especially in courses like technical education where the issue of poor performance has been a major challenge over the years.

1.1. Statement of the Problem

Scholars in colleges of education in Nigeria has expressed serious concern over the persistent problem of poor performance of students of technical education in recent years as attested to by Kumazhege (2016), Chado (2010), Langa (2013) and Adamu, Atsumbe and Raymond (2015). Studies have identified some common factors responsible for students' poor performance in technical education prominent among these factors is the refusal of the teachers to adopt innovative mode of instructional delivery in the light of the revolution brought about by ICT (Umunadi, 2009, Elbitar & Umunadi, 2011 and Udofia & Udofia, 2013). Thus, it is expected that with the adoption of innovative instructional approaches such as the use of Asynchronous instructional platform, teaching and learning can be made more realistic, flexible and enjoyable. The innovation is also capable of improving the level of academic achievement, arousing the interest of students, ensuring good –quality interaction and above all motivating the students to learn. Thus, as the world draws closer through the use of ICT, Asynchronous instructional platform continues to spread globally across educational institutions worldwide. Therefore, there is the need to appraise its effect among students of technical education.

2. Literature Review

The emergence of electronic learning, commonly referred to as e-learning has revolutionized the teaching, learning and research activities globally. It has caused a monumental transformation in the educational sector just like in several other spheres of human endeavour. One of the commonest method by which e-learning instruction is delivered involves the use of Asynchronous methods of instruction (Hrastinski, 2008). According to Simonson, Smaldino, Albright and Zvacek, (2012) Asynchronous instruction is an innovative method of instructional delivery which teachers can adopt when teaching with ICT facilities. It is against this backdrop that Scholars have been advocating for adoption of innovative and motivational teaching methodology which is not only capable of stimulating the interest of students to learn but can equally ensures effective teaching and learning. Perhaps, it is in line with this assertion that Jebba and Tyabo (2018) affirmed that the Asynchronous instructional platform is capable of making teaching and learning to be more realistic, flexible and enjoyable. Furthermore, the innovation is also capable of arousing the interest of students, improving their level of academic achievement as it also ensures good –quality interaction and above all it is capable of motivating the students to learn.

The Asynchronous instructional platform learning is based on constructive theory, a student-centered approach that emphasizes the importance of peer-to-peer interactions (Wu, Bieber and Hiltz, 2008). In support of this assertion, Ogbonna, Ibezim and Obi (2019) reveals that the theory of constructivism upholds that people's experiences enable them to build an understanding and connotation of concepts. To apply this theory in learning, Ogbonna, Ibezim and Obi (2019) suggests that when learners acquire fresh information, the tendency is to link the new information to a related existing

information or experience in memory, thereby forming their own independent mental image of the information acquired. According to Bruner (1996) the primary goal of constructivist theories of teaching is that students learn through receiving training which enable them to take initiatives when it comes to their own learning experiences, instead of relying on someone else's information. This point of view corroborates the stand of this research that innovative Asynchronous e-learning platform is capable of stimulating students' active participation in learning activities as attested by a large body of literature which reveals that students learn better when actively involved with the curriculum and learning content through e-learning media. It is against this backdrop that scholars have been advocating that teachers should develop curricula that engage students with both hands-on (practical) and minds-on (inquiry-based) learning activities. This view was further corroborated by Hrastinski, (2008); Ssekakubo et al., (2011); Tang, (2002); Udofia&Udofia, (2013) that students develop problem-solving skills and higher-order thinking when exposed to teaching and learning that involves the use of computer-based strategies. Thus, they can effectively participate in real-life applications by drawing analogies, infer relationships, analyse data and predict outcomes on their own.

2.1. Purpose of Study

This study was designed to determine the impact of Asynchronous instructional platform as a tool for enhancing the academic achievement and motivation of students' in technical education.

Specifically, the study determined:

- Students' academic achievement when taught with Asynchronous instructional platform
- The level of motivation of Students when taught with Asynchronous instructional platform
- Strategies to promote effective use of Asynchronous instructional platform among students of technical education

2.2. Research Questions

The following research questions guide the study:

- What is the impact of Asynchronous instructional platform on students' academic achievement?
- What is the level of motivation of Students when taught with Asynchronous instructional platform?
- What are the strategies that can promote effective use of Asynchronous instructional platform among students of technical education?

3. Methodology

Pre-test, Post-test, Non-equivalent Control Group, Quasi-experimental Design was used for the study. This approach was considered appropriate because the intact classes which were used for the study cannot be disorganized because of the research. Thus, this measure was necessary in order not to disrupt the normal schools' class structure and time-table. The use of intact classes in a quasi-experimental research was supported by several scholars such as Shadish, Cook and Campbell (2001), Shuttlesworth (2008) and Sambo (2008). A technical education achievement test was used to determine the achievement test while a 12 -item questionnaire was used to determine the strategies for promoting effective use of asynchronous instructional platform. The instruments for data collection were subjected to face and content validity while Kuder-Richardson (KR-21) was used to establish the stability of the achievement test, which after the final analysis resulted in a reliability coefficient of 0.92. On the other hand Kendall's *W* Test was used to establish the reliability of the instrument and it resulted in a coefficient of 0.98.

3.1. Area of the Study

The study was carried out in north central geo-political zone of Nigeria specifically in tertiary institutions where technical education courses are offered. The north central zone states are: Niger, Kogi, Benue, Kwara, Nassarawa, Plateau States and Abuja (the Federal Capital Territory).

3.2. Population/Sample of the Study

The target population for this study consists of 1250 students of technical education programme in the tertiary institutions offering technical education courses in the north- central geo-political zone of the country. Stratified random sampling technique was adopted to select 480 subjects for the study. Chado (2010) suggested the use of a stratified sampling technique in a research population that consists of a number of sub groups or strata that may differ in the characteristics being studied. On the other hand, Yaro Yamane's sampling formula was adopted to sample the desired students for the research.

4. Results and Findings

4.1. Research Question 1

What is the impact of Asynchronous instructional platform on students' academic achievement?

Group	N	Pre-test	Post-test	Mean Gain
		X	X	
Control	240	50.75	65.25	14.50
Experimental	240	55.80	78.50	22.70

Table 1: Pretest and Posttest Mean Scores of Control and Experimental Groups

Table 1 shows that the control group had a mean score of 50.75 in the pretest and a mean score of 65.25 in the posttest making a pretest, posttest mean gain in the control group to be 14.50. On other hand, the experimental group had a mean score of 55.80 in the pretest and a posttest mean of 78.50 with a pretest, posttest mean gain of 22.70. With this result, the academic achievement of the experimental group is higher than the students in the control group. Therefore, this is an indication that the Asynchronous instructional platform is more effective than the conventional teaching method, thus it has more impact for the students under study.

4.2. Research Question 2

What is the level of motivation of Students when taught with Asynchronous instructional platform?

Group	N	Pre-test	Post-test	Mean Gain	Motivation Level
		X	X		
Control	240	42.27	58.73	16.46	Slightly motivated
Experimental	240	45.20	75.45	30.25	Strongly motivated

Table 2: Pretest and Posttest Mean Scores of Experimental and Control Groups

Data presented in Table 2 shows that the Control group had a mean score of 42.27 in the pre-test and a mean score of 58.73 in the Post-test hence producing a pretest, posttest mean gain of 16.46 in the control group. Meanwhile, the Experimental group had a mean score of 45.20 in the pre-test and a post-test mean score of 75.45. Thus producing pretest posttest mean gain of 30.25. Consequently, this result is an indication that the Asynchronous instructional platform is more effective in terms of motivating students' to learn.

4.3. Research Question 3

What are the strategies that can promote effective use of Asynchronous instruction among students of technical education?

S/N	Item Statement	Mean	Remark
	Strategies To Promote Effective Use Of Asynchronous Instruction Among Students:		
1	Free access to software and virtual classrooms for students	4.50	SA
2	Provision of constant and reliable power supply by the electricity authority	4.55	SA
3	Provision of alternative solar powered system for ICT facilities	4.80	SA
4	Provision of well-equipped ICT centre by the college management	4.35	SA
5	Provision of 5G and similar high speed internet connectivity within the Campus	4.75	SA
6	Provision of subsidized I pads, Tablets, and laptops	4.55	SA
7	Close monitoring and supervision of lecturers' method of instructions by the College management	3.85	SA
8	Provision of power point projectors in the lecture	3.45	A
9	Enforcement of ICT policies by the authority	3.85	SA
10	Provision of smart/ interactive boards in the lecture halls	3.65	SA
11	Organize periodic orientation to acquaint students with the use of innovative e-learning platform	3.90	SA
12	Students should be actively involved in activities that involved the use of eLearning in classroom	4.00	SA

Table 3: Mean Ratings of Strategies to Promote Effective Use of Asynchronous instruction Among Students

From Table 3 above, the Data obtained indicates that all the item statements had mean scores above the cutoff point of 3.00. This is an indication that the students concurred with the researchers that all the item statements are strategies that can be employed to encourage effective use of Asynchronous instruction among students of technical education from the tertiary institutions under study.

5. Discussion

The findings of this study reveal that the use of Asynchronous instructional platform is more effective in teaching and learning of technical education when compared with the conventional teaching method. Data analysis revealed that students taught with asynchronous e-learning platform showed higher cognitive achievement when compared to those taught with the traditional face to face approach. This finding is in consonant with the assertion of Ogbonna, Ibezim and Obi (2019) that asynchronous instructional platform makes it easier for students to download documents, send messages to teachers or their colleagues at convenient time, thereby allowing them to make more meaningful and thoughtful contributions which is capable of improving their academic achievement. This view was further supported by Dada, Alkali and Oyewola (2019) when they opined that the asynchronous instructional platform gives the learners greater flexibility in terms of learning time, content and process thus it makes learning available as soon as or whenever it is required. With respect to research question 2, the findings revealed that students taught with Asynchronous instructional platform were strongly motivated when compared to the conventional group. This result might not be unconnected to the theory that when students are exposed to fresh information, the tendency is that they will link the new information to a related existing information or experience in memory, thereby forming their own independent mental image of the information acquired (Ogbonna, Ibezim and Obi, 2019). The implication of this theory that innovative Asynchronous e-learning platform is capable of stimulating students' active participation in learning activities as attested by a large body of literature which reveals that students learn better when actively involved with the curriculum and learning content through e-learning media.

The answer to research question 3 was provided by data in Table 3. The result revealed that the use of Asynchronous instruction platform can best be promoted among students of technical education through the Provision of free access to software and virtual classroom for the students as well as Provision of well-equipped ICT centre by the college management. Other strategies to promote effective use of asynchronous instructional platform among the students includes: provision of high speed internet connectivity such as 5G network, provision of steady and reliable power supply by the electricity authority in addition to alternative solar powered system for ICT facilities. This finding is in tandem with the suggestions of Adamu and Nathaniel (2019) as well as that of Adamu (2017) who opined that the use of Asynchronous learning platform can best be promoted through the Provision of free/subsidized laptops, I pads and Tablets for students and teachers as well as Provision of smart /interactive boards and power point projectors in the lecture halls.

Organizing capacity building programme as well as periodic orientation to train the students to understand the concept of e-learning as well as mounting of regular workshops to keep the students abreast with the latest technology on e-learning are among the top strategies suggested by the respondents. This finding agrees with that of Kamar, Kubo and Ibrahim (2016) who advocates for regular sponsorship of students to attend national and international conferences and seminars on innovative ICT based teaching and learning platforms as measures that can promote effective use of Asynchronous instruction among students of technical education.

6. Conclusion

The inability of teachers to adopt innovative eLearning teaching platforms has been acknowledged as one of the major factors responsible for the persistent failure of students of technical education in Nigerian colleges of education. It was against this backdrop that this study was conducted to determine the impact of Asynchronous instructional platform on motivation and academic achievement of students' of technical education. The study found out that the asynchronous instructional approach was more effective than the conventional method of instruction in enhancing the students' cognitive achievements. The study also revealed that the students were highly motivated as a result of exposure to a relatively new approach to learning. This finding was consistent with several other similar researches on the use of innovative eLearning platforms such as the asynchronous instructional platform which has been proven as a viable method of instruction that is not only capable of improving the students' performance, but also capable of stimulating their interest in learning.

7. Recommendation

On the basis of the findings and revelations of this study, the major recommendations are proffered:

- School authority should encourage Teachers to adopt innovative eLearning platforms such as the Asynchronous instructional platform.
- Students should be given adequate orientation on the importance, use and need of e-learning in the school system.
- The school authority should ensure adequate provision of 5G high speed internet connectivity and services within the campus
- Well-equipped ICT centre should be provided by the college management
- The lecture halls should have power point projectors and Smart /interactive boards installed.

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