

Comparative Effects of Computer Assisted Instructions on Students' Academic Achievement and Retention in Radio Television and Electronic Works in Technical Colleges in Lagos State

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ABSTRACT

The study investigated the comparative effects of Computer- Assisted Instruction on students' achievement and retention in Radio Television and Electronic Works in Technical Colleges in Lagos State. Two research questions and two research hypotheses guided the study. The study adopted quasi- experimental research design. The instrument used for data collection are Radio Television Electronic Works Assessment Sheet (RTVEWAS) and Retention Test on Radio Television and Electronic Works (RTRTVEW) developed for the study whose reliability obtained using Guttman Split-Half Coefficient whose coefficient value was 0.805. And the sample of the study comprises of one hundred and eleven (111) students which was drawn from three Technical Colleges as follows: Government Technical College (GTC) Agidingbi (computer drill and practice) – thirty three (33), Federal Science and Technical College (FSTC), Yaba- forty three (43)(Computer Tutorial) and Government Technical College (GTC) Adosoba (Demonstration method) –thirty- five (35) students. The data collected was analysed using mean and standard deviation in order to answer the research questions while ANCOVA was used to test the hypothesis. The research findings revealed that there is significant relationship between the mean achievement scores of students taught RTVEW using Computer Tutorial, drill and practice and

those taught using demonstration methods in Technical colleges in Lagos State and there is significant relationship between the retention ability of students taught RTVEW using computer tutorial, drill and practice and those taught using demonstration method in Technical colleges in Lagos State.

Keywords: Technical College, Computer- assisted instruction, Achievement, Retention

I. BACKGROUND OF THE STUDY

In recent years, teaching has been a noble profession that requires skillful, creative and innovative teacher that would expand the horizon of knowledge in the environment of learning to the younger generations through teaching, researching and educative workshop/seminar (Galle, 2021). Teaching methods must be changed to reflect a modern society mandating the need for functioning, thinking-oriented, decision-making students. Even thought, with the advancement in computer technology has made the process of teaching and learning more enjoyable through Information and Communication Technology (ICT) tools. Such tools provide both students and teachers with more opportunities than before adapting learning and teaching to individual needs and the society at large (Mikre, 2011). Computer Assisted Instruction (CAI) is considered as one important information and communication technology tool available for teachers to promote effective learning and thereby

creating interest, retention, and achievement in the concept taught. Learners visualize something which cannot be seen easily in the real world; it helps to clarify relationships through visual means; and it helps students to understand the inner life and movement of an object (Ainsworth, 2008; Weiss, Knowlton, & Morrison 2012 in Galle, 2021).

Computer-assisted instruction is now more prevalent and has become a trend (Wang, Yang, & Umoren, 2012 in Galle, 2021). Computer programs are interactive and can illustrate a concept through attractive animation, sound, and demonstration. These allow students to progress at their own pace and work individually or problem solve in a group. Computers provide immediate feedback, letting students know whether or not their answer is correct. Computer-assisted instruction in teaching has produced many positive effects. And computer assisted instruction comprises of computer tutorial, computer drill and practice, computer simulation and many others. Brummer (2014) used Computer-assisted instruction to obtain interesting positive results in teaching and learning activities in various science and science-based courses. It can be of tremendous benefits to students learning one trade to another in Technical Colleges, including a trade like Radio Television and Electronic works.

Technical colleges is a specialized institution of learning where trades and modular courses are offered in addition to general education and science subjects. Umunadi, (2013) emphasized that the main objectives of technical college education is to make students familiar with most important branches of production in industry, commerce, imparting of skills and practical competencies in the handling of tools, materials and generally equipping the students with both theoretical knowledge and work habits. Technical colleges provide the youth with vocational competencies needed in various disciplines required in the world of work. It also provide technical and vocational training for quite a number of occupations including wood work, metalwork, mechanical engineering craft practice, electrical installation, radio and television Electronic work, refrigeration, carpentry and joinery, furniture making, bakery, metal fabrication, tailoring, dress making typing, shorthand, accounts, spinning, weaving, dyeing and bleaching, vocation, carpentry and joinery, furniture making, bakery, metal fabrication, vocational agriculture, agricultural machine work and home economics (Olaitan, 1996 in Galle, 2021). The duration of training is three years, leading to the award of National Technical

certificate. Also available in some technical colleges are advance course leading to the award of Advanced National Technical Certificate (ANTC) or Advanced National Business Certificate (ANBC) in the various field of study (NBTE, 2003). Thus, knowledge acquired from these technical trade could help the graduates to secure gainfully employment Electronic industry.

Achievement can be defined as any effort which is of significance and value to a particular program, but averagely difficult, which is undertaken successfully through knowledge, skills and experience. Anekwe in Adejoh (2015) described achievement as something which has been accomplished through exertion, skills, practice and perseverance. Uwalaka (2013) conceptualized achievement as something very good but difficult, which is carried out successfully. Achievement is the ability to function effectively, respond quickly or perfectly to a given task. Thus to achieve is to accomplish a task with skill. Achievement describes the level of success concerning a task that is carried out. Academic achievement is the output of an instructional process. However, retention of learning is simply the ability to remember what has been learnt.

Eze, Ezenwafor and Obidile (2016) stated that retention is the ability to retain the knowledge of what is learnt and to be able to recall it when it is required. Retention scores indicate the percentage or degree of originally learned skill that is remembered or recalled as a function of elapse time. Retention is usually measured in collaboration with academic achievement. It is therefore seen as the achievement on a subject after a certain period of time. Retention helps in knowledge development. Knowledge development can be guaranteed when effective teaching methods are used in the teaching and learning process. In essence, comparing effect of using two or more teaching methods such as computer tutorial, drill and practice and demonstration methods may definitely develop students' retention ability as well as improve academic achievement of RTVEW students in Technical colleges in practical activities, provided that the teaching resources are available and accessible.

Statement of the problem

Learning outcome of every student majorly depends on the type of teaching methods, teaching strategies and instructional techniques or approaches employed by the teacher during instruction. The conventional teaching method termed to be teacher centered instead of students

centered slows down creativity and disallowed students from thinking beyond what is presented to them by their teachers. With constant changes and inflow of modern devices and systems, if technical teachers and students don't adapt to the use of computer interface learning so as to align with a replica of actual working environment after school, there will be likelihood for the continual production of incompetent craftsmen in the labour market, thus leading to devaluation of manpower requirement in the present-day economy as against not meeting up with the standard of the modern-day technology. And the poor academic achievement of the students on Radio Television Electronics Works (RTVEW) in NABTEB examination in the State call for attention as RTVEW has suffered negligence over the years in Lagos State such that the Technical colleges in Lagos State have not gotten all the needed support, therefore call for investigation into the causes of such negligence. This need for up-to-date skills acquisition so as to overcome the poor academic achievement of the students guide the inclusion of computer tutorial, drill and practice to complement demonstration methods of teaching RTVEW students so as to help students improve in their academic achievement and retain certain level of proficiency before graduation. To what extent can the comparative effect of computer assisted instructions affect students' academic achievement and retention in Radio Television and Electronic works in Technical colleges in Lagos State?

Purpose of the Study

1. Mean score effect of the interaction between academic achievement of students taught using computer tutorial, drill and practice and those taught using demonstration method in RTVEW in Technical colleges in Lagos State.
2. Mean score effect of the interaction between retention ability of students taught using computer tutorial, drill and practice and those taught using demonstration method in RTVEW in Technical colleges in Lagos State.

Research Questions

1. What are the mean score effect of the interaction between academic achievement of students taught using computer tutorial, drill and practice and those taught using demonstration method in RTVEW in Technical colleges in Lagos State?
2. What is the mean score effect of the interaction between retention ability of students taught using computer tutorial, drill and practice and

those taught using demonstration method in RTVEW in Technical colleges in Lagos State?

Research Hypotheses

The following null hypotheses was tested at 0.05 level of significance to guide the study:

1. There is no significant relationship between the mean performance scores in academic achievement of students taught RTVEW using Computer Tutorial, drill and practice and those taught using demonstration methods in Technical colleges in Lagos State.
2. There is no significant relationship between the retention ability of students taught RTVEW using computer tutorial, drill and practice and those taught using demonstration method in Technical colleges in Lagos State.

II. METHODOLOGY

The study adopted pre-test, post-test non-equivalent control group quasi-experimental research design. Specifically the non-randomized control group designed involving two groups control and experimental groups. The study was conducted in three technical colleges in Lagos State, precisely 35 respondents from Government Technical College (GTC) Adosoba, with 33 respondents from Government Technical College (GTC), Agidingbi and Federal Science and 43 respondents from Technical College (FSTC), Yaba. Population of the study was 111. There was no sampling of subjects as the entire population from the three Technical colleges offering the trade was involved in the study. The instrument used for data collection are Radio Television Electronic Works Assessment Sheet (RTVEWAS) and Retention Test on Radio Television and Electronic Works (RTRTVEW) developed for the study. The instrument was validated by three experts in the school of Technical Education. The reliability of the instrument was obtained from Guttman Split-Half Coefficient whose coefficient value was 0.805. The data collected was analysed using mean and standard deviation in order to answer the research questions while ANCOVA was used to test the hypothesis.

III. RESULTS PRESENTATION

Research Question One: What are the mean score effect of the interaction between academic achievement of students taught using computer tutorial, drill and practice and those taught using demonstration method in RTVEW in Technical colleges in Lagos State?

Data for answering the research question three are presented below

Table 1

The mean score effect of the interaction between academic performance of students taught using computer tutorial, drill and practice and those taught using demonstration method in RTVEW in Technical colleges in Lagos State

Treatment	Pre- Test N	Pre- Test Mean	Test Standard deviation	Post- Test Mean	Post Test Standard deviation	Mean Achievement Gain
Computer Tutorial	43	34.23	10.191	67.53	13.752	33.3
Drill and practice	33	28.48	9.786	51.76	11.435	23.28
Demonstration Method	35	31.54	6.195	44.23	11.228	12.69

In the Table 1 above which showed that the computer tutorial method whose pre- test and post- test mean scores are 34.23 and 67.53 while their standard deviations are 10.191 and 13.752 respectively. The computer drill and practice method whose pre- test and post- test mean scores are 28.48 and 51.76 while their standard deviations are 9.786 and 11.455 respectively. The demonstration method however have pre- test and post- test means score of 31.54 and 44.23 while their standard deviations are 6.195 and 11.228 respectively. Therefore, the mean achievement gain for the computer tutorial method was 33.3 while the computer drill and practice method was 23.28 and the demonstration method was 12.69; indicating

that highest academic performance effect was obtained by using computer tutorial followed by computer drill and practice method over the demonstration method in the teaching and learning of Radio Television and Electronic works in Technical Colleges in Lagos State.

Research Question Two: What is the mean score effect of the interaction between retention ability of students taught using computer tutorial, drill and practice and those taught using demonstration method in RTVEW in Technical colleges in Lagos State?

Data for answering the research question six are presented below

Table 2

The mean score effect of the interaction between retention ability of students taught using computer tutorial, drill and practice and those taught using demonstration method in RTVEW in Technical colleges in Lagos State

Treatment	Retention N	Retention Mean	Retention Standard deviation	Post- Test Mean	Post Test Standard deviation	Mean Achievement Gain
Computer Tutorial	43	65.02	12.347	67.53	13.752	2.51
Drill and practice	33	49.58	9.679	51.76	11.435	2.18
Demonstration Method	35	41.83	10.051	44.23	11.228	2.40

Table 2 above showed that the computer tutorial method produced the retention mean score and standard deviation values of 65.02 and 12.347 respectively while computer drill and practice method produced the retention mean score and standard deviation values of 49.58 and 9.679 respectively. The demonstration method

however have retention means score and standard deviation of 41.83 and 10.051 respectively. Therefore, the mean achievement gain in the retention level for the computer tutorial method was 2.51 while computer drill and practice method was 2.18 and the demonstration method was 2.40, indicating that computer tutorial have the highest

retention ability level followed by the demonstration method over the computer drill and practice method with least students' retention in the teaching and learning of Radio Television and Electronic works in Technical Colleges in Lagos State.

Research Hypothesis One: There is no significant relationship between the mean achievement scores of students taught RTVEW using Computer Tutorial, drill and practice and those taught using demonstration methods in Technical colleges in Lagos State.

Table 3

ANCOVA Analysis of the Students' Achievement using computer tutorial method, computer drill and practice method and those taught using demonstration method in Technical colleges in Lagos State.

Tests of Between-Subjects Effects						
Dependent Variable: Post-Test Achievement Scores computer tutorial, drill and practice and demonstration						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	21352.914 ^a	3	7117.638	122.899	0.000	0.775
Intercept	3445.313	1	3445.313	59.490	0.000	0.357
Pre-Test Achievement Scores computer tutorial, drill and practice and demonstration	10216.096	1	10216.096	176.400	0.000	0.622
Treatment group	7901.288	2	3950.644	68.215	0.000	0.560
Error	6196.834	107	57.914			
Total	369402.000	111				
Corrected Total	27549.748	110				

a. R Squared = .775 (Adjusted R Squared = .769)

Table 3 shows that computer tutorial method, computer drill and practice method and demonstration method as the main effect is significant to students' academic achievement in Radio Television and Electronic Works (RTVEW). This is revealed by the calculated F-value of 176.400 and p-value of 0.000 is less than 0.05. Therefore, the null hypothesis of no significant difference is rejected. This indicates that there is significant relationship between the mean achievement scores of students taught RTVEW

using Computer Tutorial, drill and practice and those taught using demonstration methods in Technical colleges in Lagos State.

Research Hypothesis Two: There is no significant relationship between the retention ability of students taught RTVEW using computer tutorial, drill and practice and those taught using demonstration method in Technical colleges in Lagos State.

Table 4

ANCOVA Analysis of the Students' retention ability using computer tutorial method, drill and practice method, and those taught using demonstration method in Technical colleges in Lagos State.

Tests of Between-Subjects Effects						
Dependent Variable: Pre-Test Achievement Scores computer tutorial, drill and practice and Demonstration						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6025.522 ^a	4	1506.380	48.055	0.000	0.645
Intercept	.136	1	0.136	0.004	0.948	0.000
Post-Test Achievement of computer tutorial, drill and practice/ Demonstration	294.729	1	294.729	9.402	0.003	0.081

Retention Score	ability 0.399	1	0.399	0.013	0.910	0.000
Treatment group	1200.380	2	600.190	19.147	0.000	0.265
Error	3322.803	106	31.347			
Total	120720.000	111				
Corrected Total	9348.324	110				

a. R Squared = .645 (Adjusted R Squared = .631)

Table 4 shows that computer tutorial method, computer drill and practice method and demonstration method as the main effect are significant to students' retention in Radio Television and Electronic Works (RTVEW). This is revealed by the calculated F-value of 9.402 and p-value of 0.003 is less than 0.05. Therefore, the null hypothesis of no significant difference is rejected. This indicates that there is significant relationship between the retention ability of students taught RTVEW using computer tutorial, drill and practice and those taught using demonstration method in Technical colleges in Lagos State.

IV. DISCUSSION OF THE FINDINGS

The result of the findings revealed that the mean achievement gain for the computer tutorial method was 33.3 while the computer drill and practice method was 23.28 and the demonstration method was 12.69; indicating that highest academic performance effect was obtained by using computer tutorial followed by computer drill and practice method over the demonstration method in the teaching and learning of Radio Television and Electronic works in Technical Colleges in Lagos State. This indicates that there is significant relationship between the mean achievement scores of students taught RTVEW using Computer Tutorial, drill and practice and those taught using demonstration methods in Technical colleges in Lagos State. The result of this study is in agreement with the findings of Ada, Anyachebelu and Chinyelu (2012); Madjoub (2013) who found and reported that there was significant difference in the performance of students taught by CAI and lecture method. Miandoab, Mostafaei and Ghaderi (2012) in Galle (2021) reported that there was statistically significant difference between the mean achievement gain of students taught Economics using computer-assisted instructional approach (Course-lab 2.4 eLearning Package) and those students taught with conventional instructional method (conventional instructional tools). Contrary to the above finding, the result is contrary to the previous finding of Bayraktar (2008) who could not find any significant difference between the

students exposed to CAI and those exposed to lecture method.

Additionally, the mean achievement gain in the retention level for the computer tutorial method was 2.51 while computer drill and practice method was 2.18 and the demonstration method was 2.40, indicating that computer tutorial have the highest retention ability level followed by the demonstration method over the computer drill and practice method with least students' retention in the teaching and learning of Radio Television and Electronic works in Technical Colleges in Lagos State. This indicates that there is significant relationship between the retention ability of students taught RTVEW using computer tutorial, drill and practice and those taught using demonstration method in Technical colleges in Lagos State. The results are in compliance with that of Nnaobi (2013) which earlier showed that computer-aided instruction can sustain students' interest, encourage them to participate actively in the lesson and help them to retain the learnt concepts for a long time.

V. CONCLUSION

Conclusively, the study attempted to find out how the comparative effects of computer assisted instruction on the students' achievement and retention in Radio Television and Electronic Works (RTVEW) in Technical colleges in Lagos State. And it was discovered that there was significant relationship between the mean achievement scores of students taught RTVEW using Computer Tutorial, drill and practice and those taught using demonstration methods in Technical colleges in Lagos State. Additionally, there was significant relationship between the retention ability of students taught RTVEW using computer tutorial, drill and practice and those taught using demonstration method in Technical colleges in Lagos State.

VI. RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made for positive academic achievement and retention of the students in RTVEW:

- The students should be delighted to learn through the use of computer tutorial for better academic achievement thereby able to retain the learnt concepts in the trade.
- The students should be ready to learn through the usage of computer drill and practice packages available for school learning in order to be relevant in the 21st century both to themselves and their world at large including the Technical Colleges in Lagos State;
- The conventional method of teaching and learning practical lessons should be supported with the computer- aided instruction in order to strengthened the networking of learning from the schools to the industries where the students marry what learnt in the school to the world of work, thereby, providing feedback on areas where adjustment needed to be made in order to prepare students toward the needs out there in the society;
- The government, school administrators and teachers should support the use of computer aided instructions for the teaching of the lessons in the Technical Colleges thereby making it possible to train students that will be computer literate in RTVEW thereby encouraging more students to enroll into the trade in the Technical Colleges in Lagos State.

REFERENCES

- [1]. Ada, F. M., Anyachebelu, S. A., &Chinyelu, J. G. (2012). The effect of computer-assisted instruction (CAI) package on the performance of senior secondary students in mathematics. Retrieved on April 20, 2014 from http://www.sri.com/policy/csted/reports/sandt/it/Kulik_ITinK-12_Main_Report.pdf
- [2]. Adejoh, I .S. (2015). Effects of group investigation and jigsaw instructional techniques on secondary school students' achievement and transferability in Economics in Kogi state, Nigeria; An unpublished M.Ed dissertation of the University of Nigeria Nsukka.
- [3]. Ainsworth, S. (2008). How do animations influence learning:Robinson, D.H. &Schraw, G. (Eds.).Recent innovations in educational technology that facilitate student learning. (pp. 37-67). Charlotte: InformationAge Publishing and Solomon publishing COY LTD.
- [4]. Bayraktar, E. A. (2008). Role of interactive multimedia for enhancing students' achievement and retention. International Women Online Journal of Distance Education, 2 (3). Retrieved on June 30, 2014 from http://www.wojde.org/FileUpload/bs295854/File/02_23.pdf
- [5]. Brummer, L. (2014). Equipping foundation-phase learners for successful Computer-assisted instruction.Unpublished M.Ed thesis, University of South Africa.
- [6]. Eze, T. I. Ezenwafor J. I &Obidile I J. (2016) Effects of problem-based teaching method on students' academic performance and retention in financial accounting in technical colleges in Anambra state. Scholar Journal of Arts, Humanities and Social Sciences, 4(6A), 634-639.
- [7]. Galle, S. A. (2021). Effect of Computer-Assisted Instruction on Senior Secondary School Economics Students' achievement and Interest in Nasarawa State, Nigeria. Unpublished Doctorate thesis from Educational Measurement and Evaluation Department, Nasarawa State University.
- [8]. Madjoub, M. B. (2013). Computer assisted instruction on the achievement of basic school students in pre-technical skills. Retrieved on November 2, 2015 from https://www.academia.edu/6589553/Effect_of_Computer_Assisted_Instruction_on_the_Achievement_of_Basic_School_Students_in_Pre-Technical_Skills
- [9]. Mikre, F. (2011). The roles of information communication technologies in education: review article with emphasis to the computer and internet.Ethiopia Journal of Education and Science,6(2), 1-16.
- [10]. Nnaobi, B. C. (2013). Enhancing students' performance using computer-aided instruction (CAI) in tertiary institutions in Rivers State. Retrieved on April 7, 2014 from http://www.concentric.net/walwpr/thesis/ref_list.html#kearsle
- [11]. Umunadi, E, K, (2013). Functional vocational and technical education curriculum for sustainable youth empowerment in Nigeria. European Centre for Research Training and Development UK 1(1), 7-13,
- [12]. Uwalaka, A. J. (2013). Effect of constructivist teaching method on students' achievement in French listening

- comprehension in Owerri North Local Government area: Unpublished master's dissertation) University of Nigeria, Nsukka, Nigeria.
- [13]. Wang, A. R., Yang. Y, &Umoren.E.(2012). A computer assisted instruction system with a vision-based interactive interfacefor children. International Journal of Humanities and Arts Computing 6.1-2 (2012): 172-183.
- [14]. Weiss, R.E., Knowlton, D.S. & Morrison G.R. (2012). Principles for usinganimation in computer based instruction: theoretical heuristics for effectivedesign. Computers Human Behaviour, 18, 465-477.