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EFFECT OF INTELLIGENT TUTOR INSTRUCTIONAL STRATEGY ON STUDENTS' ACADEMIC ACHIEVEMENT IN WINDING OF ELECTRICAL MACHINES IN TECHNICAL COLLEGES IN IMO STATE

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Abstract
The study was carried out to investigate the effect of intelligent tutor instructional strategy on students' winding of electrical machines achievement in technical colleges in Imo State. The population of the study was 64 students in National Technical Certificate (NTC) 11. All the 64 students in National Technical Certificate (NTC) 11 was used in the study without sampling because their population size was considered manageable. The design of the study was quasi-experimental. The 64 students in National Technical Certificate (NTC) 11 used in the study were divided into experimental and control groups. Experimental group were taught with intelligent tutor instructional method while the control groups were taught with discussion and guided discovery method of instructions. The instrument used for data collection for the study was a self-structured Winding of Electrical Machines Achievement Test (WEMAT). The instrument was face and content validated by three experts. Three research questions and three hypotheses were raised. Mean statistics and standard deviation were used to answer the research questions, while Analysis of Variance (ANOVA) was used to test the null hypotheses at 0.05 level of significance. The research findings indicate that there is significant difference between the mean performance of students in the experimental group than those students in the control groups. Students taught with Intelligent Tutor instructional strategy performed better than those students exposed to discussion and guided discovery methods of instruction. Based on the findings, it was recommended among others that government should provide adequate number of computers in technical colleges so that teachers can effectively delivers their lesson using the Intelligent Tutor instructional strategy, vocational education teachers should use the Intelligent Tutor instructional strategy to teach vocational related trades in technical colleges.

Keywords: Intelligent tutor, instructional strategy, achievement.

Introduction

Technical colleges is a segment of Technical and Vocational Education and Training (TVET) which is designed to produce craftsmen at the post-primary school level and master craftsmen at the advanced craft level. According to National Board for Technical Education (NBTE, 2015) technical colleges are institutions where students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work. The courses offered at the technical colleges that can help students to acquire relevant knowledge and skills in different occupation normally leads to the award of National Technical Certificate (NTC) and Advance National Technical Certificate (ANTC). The curriculum programmes of technical colleges according to Federal Republic of Nigeria (2013) are grouped into related trades. Electrical Installation and Maintenance Work (EIMW) is one of the trades offered in technical colleges in Nigeria. Kamalu and Taiwo (2019) described EIMW as electrical engineering trade offered in Nigerian technical colleges which has Battery Charging and Maintenance, Domestic Installation, Industrial Installation, Cable Jointing, Solid Devices and Winding of Electrical Machines as its related trades.

The general objectives of winding of electrical machines trade includes, that students should be able to acquire skills for preparation and interpretation of winding drawings, acquire skills for dismantling machines and equipment and test for continuity among others (National Board for Technical Education (NBTE) Syllabus, 2015). The realization of the above stated objectives demands the use of high-quality instructional methods by vocational teachers in technical colleges in order to effectively deliver their lesson. Briggs (2021) defined instructional strategy as techniques used by qualified teachers to effectively deliver his/her lesson during the period of teaching and learning in order to achieved educational objectives.

According to Okpara and Echetama (2022) as vital as instructional strategy on attainment of educational objectives during teaching and learning process many vocational teachers has continue to use only the conventional methods of teaching in developing skills among technology education students. Okpe (2021) observed that the conventional methods of teaching commonly used by technology education teachers in technical colleges in training their students have failed to yield the desired results. According to Bafarawa (2018) the continuous use of conventional methods of teaching such as discussion, lectures, demonstration, guided discovery and other related methods of teaching as the only teaching methods that vocational education teachers will be adopted during teaching and learning process has resulted to students' poor performance in technical related trades in technical colleges. Similarly, Ugwu and Kio (2022) noted that the continuous use of conventional methods of teaching do not enhances students' acquisition of skills and development of self-concept as well as interest in learning, it may rather make it difficult for the students to develop the right habit of job performance. So, there is an urgent need for the introduction of new instructional process in technical colleges in Nigeria as implied in developed counties of the world.

At present the average school age child spends much time to play video games, watch television and explore other electrical media devices, including the use of mobile phones (Rumoro, 2018). There exploration and manipulation according to Rumoro (2018) is a great development in education which have further stimulated interest and created enabling environment for learning to take place anytime and anywhere without the presence of a teacher. According to Kufor (2019) problem based, context based and field trip teaching methods are significant predicators of technical skills among vocational education students. The view of the foregoing authors reviews the fact that the emergence of Information and Communication Technology (ICT) have created a knowledge-based society that have changed the global economy and the standard of education in developed countries of the world at present. Moreover, it is important that learners should have access to education anywhere and anytime without the presence of a teacher. Information and Communications Technology (ICT) instructional method such as the use of Intelligent Tutor method can effectively be used for instruction anytime and anywhere by the students on their own and can make instruction available and accessible to learners (Williams, 2022).

Intelligent Tutor according to Brown (2021) is a computer-based simulation-based learning approach that assists students to learn and experience the effect of different action in a variety of situation. Amankwa (2023) viewed Intelligent Tutor as a software application that uses adaptive electronic technology in personalized instruction delivery. The goals of an Intelligent Tutor according to Morgan (2018) is to provide personalized Computer-Based Instruction to students without a human teacher been present at the classroom. The difference between intelligent tutor methods of teaching and the conventional methods of teaching is that the Intelligent Tutor uses adaptive electronics technology in personalized instruction delivery without the involvement of a human teacher while in conventional methods of teaching the presence of a human teacher is always required (Sang, 2019).

Several studies such as (Kamalu and Taiwo, 2019; Ugwu and Kio, 22) have shown that over the years, considerable progress have been made in different developed countries of the world in the use of Intelligent Tutor in different educational programmes. According to Briggs (2021) in advanced countries (such as Brazil, Japan, America, Great Britain among others) the use of Intelligent Tutor in assisting

students to learn on their own has been greatly explored at all levels of education from basic education up to the tertiary education and has proved to be successful. Intelligent Tutor method of instruction in science and technology related areas encourages learners to be actively involves in finding out on their own the procedure, principles and concepts involved in any topic, this subsequently assist the learners to carryout problem-solving on their own in any topic (Morgan, 2018). Kufor (2019) stated that Intelligent Tutor instructional method is meant for the self-development and sustainability enables leaner to identify an objective plan for its actualization. Howe (2023) noted that Intelligent Tutor instructional strategy has led to the empowerment in students' comprehension, engagement, altitudes, motivation and better academic result which has all contributed to the ongoing interest in the investment in research on educational programme all over the globe. According to Okpara and Echetama (2023) Intelligent Tutor instructional strategy which uses adaptive electronic technology in personalized instructional delivery usually attracts most students' attention during teaching and learning to a better academic achievement.

Academic achievement according to Bafarawa (2018) relates to what somebody has succeeded in doing, usually efforts, skill or courage, and a level of knowledge attained. In an academic setting academic achievement connotes performance in school subject as symbolized by a score or mark on test or examination. In the context of this study, academic achievement is the score or mark achieved by EIMW students on examination. Academic achievement is usually centered on the attainment of the objectives of the content of the study. During teaching and learning process the objectives usually cover three domains of learning which include cognitive, psychomotor and affective education domains. The significant difference in academic achievement of students due to methods of teaching usually adopted by teachers in science and technology related areas have been a source of concern to science and technology educators and researchers. The Federal Ministry of Education in her report on TVET institutions cited in Ugwu and Kio (2022) revealed that students are always put-off or not been interested and motivated in VTE because of the non-motivating and unchallenging methods and approach teachers of technology education usually adopt to teach the students. Therefore, a viable method of instruction that will motivate and stimulate and as well enhance teaching and learning process in technology related trades needed to be adopted by teachers of technology at all levels of education in Nigeria. It is on this view that the researchers want to investigate the effect of Intelligent Tutor instructional strategy on students' academic achievement in Winding of Electrical Machines in technical colleges in Imo State.

Statement of the Problem

There is a general concern over the low performance of technical college graduates, most especially those of vocational trade who cannot cope with the world of work. The goal of Electrical Installation and Maintenance Work Trade which include areas in Domestic Installation, Industrial Installation, Battery Charging and Winding of Electrical Machines among others in technical colleges in Nigeria according to National Board For Technical Education (2018) is to provide training that can lead to the production of skilled personal like craftsmen and instructors who could either secure employment at the end of their training, set up their own business or further their studies in advance higher technical institutions. Contrary to achieving the above goals, majority of students according to Briggs (2021) had completed their programme in technical colleges with very poor academic performance and inadequate skills which is incapable of earning them a living after graduation from the school. According to Chief Examiner National Technical Certificate Examination (2023) the decline in students' academic performance among others is due to the poor methods of teaching used by teachers of technology which do not motivate the students to actively be involved during teaching and learning process. Therefore, in order to seek for a better alternative instructional strategy for the teaching and learning of winding of electrical machines, the study is poised to investigate the effects of Intelligent Tutor instructional strategy on students' winding of electrical machines achievement in technical colleges in Imo State.

Research Questions

The following research questions were posed to guide the study:

1. What is the outcome of using Intelligent Tutor instructional strategy on students' academic achievement when taught procedures for making wave winding in Imo State technical colleges?
2. What is the outcome of using Intelligent Tutor instructional strategy on students' academic achievement when taught how to dismantle machines for rewinding operation in Imo State technical colleges?
3. What is the outcome of using Intelligent Tutor instructional strategy on students' academic achievement when taught how to test for continuity and insulation resistance using a megger test set in Imo State technical colleges?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant difference in the mean score of students' taught procedures for making wave using Intelligent Tutor instructional strategy and those taught using traditional discussion method and guided discovery method of teaching in Imo State technical colleges.
2. There is no significant difference in the means score of students taught how to dismantle machine for rewinding operation using Intelligent Tutor instructional strategy and those taught using traditional discussion method and guided discovery method of teaching in Imo State technical colleges.
3. There is no significant difference in the mean score of students taught how to test for continuity and insulation resistance using a meggers test set using Intelligent Tutor instructional strategy and those taught using traditional discussion method and guided discovery method of teaching in Imo State technical colleges.

Methodology

The study adopted quasi-experimental design. According to Nworgu cited in Amakiri and Onyagiri (2021) quasi-experimental design is a research design used when participants are not randomly assigned to groups, with measurements taken before and after the intervention. Six lessons of winding of electoral machines were prepared by the researchers based on 2024 NBTE syllabus, lesson topics included, types and uses of tools in winding work, preparation and interpretation of simple wave winding drawing, skills for dismantling machines for rewinding, types of conductors used in winding, methods of connecting winding using the prepared data and testing for continuity and insulation resistance using megger or bridge test instrument.

The population of the study comprised of 64 Electrical technology students in National Technical Certificate (NTC) in the two selected technical colleges in Imo State with adequate ICT facilities to carry out the study which include GTC Owerri and GTC Ahiara. The study adopted a census sampling technique this is because the population is of manageable size. Out of the 64 students used in the study 24 students' comprising 12 students from each school was assigned to experimental group while the remaining 40 students' (20 students' each from each school was assigned to control groups comprising traditional discussion method and guided discovery method groups). The choice of National Technical Certificate (NTC) year II students is based on the selected topics for the study which falls within National Technical Certificate (NTC). II Electrical Installation and Maintenance Work Trade curriculum.

The instrument for data collection was a well-strutted instrument titled "Winding of Electrical Machines Achievement Test" (WEMAT). The instrument, lesson plan and table of specification/test blue print was subjected to face and content validity by three experts who were selected from Industrial Technical Education Department, Rivers State University. Port Harcourt. The instrument that was obtained after validation was subjected to reliability test. Reliability co-efficient of the test instrument was established using test-re-test reliability techniques. The reliability co-efficient achieved was 0.75.

The experimental group had their lesson with Intelligent Tutor while the control groups were taught by the researches and three research assistants. The control groups were taught using traditional discussion method and guided discovering method of teaching while the experimental group were taught using

Intelligent Tutor instructional strategy. At the end of the treatment, students were tested on what they were taught. The experimental group wrote their examination on the Intelligent Tutor using the computer-Based method of assessing student while the control groups wrote their examination using paper, pen and pencil. An orientation programme was organized for participating teachers in the first week. During the training section, general description on the treatment for experimental and control groups were done.

Mean and standard deviation were used to answer the research questions while the Analysis of Variance (ANOVA) were used to test the null hypotheses at 0.05 level of significance. The computation of mean, standard deviation, pre-test and post-test was carried out with Statistical Package for Social Sciences (SPSS)

Results

The results of this study is presented in Tables 1-6 in accordance with the research questions and hypotheses that guided the study.

Research Question 1: what is the outcome of using Intelligent Tutor instructional strategy on students' academic achievement when taught procedures for making waved winding in Imo State technical colleges?

Table 1: Mean ($\bar{x}$) and Standard Devotion (SD) Scores of Students Mean Achievement Scores for the Experimental and Control Groups.

Group	N	Pretest		Post-test		Mean gain score
		X_1	SD_1	X_2	SD_2	X_2-X_1
Intelligent tutor (experimental)	24	34.51	4.31	70.76	5.65	36.25
Discussion (control)	20	27.65	3.25	49.27	4.35	21.62
Guided discovery (control)	20	34.15	3.19	57.85	4.38	23.70

***Source**: Field survey, 2025*

The data presented in Table 1 indicated that the intelligent tutor (experimental group) pre-test and post-test scores are 34.51 and 70.76 with standard deviation scores of 4.31 and 5.65 respectively. The discussion method (control group) has pre-test and post-test sources of 27.65 and 49.27 with standard deviation of 3.25 and 4.35 respectively. Also, the guided discovery method ((control group) has pre-test and post-test scores of 34.15 and 57.85 with standard deviation scores of 3.19 and 4.38 respectively. Therefore, the mean achievement gain for the experimental group is 36.25 while the mean gain for the discussion and guided discovery method groups are 21.62 and 23.70 respectively. This implies that those students taught using Intelligent Tutor instructional strategy performed better than those students exposed to the discussion and guided discovery method of teaching.

Research Question 2: What is the outcome of using Intelligent Tutor instructional strategy on student's academic achievement when taught how to dismantle machines for rewinding operation in Imo State technical college?

Table 2: Mean ($\overline{X}$) and Standard Deviation (SD) Scores of Students' Mean Achievement Scores for the Experimental and Control Groups

Group	N	Pretest	Post-test	Mean gain score

		X_1	SD_1	X_2	SD_2	X_2-X_1
Intelligent tutor (experimental)	24	33.45	4.15	63.79	5.51	30.34
Discussion (control)	20	31.73	3.39	58.86	4.71	27.13
Guided discovery (control)	20	31.58	3.25	55.81	4.39	24.23

***Source**: Filed Survey, 2025*.

The data presented in Table 2 indicated that the Intelligent Tutor (experimental group) pre-test and post-test scores are 33.45 and 63.79 with standard deviation scores of 4.15 and 5.51 respectively. The discussion method (control) group has pre-test and post-test scores of 31-73 58.86 with standard deviation of 3.39 and 4.71 respectively. Also, the guided discovery method (control) group has a pre-test and post-p-test scores of 31.58 and 55.81 with standard deviation scores of 3.25 and 4.39 respectively. Therefore, the mean achievement gain for the experimental group is 30.34 while the mean gain for the discussion and guided discovery method groups are 27.13 and 24.23 respectively. This implies that those students taught using Intelligent Tutor instructional strategy did better than their counterparts exposed to the discussion and guided discovery methods of instruction.

Research Questions 3: what is the outcome of using Intelligent Tutor instructional strategy on students' academic achievement when taught how to test for continuity and insulation resistance using a megger test set in Imo State technical college?

***Table 3**: Mean ($\overline{X}$) and Standard Deviation (SD) Scores of Students' Mean Achievement Scores for the Experimental and Control Groups*

Group	**N**		**Pretest**	**Post-test**		**Mean gain score**
		X_1	SD_1	X_2	SD_2	X_2-X_1
Intelligent tutor (experimental)	24	31.41	4.39	68.89	5.21	37.48
Discussion (control)	20	34.65	3.48	55.78	4.89	21.13
Guided discovery (control)	**20**	**30.75**	**3.15**	**50.89**	**4.45**	**20.14**

***Source**: Field Survey, 2025*

The data presented in Table 3 indicated that the Intelligent Tutor (experimental groups) pre-test and post-test scores are 31.41 and 68.89 with standard deviation scores of 4.39 and 5.21 respectively. The discussion method (control) group has pre-0test and post-test scores of 34.65 and 55.78 with standard deviation of 3.48 and 4.89 respectively, also, the guided discovery method (control) group has a pre-test and post-test scores of 30.75 and 50.89 with a standard deviation scores of 3.15 and 4.45 respectively. Therefore, the mean achievement gain for the experimental group is 37.48 while the gain for the discussion and discovery method groups are 21.13 and 20.14 respectively. This implies that those students' taught using Intelligent Tutor instructional strategy did better than their counterpart exposed to the discussion and guided discovery methods of instruction.

Hypothesis 1: There is no significant difference in the mean score of students' taught procedures for making wave winding using Intelligent Tutor instructional strategy and those taught using traditional discussion method and guided discovery method of teaching in Imo State technical colleges.

Table 4: Analysis of Variance (ANOVA) Summary Table on the Significant Difference between Students' Taught Procedures for making wave Winding with Intelligent Tutor Instructional Strategy in Technical Colleges in Imo State

Sources of Variance	**Sum of squarer's**	**Df**	**Mean Square**	**F. cal.**	**F. crit**	**Alpha level**	**Decision**
Between groups	1260.23	2	630.12	24.67	3.15	0.05	Significant
Within groups	1505.21	61	25.52				

Total	2765.44	63

From the result in Table 4, the calculated f-ratio = 24.67, while f-critical = 3.15 at 0.05 level of significance, at degree of freedom (df) = 2 and 61. This shows that the value of f-ratio (24.67) calculated is greater than the value of f-critical (3.15). Since the value of f-ratio calculated (24.67) is greater than the value of f-critical (3.15) the first null hypothesis is therefore rejected. This show that there is significant difference between the mean gain scores of students' taught procedures for making wave winding with Intelligent Tutor instructional strategy and those taught with discussion and guided discovery methods of teaching in Imo State technical colleges.

Hypothesis 2: There is no significant difference in the mean score of students taught how to dismantle machines for rewinding operation using intelligent tutor instructional strategy and those taught using traditional discussion method and guided discovery method of teaching in Imo State technical colleges.

Table 5: Analysis of Variance (ANOVA) Summary Table on the Significant Difference between students' Taught how to Dismantle Machines for Rewinding Operation with Intelligent Tutor Instructional Strategy in Technical Colleges in Imo State

Sources of Variance	**Sum of squarer's**	**Df**	**Mean Square**	**F. cal.**	**F. crit**	**Alpha level**	**Decision**
Between groups	569.15	2	1059.94	11.29	3.15	0.05	Significant
Within groups	1424.27	61	25,41				
Total	1995.41	63					

From the result of Table 5 the calculated f-ratio = 11.29, while f-critical = 3.15 at 0.05 level of significance, at degree of freedom (df) = 2 and 61. This shows that the value of f-ratio (11.29) calculated is greater than the value of f-critical (3.15). Since the value of f-ratio calculated (11.29) is greater than the values of f-critical (3.15) the second null hypothesis is therefore rejected. This shows that there is a significant difference between the mean gain scores of students taught how to dismantle machines for rewinding intelligent tutor instructional strategy and those taught with discussion and guided discovery methods of teaching in Imo State Technical Colleges.

Hypothesis 3: There is no significant differences in the mean score of students taught how to test for continuity and insulation resistance using a megger test set using Intelligent Tutor instructional strategy and those taught using traditional discussion method and guided discovery method of teaching in Imo State Technical Colleges.

Table 6: Analysis of Variance (AWOVA) Summary Table on the Significant Differences between Students' Taught how to test for Continuity and Insulation Resistance using megger test-set with Intelligent Tutor Instructional Strategy in Technical Colleges in Imo State

Sources of Variance	**Sum of squarer's**	**Df**	**Mean Square**	**F. cal.**	**F. crit**	**Alpha level**	**Decision**
Between groups	58.64	2	290.82	11.40	3.15	0.05	Significant
Within groups	1504.57	61	25.50				
Total	2086.21	63					

From the result in Table 6 the calculated f-ration = 11.40, while the f-critical = 3.15 at 0.05 level of significant, at degree of freedom (df) = 2 and 61. This shows that the value of f-ratio (11.40) calculated is greater than the value of f-critical (3.15). Since the value of f-ratio calculated (11.40) is greater than the value of f-critical (3.15) the third null hypothesis is therefore rejected. This shows that there is a significant difference between the mean gain scores of students taught how to test for continuity and insulations resistance using a megger test set with intelligent tutor instructional strategy and those taught with discussion and guided discovery methods in Imo State Technical Colleges.

Discussion

There result of the study shown in Table 1 revealed that Intelligent Tutor instructional strategy group taught procedures for making wave winding did better than the discussion method and guided discovery method groups with mean gain scores of 36.25, 21.62 and 23.70. Also, the finding showed a significant difference between the effect of instructional strategy, discussion method and guided discovery method on academic achievement of students in procedures for making wave winding. These findings are in line with Morgan (2018) who noted that Intelligent Tutor method of instruction in science and technology related areas encourages the learners to be actively involved in finding out on their own the procedure, principles and concept involved in any topic, this subsequently assist the learners to carryout problem-solving in solving on their own in any topic. This means that Intelligent Tutor instructional strategy is more effective than the discussion and guided discovery methods of teaching in helping learners to be more active in finding out on their own the procedure, principles and concept involved in any topic.

Data presented in Table 2 on how to dismantle machines for rewinding operation revealed that the Intelligent Tutor instructional strategy group performed more better than the discussion method and guided discovery method groups with mean gain scores of 30.34, 27.13 and 24.23 respectively. The finding of the study is in line with Kufor (2019) who stated that Intelligent Tutor instructional strategy which is meant for self-development and sustainability enables the learners to identify an objectives plan for its actualization. This means that intelligent tutor instructional strategy is more effective than the discussion and guided discovery methods of teaching when it comes to helping students identify an objective plan such as how to dismantle machine for rewinding operation.

The result of the study presented in Table 3 on how to test for continuity insulation resistance using megger test set revealed that the intelligent tutor instructional strategy group performed better than the discussion method and the guided discovery method groups with mean gain scores of 37.48, 21.13 and 20.14 respectively. This finding indicated a significant difference between the effect of Intelligent Tutor instructional strategy, discussion method and guided discovery method of teaching on academic achievement of students on how to test for continuity and insulation resistance using megger test set. This funding is in line with Howe (2023) who noted that Intelligent Tutor Instructional strategy has led to the improvement in student's comprehension, engagement, attitudes, motivation and better academic result which has all contributed to the ongoing interest in the investment in research on educational programme all over the globe.

Similarly, data analysis on Tables 4, 5 and 6 indicated that there is a significant difference between the mean gain scores of students taught winding of electrical machines with Intelligent Tutor instructional strategy, discussion method and guided discovery method of instruction. The experimental group did better than their counterparts taught with discussion and guided discovery methods of instruction. The result was in accordance with the word of Okpara and Echetama (2023) who found that Intelligent Tutor instructional strategy which uses adaptive electronic technology in personalized instruction delivery usually attracts most students' attention during teaching and learning process, hence leading to a better academic achievement of the students.

Conclusion

Based on the finding of the study. It was deduced that Intelligent Tutor instructional strategy usually improve students' comprehension, engagement, attitudes, motivation and better academic result than discussion and guided discovery methods of teaching winding of electrical machines in Imo State Technical Colleges. Also, the use of Intelligent Tutor instructional strategy attracts students' attention during teaching and learning period hence leading to a better academic achievement. Students' taught winding of electrical machines with Intelligent Tutor instructional strategy did better than their counterparts taught with discussion and guided discovery methods of teaching in Imo State Technical Colleges.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Adequate number of computers should be provided by government in all the technical colleges in Nigeria. This will enable TVE educators to effectively deliver their lesson using the Intelligent Tutor method.
2. TVE educators should immediately adopt the use of Intelligent Tutor instructional strategy in the delivery of their lesson in all the vocational related trades. This will enable the students to study on their own anywhere and anytime without the presence of a human teacher as it is practice in other developed countries of the world.
3. TVE educators should be given on-the-job training opportunities by the government such as short-term courses, seminar and workshop as to enable them to update their knowledge and skill. This will help TVE educators to constantly keep abreast with the ever-changing scientific knowledge and various modern method of teaching vocational trade related courses in line with global trends in education.

References

Amankwa, K.W. (2023), *Effect of Computer-Based Method of Teaching on students' academic achievement in metal work technology in technical colleges in Ghana*. http//www.edu. journal.org.

Bafarawa, A.M. (2018). Evaluation of teaching methods/techniques in vocational related trades programmes in government technical colleges in Kano State. *Journal of Technical and Vocational Education,10* (1), 10-15.

Briggs, M.T. (2021). The use of technology assisted instruction in science teaching and learning process: An index for the achievement of National Development. *Academic Secondary Journal, 11* (1) 100 – 115.

Brown,S.E. (2021). *Learning theories and Intelligent Tutor system.* http//www.edu.its.edu.org

Federal Republic of Nigeria (2-013). *National Policy on Education. (Revised 6th edition*). Lagos: Nigeria Educational Research and Development Council (NERDC).

Howe, M.E. (2021). Workshop/Laboratory instruction using Intelligent Tutor system: The teacher role. *Journal of Education in Developing Areas, 12* (1), 30 – 45.

Kamalu, C.A. Taiwo, A.B. (2019). Computer-based instruction: A springboard to student's performance in electrical installation and maintenance work trade. http//www.cdm. journal.org

Kufor,A.M. (2019). *Study of Intelligent Tutor aided learning and its application to practical skill training in vocational related trades programmes*. http//www. intelligent tutor. edu. Journal. Org.

Morgan, B.E. (2018). Comparative video tape and hand – out model of instrument for teaching exercise skill retention in normal children. *Educational Psychology Journal, 10* (1), 115 – 130.

National Board for Technical Education (2015). *National technical certificate (NTC) and advance national technical certificate (ANTC) curriculum and course specifications*. Benin: NBTE press ltd.

National Board for Technical Education (2018). *Electrical Installation and Maintenance Work Trade, National Technical Certificate (NTC) and Advance National Technical Certificate (ANTC) National Board for Technical Education*. Benin: NBTE press ITD.

National Board for Technical Education (2015). Assessment and evaluation of technical education programmes in Nigeria. Annual repent on technical education programmes in Nigeria.

National Board for Technical Education (2023). Chief Examiner's Report on National Technical Certificate Examination.

Okara, L.N Echetama, N.U. (2022). An Investigation into teacher's efficacy in implementing computer education in Nigerian Colleges of education. *Academic Journal of Interdisciplinary Study, 15* (1) 60 – 75.

Okpe, U.N. (20210. Evaluation of teaching methods/techniques in vocational related programmes in government technical colleges in Delta State. *Journal of Education and Practice, 8* (1) 90 – 105.

Rumuro, E.B. (2018). Intelligent Tutoring for main achievement testing. *http//www. wayanalogue.net. 00125.wayang*.

Sang, T.C. (2019.). The impact of positive feedback in a constraint -based computer aided instruction. *International Journal of Artificial Intelligent on Education, 16* (122), 105 –127.

Ugwu, E.O & Kio, C.A. (2022). Promoting student internet in science related subjects using local games. International *Journal of Arts and Technology Education*, 7 (1), 68 – 88.

William, M.O. (2022). Strategies form improving students' learning retention in physics. *http//www.edu.journal.org*.