

DEVELOPMENT AND VALIDATION OF A WEB-BASED INSTRUCTION FOR ECONOMICS STUDENTS IN ABIA STATE COLLEGES OF EDUCATION (TECH) AROCHUKWU, NIGERIA

NZEADIBE OKECHUKWU

Department of Economics Education

Abia State College of Education (Technical) Arochukwu

nzeadibekechukwu@gmail.com

Abstract

Web-based Instruction are applications that runs on World Wide Web and are useful for effective teaching of various subjects in schools and colleges. This study explore the effectiveness of Web-based instruction in teaching of Economics to undergraduate students. It is a survey research consisting of 35 undergraduate students of Abia State College of Education (Technical) Arochukwu taught with Web-based Instruction applications and later asked to complete a questionnaire to get a feedback on their experience when using the application to learn various economics topics such as Micro economics, Micro economics and Business finance. Responses obtained from them were analyzed using simple mean and results were further interpreted. The outcome of the study shows that there is improvement in learning of Economics in terms of mastery of the topics when using Web-based Instructions. Also, students were able to develop personal skills while using the learning platforms. In conclusion, Web-based learning platform is recommended for learning economics among undergraduate students of the college.

Keywords: *Web-Based Instruction, learning methods, World Wide Web*

Introduction

People from all walks of life use computer to accomplish one thing or the other. In fact, computer is used in almost all the fields of human endeavour. In education, computer is used to help learners to learn. The use of computer to aid learning is referred to as computer assisted instruction (CAI). Educational professionals have developed a number of computer assisted instructional packages in different subjects to assist students in learning. Empirical studies with such packages show their effectiveness in areas of increasing students' achievement, attitude and interest among others. For example, experimental studies with computer assisted package show that students taught with computer assisted instructional package perform better than those taught with traditional methods (Yusuf & Afolabi, 2010; Banik & Biswas, 2017; Ode, 2018). In the area of attitude, studies have shown that computer assisted instructional package increases students' attitude towards learning subjects (Pilli, 2008; Nazimuddin.2015). Other studies confirm the effectiveness of computer assisted instruction in increasing students' interest in learning subjects (Turo, 2015;Nwanne & Agommuoh, 2017). Although, computer assisted instruction is effective in cognitive and affective domains, it is not as effective as face to face instruction in area of psychomotor domain. The design of computer assisted instruction to teach and assess psychomotor skills remains one of the challenges in the field of computer assisted instruction.

Although computer assisted instruction is very effective in improving students' academic achievement, but it has limitation of not being access anywhere in the world. Web-based instruction came in to remove this limitation. Web-based is another form of computer assisted instruction with contents of instruction resides in internet. Web-based instruction is one of the most widely applications of internet. Web-based Instruction (WBI) is a hypermedia-based instructional program which utilizes the attributes and resources of the internet and World Wide Web to facilitate the development of interactive electronic learning processes and curriculum materials, creating a more meaningful learning environment (Uparimpanich, 2008). There is widespread of use of web-based instruction among students. This widespread use of according to Horzum (2012) is largely due to effective use of web tools which support the learning process.

Web-based instructions are developed using principles and models and applications. Web-based principles according to Fadli (2013) include; 1) self-learning, 2) mastery learning, 3) active learning and 4) networked learning. ADDIE model (Brandson, Raymer, Cox, Furman, King & Hannum, 1975) is one of the most widely models used as a guide for developing web-based instructions. Google Apps for education on the other hand, is one of the widely used applications in web-based instruction.

There are many empirical studies which show effectiveness of web-based instruction. For example, Ercan, Bilen& Bulut (2014) conducted a research to determine the effect of web-based instruction with educational animation content at sensory organs subject on the 7th grade students' academic achievement and attitudes in the science and technology course. The study show that there is a meaningful difference in favour of experimental group on the academic achievement pre-test / post-test marks between experimental group instructed with web-based instructional materials with educational animation content and control group instructed with traditional lecture method. It is also found that there is no significant difference on attitudes towards science and technology. Horzum (2012) on the other hand carried out a study determine the effect of web based instruction on students' web pedagogical content knowledge, academic achievement and the general satisfaction of the course. The study showed that the web pedagogical content knowledge and the attitudes towards web based instruction of the experiment group were found to be higher than control group after the course. Also the academic achievement of experiment group was higher than control group and there was no difference in course satisfaction. Anunobi, Gambari, Abdullahi and Alabi (2016) in a study to find the effects of web-based instruction on junior secondary school students' retention in Basic Technology in Nigeria found that students exposed to web-based instruction retained basic technology concepts than their counterparts exposed to conventional teaching method. There was no significant difference between the mean retention scores of male and female student exposed to web-based instructions; high, medium, and low achievers' students exposed to web-based instruction retained the concept of basic technology equally. Erdogan, Bayram and Deniz (2008) investigated the factors that affect learners' academic achievement and attitudes in web based education. They found that web based education have positive effects on the improvement of academic achievement. The effect of web based education on attitude toward learning suggested that web use had positive effects mainly on motivation for learning and interested in the lessons.

The above empirical studies show that web-based instruction is very effective. Therefore, many courses can be taught in Abia State College of Education (Technical) Arochukwu using web-based instruction approach. The present lockdowns and the requirements of social and physical distancing occasioned by coronavirus couple with the effectiveness of web-based instruction motivated the researchers to develop and validate a web-based instruction for economics students in Abia State College of Education (Technical) Arochukwu.

Problem Statement

The advent of coronavirus has affected the way students study in the sense that students are expected to maintain both social and physical distancing. This implies that courses with large number of students require the use of big halls in order to maintain the required stipulated physical distance. Schools without big halls like ASCETA need to divide their students for several sessions for a particular course. This additional task will increase the stress already experiencing by economics lecturers in lecturing economics courses. In addition students' performances in some economic courses are poor. Hence, the researchers determined to develop and validate a web-based instruction for economic students in Abia State College of Education (Technical) Arochukwu in order to reduce the problem of physical and social distancing as well as improving students' performance.

Objectives of the Study

The objectives of the study are to:

1. Develop web-based instruction for economics students.
2. To compare academic achievement of students who received instruction via web-based instruction with the achievement of students who received instruction via face to face instruction.

3. To determine students' satisfaction with web-based instruction

Hypotheses

Hypothesis 1: there is a significant difference in the mean achievement scores of students taught Economics using WBI and those taught using LM

Hypothesis 2: there is a statistically significant difference in the mean achievement scores of economics students exposed to WBI in the low-ability, medium-ability, and high-ability groups

Literature Review

This section reviewed some studies on computer assisted instructions as well as web-based instructions. Such studies guide the researchers towards development of the web-based instruction for economics students as well as the method of evaluating its effectiveness.

Development of Web-based Instruction

Web-based instructions are developed using different types of authoring tools and applications. This sub-section considered only Google apps for education (GAfE).

GAfE according to Hariadi, Dewiyan and Sudarmaningtyas (2016) is a feature provided by Google to help learning process through information technology, especially collaboration between students and teachers. The benefits of GAfE include (1) stay connected wherever, uniting students and lecturers quickly without space and time constraints, (2) ease of managing tasks, grades and courses, and (3) unlimited learning sources, for both students and lecturers. Some features of the GAfE include Gmail, Google Drive, Google Hangout, Google Calendar, Google Groups, and Google Site. Researches conducted with web-based instructions developed using GAfE show its effectiveness (Suwantarathip & Wichade, 2014)

Effectiveness of Web-based instructions

Alasoluyi (2015) conducted a study which examined the effect of computer assisted instruction (CAI) on students' performance in economics in senior secondary schools in Ekiti State, Nigeria. The study was conducted with four research objectives and four research questions were asked while four null hypotheses were formulated and tested at $p < 0.05$. Literatures that are related to the study were also reviewed. This study was conducted in the public Senior Secondary Schools in Ekiti State. Specifically, students of SSS II in Government Science College Iyin-Ekiti, Community High School Iyemero-Ekiti, Government College Oye-Ekiti, and Ijaloke Grammar School Emure-Ekiti with a population of 195, using quasi-experimental design. The bio-data of the respondents was analyzed with the use of frequency and percentage while mean and standard deviation was used to answer the four research questions. All the four null hypotheses were tested at 0.05% level of significance using t-test. A t-test of independent sample was used to compare the performance of students taught using Computer Assisted Instruction (CAI) method with the performance of the group taught using only traditional method. The findings of the study among others revealed a significant difference in the post-test performance scores of students taught Economics with the use of computer assisted instruction when compared with those taught using the traditional method of instruction; that there was no significant difference in the performance of male and female students taught Economics with the use of computer assisted instruction. The first, third and fourth null hypotheses were rejected because the t-value was more than the p-value and the second null-hypotheses were retained as the t-value was less than the p-value. The study concluded that students perform better and score higher in Economics given test when taught using CAI enhanced method. Based on the conclusion, the study recommended that teachers and students in the Senior Secondary School as well as other levels of education should imbibe the use of CAI method of teaching since it enhances students' performance in courses of study. Also the study recommended that CAI drill and practice software as well as CAI Experts and CAI resources (financial, infrastructure, computers and power generation sources) should be made available by respective Ministries of Education at the Federal and State levels, as well philanthropists who are interested to encourage educational development throughout the country.

Ercan, Bilen& Bulut (2014) conducted a research to determine the effect of web-based instruction with educational animation content at sensory organs subject on the 7th grade students' academic

achievement and attitudes in the science and technology course. Quasiexperimental research method was applied in this study. For this purpose, as a means of measuring, Science and Technology achievement test consisting of 30 questions and 15-itemed Science Course attitude scale developed by Geban et.al. (1994) were used. In experimental group, the sensory organs were explained with web-based instructional materials with educational animation content, and academic achievement test and attitude scale were applied as post-test; in the control group, subject of sensory organs were rendered in the traditional lecture method and application is finished with applying academic achievement test and attitude scale as post-test. As consequence of study, there is a meaningful difference in favor of experimental group on the academic achievement pre-test / post-test marks between experimental group instructed with web-based instructional materials with educational animation content and control group instructed with traditional lecture method. It is found that there is no significant difference on attitudes towards science and technology.

Horzum (2012) carried out a study to determine the effect of web based instruction on students' web pedagogical content knowledge, academic achievement and the general satisfaction of the course. The study was planned and completed according to pre test and post test with control group experimental design. The study was carried out on 29 students. The web content knowledge of the students in both group showed significant change after the experimental procedure. The web pedagogical content knowledge and the attitudes towards web based instruction of the experiment group were found to be higher than control group after the course. Also the academic achievement of experiment group was higher than control group and there was no difference in course satisfaction.

Anunobi, Gambari, Abdullahi and Alabi (2016) conducted a study which examined the effects of web-based instruction on junior secondary school students' retention in Basic Technology in Nigeria. Quasi-experimental design (pretest-post test, non-equivalent, non-randomized control group design) was adopted in this study. 119 Junior Secondary School class two (JSS II) students were drawn from four co-educational registered private secondary schools in Minna Metropolis, Nigeria. Three research questions with corresponding hypotheses were formulated and tested at 0.05 level of significance. Basic Technology Achievement Test (BTAT) consists of 50 items, multiple choice objectives question was used for data collection. Web-based instruction (WBI) and BTAT were validated by education technology experts, computer experts, industrial and technology education lecturers, secondary school basic technology teachers and basic technology students. BTAT was subjected to pilot test and 0.90 reliability coefficient was obtained using Pearson Product Moment Correlation Coefficient. BTAT was administered on students in experimental and control groups and data obtained were analyzed using Analysis of Covariance (ANCOVA) to test the hypotheses. The results of the study 274 indicated that students exposed to Web-Based Instruction retained basic technology concepts than their counterparts exposed to Conventional Teaching Method. There was no significant difference between the mean retention scores of male and female student exposed to Web-based instructions; high, medium, and low achievers' students exposed to WBI retained the concept of Basic Technology equally. Based on the above findings it was recommended that Web-Based Instruction should be used to improve students' retention in Basic Technology.

Erdogan, Bayram and Deniz (2008) investigated the factors that affect learners' academic achievement and attitudes in web based education. 127 students enrolled in the e-MBA Masters Degree of Bilgi University constituted the study group of the research. A survey method was used for the study and the data were collected by a Demographic Information Questionnaire and Web Based Education Attitudes Scale. Initially, Demographic Information Questionnaire and Web Based Education Attitudes Scale were administered to the e-MBA students. Then, the e-MBA Degree average course grades (GPA) were obtained from the department to determine academic achievement of the students. At the end of the study, it was revealed that web based education have positive effects on the improvement of academic achievement. The effect of web based education on attitude toward learning suggested that web use had positive effects mainly on motivation for learning and interested in the lessons.

Methodology

Web-based instruction for economic development and validation will be achieved via two distinct steps; developing the tutor and validating the developed tutor. For the development, ADDIE model will be used while quasi-experimental design will be used for validation.

Development (ADDIE Model)

ADDIE Model (Analysis, Design, Development, Implementation, and Evaluation Model) is a framework that list generic process which instructional designers and training developers used in producing instruction. ADDIE Model was created in 1975 by the centre for educational technology, Florida State University for the U.S Army and then quickly adopted by all the U.S Arm Forces (Brandson, Raymer, Cox, Furman, King& Hannum,1975).ADDIE Model ,from the name has five phases, which are depicted in fig. 1.

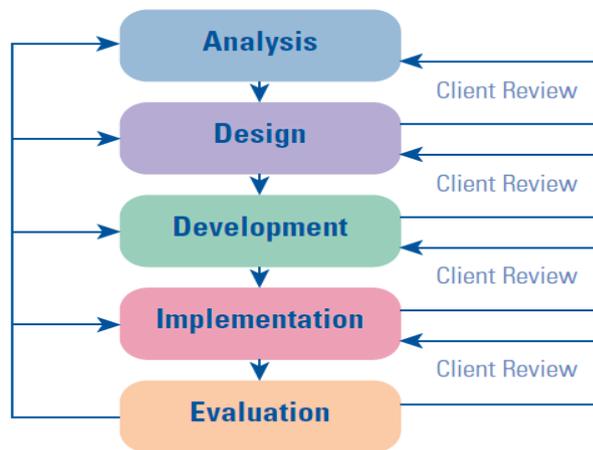


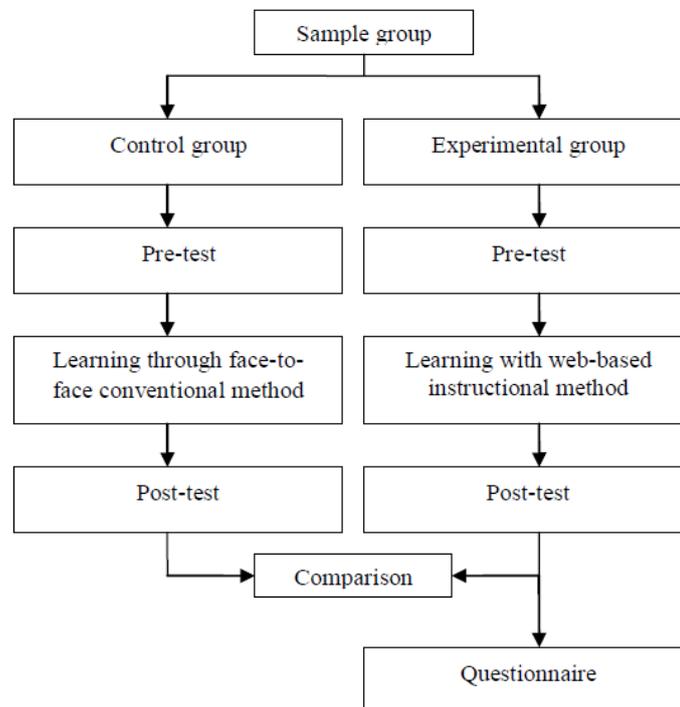
Fig. 1 ADDIE Model

1. *Analysis phase:* Analysis phase is the phase where developer determines what to be learned. In order to determine what is to be learned, the developer defines the problem, identify the sources of the problem and then proffer possible solutions. This can be achieve through conducting front end analysis such needs assessment, Task analysis and training situations analysis among others.
2. *Design phase:* In design phase, the developer specifies how the knowledge, skills and altitudes determined in analysis phase is to be learned. The developer achieve these objectives through developing test items, plan for instruction and identify resources (eg instructional materials), selecting a delivery system and sequencing the instruction among others.
3. *Development phase:* Development phase involve authoring and producing instructional materials in form of lecture notes, handouts, monographs or text books using the outputs of the design state.
4. *Implementation phase:* Implementation phase is the instructional delivery phase where teacher used the developed instruction to teach students.
5. *Evaluation phase:* In this phase, the developer determines the instructional effectiveness of the developed instructional material through summative evaluation. In summative evaluation the developer generates instructional data and uses it to find the efficacy of the instructional material. As can be seen from fig 1, evaluation take place at every phase of the model. This form of evaluation, which is referred to as formative evaluation help the developer to improve instruction before the implementation of the final product (instruction).

Validation

Design of the Study

Quasi-Experimental design will be used for the validation of the web-based instruction for economics students. The follow chart for the design is shown in fig. 2.



Source: Woottipong (2013)

Fig. 2 Flow chart for the experimental Design

Experimental Procedure

Both experimental and control group will be subjected to the same pre-test. Thereafter, the experimental group will receive instruction via internet while control group will receive face to face instruction with human teacher. Both experimental and control group will receive reshuffled test as post –test at the end of the treatment. A statistical tool, Analysis of Covariance will then be used to analyze the data collected during experimentation. All the major extraneous variables to the study will be controlled.

Participants

The study will be carried out in departments of economics education in Abia State College of Education (Tech) Arochukwu and Alvan Ikoku Federal College of Education, Owerri. The population of the study consisted of 67 economics students; 20 from Abia State College of Education (Technical) Arochukwu and 47 from Alvan Ikkoku Federal College of Education, Owerri.

Procedure

A simple nonrandomization technique was used where the study’s intact classes were divided into experimental and control groups at random through a toss of a coin labeled EG (experimental group) or CG (control group). 60 students were in the control group while 85 students were in the treatment group. Student’s ability group was determined using student’s achievement scores obtained from introduction to Economics in their first-semester course examination. Based on the ability group, the experimental group has n=85 students (low ability, n = 37; medium ability, n= 22; and higher ability, n = 26) and the control group (low ability, n =40; medium ability, n = 20; and higher ability, n = 25). Attending classes were mandatory for students. Research assistants also doubled as lecturers and technologists to ensure students’ active participation. Researcher organized a five-day workshop for technologists and lecturers on the training of WBI packages developed for the study. Hence, each training session lasted about an hour before the

commencement of the experiment. Initial knowledge of students’ academic achievement was determined using a pretest for both groups. After the pretest, an intervention was conducted on the treatment group and not included in the control group. The researcher developed a WBI package after taking into account the IDDIE model. The intervention package consists of a WBI lesson plan and WBI instruction manual developed by the researcher after review from a selected expert in the field of Economics. The package serves as a guide for the lecturer, technologist, and the students during the teaching and learning process such as instructional objectives, strategy, problem situations, instructional materials, students and teacher activities, assessment, instructional procedures for the students, experimental procedure, and group task activities. The WBI package was developed by the researcher. The treatment for the two groups lasted for ten weeks of 2 hrs per session.

Analysis

SPSS (version 23) was used to analyze the data, and the significance threshold for all tests was set at 0.05. An analysis of covariance (ANCOVA) was deemed adequate for determining the difference between the treatment’s initial effects on the dependent variable. Again, because the study involved pretest and posttesting, intact classes, the statistical technique used to analyze the hypothesis allowed the researcher to correct for the initial group difference. ANCOVA was used to compare the means of the two groups.

Results

Conducted Analysis of Variance (ANOVA) to determine whether there is a significant difference in the mean achievement scores on the Economics Achievement Test (EAT) between students exposed to WBI and those exposed to LM. Table 1 summarizes the results for students in the experimental and control groups. There was no baseline difference in EAT scores between the two groups at the time of the pretest ($F [2.145] = 3.516, P < 0.175$) (see Table 1). Post-intervention outcome revealed a significant increase from pretest to posttest ($F [2.145], 65.77 P < 0.001$) for the experimental group, whereas the control group showed no significant difference over the same duration. The post-posttest also showed a significant increase in EAT score (see Table 1).

Table 1: ANOVA summary statistic on computer programming student’s academic achievement.

Test	Treatment group (n=85) M ± SD	Control group (n=60) M ± SD	DF	F	Sig.
Pretest	25.27 ± 11.76	22.24 ± 7.03	(2.145)	3.516	0.175
Posttest	66.41 ± 11.402	55.28 ± 8.69	(2.145)	65.80	0.001
Retentio n	73.20 ± 8.71	57.66 ± 6.74	(2.145)	131.885	0.001

Table 2: Summary of ANOVA statistics of the experimental group with respect to ability level

Test	LA (n = 37) M ± SD	MA (n = 22)	HA (n = 26) M ± SD	df	f	Sig
Pretest	16.84 ± 1.22	23.45 ± 0.88	36 ± 1.62	(1.84)	78.435	<0.01
Posttest	46.24 ± 4.42	48.40 ± 3.22	49.64 ± 4.22	(1.84)	4.201	0.132
Retentio n	45.54 ± 1.54	48.94 ± 2.40	50.04 ± 5.53	(1.84)	4.032	0.101

M = mean; LA= low ability; MA= medium ability; HA= the higher ability; F = f-ratio; df = of freedom; SD = standard deviation.

According to the hypothesis, there is no significant difference in EAT scores between students with low-, medium-, and higher-ability levels exposed to WBI. As shown in Table 2, there was a considerable disparity in students’ achievement scores according to their ability level ($F [1.84] = 78.432, P < 0.001$); the pretest result ranges between low ($16.84 ± 1.22$), medium ($23.45 ± 0.88$), and higher ($36 ± 1.62$) students

using CPAT (see Table 2). However, in the posttest and retention scores, there was no substantial difference in achievement scores, according to the results. At posttest score, $F [1.84] = 4.201$, $P = 0.132$, with the following ability levels: low (46.24 ± 4.42) medium (48.40 ± 3.22), and higher ability (49.64 ± 4.22). At retention score, $F [1.84] = 4.032$, $P = 0.101$, with the following ability levels: low (45.54 ± 1.54), medium (48.94 ± 2.40), and higher ability (50.04 ± 5.53).

Discussion

The results revealed that students taught using Web Based Instruction (WBI) had higher achievement means scores in economics than those taught using LM (see Table 1). This finding is in line with Alasoluyi (2015) stating that the use of WBI in teaching improved academic achievement of student. Also, there is a significant difference as shown in Tables 2 between the mean academic score of students taught economics using WBI pedagogy and those taught using lecture methods. These findings support the view of Olelewe, Doherty, Orji, Aneyo (2021) that the traditional method of teaching can be improved with newer pedagogical approaches. Furthermore, the findings of this research work indicate that there is a notable disparity in the academic achievement of students who employed WBI methods, as opposed to the LM. Thus, these findings are consistent with those of Ikeda, Kijima, Kawabata, Fuchimoto, and Ito (2007), who found that using WBI methods aids students with low, average, and higher ability levels in math, meaning that there were significant differences in student performance at all three levels of ability. Daybell (2005) also found that using WBI enhanced student performance and helped in reducing diversity among students. Hence, as shown in Table 2, there was a considerable disparity in students' achievement scores according to their ability level. Perhaps, the findings of this study can be attributed to students being actively engaged in the learning activities associated with WBI. According to Heyneman and Lee (2014), the use of active learning strategies helped students in achieving mastery of the subject through critical thinking, problem-solving, and collaborative learning. Thus, with WBI pedagogy integration, teachers were able to maintain concentration and deep learning among the students which is why the treatment group outperformed the control group in economics

Conclusion

This study added to the body of knowledge by demonstrating the efficacy of WBI and LM on academic achievement and retention of students in economics. Based on the findings of this study, the study concludes that the use of Web based innovative pedagogy greatly enhanced undergraduate students' academic achievement and retention in economics. Hence, the need for WBI in teaching and learning of Economics in colleges of education is warranted since economics has to do with the understanding of business and management of economy which help to develop knowledge and skills necessary for employment, and a self-reliant and independent individual can effectively and efficiently start a business. Thus, economics science lectures are encouraged to employ Web based innovative pedagogical approaches that can be effectively combined to achieve active learning across learning experiences particularly in economics subjects at the colleges of education in Nigeria.

References

- Alasoluyi, O.E. (2015). Effect of Computer Assisted Instruction (CAI) on Students' Performance in Economics in Senior Secondary Schools in Ekiti State, Nigeria. Unpublished Master's Thesis, Department of Educational Foundations and curriculum, Ahmadu University, Zaria. Retrieved on 3rd July, 2020.
- Anunobi, V.N., Gambari, A.I., Abdullahi, & Alabi, T.O. (2016). Investigating the Effectiveness of Web-based Instruction on Junior Secondary School Students' Retention in Basic Technology in Nigeria. *Bulgarian Journal of Science and Education Policy (BJSEP)*, 10(2), 273-296.
- Banik, S. & Biswas, N.B. (2017). Effectiveness of Teaching Physics through Computer Assisted Instruction and Traditional Method at Higher Secondary Level. *International Journal of Advanced Education and Research*, 2 (5), 10-14.

- Brandson, R.K., Raymer, G.T., Cox, J.L., Furman, J.P., King, F.J. & Hannum, W.H. (1975). Interservice Procedures for instructional systems development (1-5) *TRADOC Pam 350-30.NAVEDTRA 106 A, Ft Monroe, VA U.S Army Training and Doctrine Command*
- Daybell J, (2005) “Interpreting letters and reading script: evidence for female education and literacy in Tudor England,” *History of Education*, vol. 34, pp. 695–715, 2005
- Ercan,O., Bilen, K & Bulut,A. (2014). The Effect of Web-based Instruction with Educational Animation Content at Sensory Organs Subject on Students' Academic Achievement and Attitudes. *Procedia - Social and Behavioral Sciences*, 116, 2430 – 2436.
- Erdogan, Y., Bayram,S & Deniz, L. (2008). Factors that Influence Academic Achievement and Attitudes in Web Based Education. *International Journal of Instruction*,1(1),31-48. +
- Fadli, F. (2013). Development of Web-based Instructional Model. International Conference on Education and Language 2013, UBL, Indonesia.
- Hariadi, B, M.J.S. Dewiyani & Sudarmaningtyas, P. (2016). Development of Web-Based Learning Application for Generation Z. *International Journal of Evaluation and Research in Education (IJERE)*,5(1),60- 68.
- Heyneman S and Lee B, “ Thee impact of international studies of academic achievement on policy and research,” *Handbook of International Large-Scale Assessment: Background, Technical Issues and Methods of Data Analysis*, pp. 37–72, Chapman and Hall/CRC, Boca Raton, FL, USA, 2014
- Horzum, M.B.(2012). The Effect of Web- based Instruction on Students’ Web Pedagogical Content Knowledge, Course Achievement and General Course Satisfaction. *Çukurova University Faculty of Education Journal*,41 (1),36-51.
- Ikeda Y, Kijima K, Kawabata K, Fuchimoto T, and Ito A, (2007) “Relationship between side medicine-ball throw performance and physical ability for male and female athletes,” *European Journal of Applied Physiology*, vol. 99, pp. 47–55, 2007.
- Nazimuddin, SK. (2015). Computer Assisted Instruction (CAI): A New Approach in the Field of Education. *International Journal of Scientific Engineering and Research (IJSER)*,3(7),185-188.
- Nwanne,S.C.& Agommuoh, P.C. (2017). Computer Assisted Instruction (CAI) on Students’ Interest and Achievement in Physics in Imo State, Nigeria. *IOSR Journal of Research & Method in Education (IOSR-JRME)*, 7(3), 53-58
- Ode, D. (2018). Effects of Computer–Assisted Instruction on Secondary School Students’ Academic Achievement in the Learning of Government as a Subject. *International Journal of Education (IJE)*,.6 (2), 39-44.
- Olelewe C, Doherty F, Orji C, and Aneyo I, (2021) “Effects of innovative pedagogy integration in electrical installation and maintenance works in Enugu and Lagos states technical colleges,” =e *International Journal of Electrical Engineering & Education*, Article ID 0020720921997051, 2021.
- Pilli,O. (2008). The Effects of Computer-Assisted Instruction on the Achievement, Attitudes and Retention of Fourth Grade Mathematics Course. Doctoral Theses, Department of Educational Science, Middle-East Technical University. Retrived on 3rd July, 2020

- Suwantarathip, O. S. & Wichade, S. (2014). The Effects of Collaboration Writing Activity Using Google Docs on Students' Writing Abilities, *TOJET: The Turkish Online Journal of Educational Tehnology*, 13(2), 148-156,
- Turo, P.T. (2015). Computer Assisted Instruction (CAI) and Students Interest as Determinant Of SSII Chemistry Students' Achievement in Chemical Equilibrium in Rivers State. *IOSR Journal of Applied Chemistry (IOSR-JAC)*, 8(1), 50-56.
- Uparimpanich, N. (2008). *Web-based Instruction for Introduction to French Phonetics of Students at 10th Grade: A case Study at Boscopitak School, Thailand*. Unpublished Master's Thesis. Mahidol University.
- Woottipong, K. (2013). The Development of Web-Based Instruction in English Paragraph Writing for Undergraduate University Students. *Malaysian Journal of ELT Research*, 9(2), 49-81.
- Yusuf, M.O. & Afolabi, A.O. (2010). Effects of Computer Assisted Instruction (CAI) on Secondary School Students' Performance in Biology. *TOJET: The Turkish Online Journal of Educational Technology*, 9(1), 62-69.