NAU Journal of Technology & Vocational Education, Vol. 9, No. 1, July 2024

UTILISATION OF INNOVATIVE PEDAGOGICAL STRATEGIES: A CROSS-SECTIONAL SURVEY IN VOCATIONAL AND TECHNICAL EDUCATION IN TERTIARY INSTITUTIONS

Vincent O. Omojiriemu[1], Samson Onyeluka Chukwuedo[2] & Francisca N. Nnanjifor[3]
[1,2] Department of Technology and Vocational Education, Nnamdi Azikiwe University Awka
omojiriemuvincent@gmail.com

Abstract
The study sought to determine the extent of utilisation of innovative pedagogical strategies for teaching of vocational and technical education courses in tertiary institutions in Delta State. Two research questions were raised for the study and four null hypotheses were tested. Descriptive survey research design was adopted. The entire population of 189 VTE lecturers in the five public owned tertiary institutions in Delta State was studied without sampling. A structured and questionnaire which was validated by experts was used for data collection. Cronbach alpha was used to measure the internal consistency which yielded an overall reliability co-efficient of 0.87. The researchers administered the instrument with five research assistants using direct method to the respondents. Mean and standard deviation were used for answering the research questions and t-test was used for testing the null hypotheses at 0.05 level of significance. The study revealed that VTE lecturers slightly utilised activity-based and interactive pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State. The study concluded that VTE lecturers, irrespective of their gender and years of teaching experience slightly utilized activity-based pedagogical strategies and interactive pedagogical strategies when teaching VTE courses in tertiary institutions. Among others, it was recommended that professional conferences and in-service seminars should be organized for VTE lecturers to update their instructional competency on the utilisation of activity-based and interactive pedagogical strategies. This would increase VTE lecturers' instructional efficacy and be more open to use activity-based and interactive pedagogical strategies for teaching VTE courses in tertiary institutions.
Keywords: Vocational and technical education, innovative pedagogical strategies, activity-based strategies, interactive strategies

Introduction

Vocational and Technical Education (VTE) is an umbrella of specialized disciplines that is designed to prepare students for effective participation in the world of work. Vocational and technical education, according to Adepoju (2014), is an educational programme that inculcates knowledge, skills, competencies and all other structural experiences that can effectively enable students to secure jobs in the various sectors of the economy. The range of courses in vocational and technical programme includes accounting education, office technology and management, automobile mechanics technology, electrical and electronics technology, repairs and installations technology, welding and fabrication technology, woodwork technology, carpentry and joinery technology, block-laying and bricklaying technology, painting and decoration, electrical installation and maintenance work and metalwork technology among others.

Hence, graduates of vocational and technical education are expected to become highly skilled craftsmen, technicians and enterprising job creators in the society. However, Amaechi and Thomas (2016) averred that graduates of vocational and technical education programme are

finding it difficult to handle complex technological projects due to the traditional based pedagogical strategies they were exposed to tertiary institutions. In this same vein, Hassan (2016) posited that the traditional lecture method used for teaching vocational and technical education courses is inadequate for equipping students with creative skills, higher order thinking skills and problem-solving skills to thrive as craftsmen, technicians and job creators in the 21st century workplace.

The industrial-based nature of vocational and technical education courses demands the use of active, stimulating and innovative pedagogical strategies that can adequately prepare students for the numerous technologies utilized in today's industries when they graduate. Strategy refers to organized formats for achieving stated goals. In the context of education, Nwazor and Onokpaunu (2016) asserted that strategy entails how institutions of learning can equip students with the desirable competitive advantages beyond mere classroom performances to deal with the problems of the society. The pedagogical strategies of vocational and technical education courses must go beyond the four walls of a classroom so that students can acquire relevant competencies and skills needed for effective participation in the labour market. Thus, VTE lecturers are expected to adopt innovative and effective teaching strategies that would meet the various objectives of the programme

Innovative pedagogical strategies are ground breaking and modern approaches in teaching and learning of subject matters in the classroom. Accordingly, Kettle (2013) asserted that innovative teaching strategies are instructional approaches that focused on the development of how knowledge is assimilated, produced and used in a manner that creates innovations. The clarion call for the utilization of innovative pedagogical strategies for teaching VTE courses is based on the notion that traditional teaching methods do not aligned with the current technological advancements in the world of work (Amaechi & Thomas, 2016). It is with this understanding that, innovative pedagogical strategies such as interactive strategies (Yinusa, 2014); mentoring strategies (Udemba, 2015); challenge-based strategies and indirect strategies (Hassan, 2016) and activity-based strategies (Siaw, 2019) provide educators with effective means of training students for life as job creators. However, the researchers focused on activity-based pedagogical strategies and interactive pedagogical strategies because they provide lifelong learning value for students to succeed in their careers upon graduation. More so, these pedagogical strategies have not been given adequate empirical attention in Delta State.

Activity-based pedagogical strategies include all in-class and out-of class activities that foster the development of cognitive, affective, and motor skills among students (Akkus, 2015). This could be why, Kettle (2013) and Ebeogu and Ojo (2020) averred that internship, school-based entrepreneurial ventures, flipped classroom, project-based, task-based approach and apprenticeship strategy among others are instructional strategies embedded in activity-based pedagogical strategies. In practical terms, activity-based pedagogical strategies, practice-based or work-based learning strategies incorporate theory and practice modes of learning to reflect real-life experiences from everyday routines of the workplace (Billett, 2015).

Activity-based pedagogical strategies are hands-on instructional strategies that enable students to learn concepts of subject matters through practical classroom activities. Udemba (2015) stated that the idea behind the integration of activity-based strategies in teaching vocational and technical education courses is that students can be given participatory roles in the classroom while their educators becomes the facilitator in order to encourage them generate practical alternatives in solving problems. While, activity-based pedagogical strategies are instructional strategies that provide opportunities for students to gain initiative-taking skills while assuming direct responsibility for their actions (Anwer, 2019), interactive pedagogical

strategies, on the other hand, are instructional procedures that encourage students to create their knowledge on subject matters through social interactions (Giorgdze & Dgebuadze, 2017).

Interactive pedagogical strategies are instructional arrangements where students enter into rational arguments with their colleagues and educators in the pedagogical process to organize their thoughts in order to develop social, team work and discussion skills. According to Atanasescu and Dumitr (2013), interactive pedagogical strategies are instructional settings which allow confrontation of intelligent ideas and creative arguments between educators and learners on academic subjects. According to Gabriela-Paula (2013), interactive pedagogical strategies include think-pair-share, jigsaw technique, guest speaker presentation, lotus blossom technique, the gallery walk, brainstorming and roundtable teaching strategy. The fact that, interactive pedagogical strategies stand to instil oral communication, critical thinking, listening, observational, social and interpersonal skills among students make them effective pedagogical strategies for teaching vocational and technical education courses (Kettle, 2013).

The utilisation of activity-based and interactive pedagogical strategies for teaching vocational and technical education courses could be influenced by the gender and years of teaching experience of VTE lecturers in tertiary institutions. Gender is the behavioural characteristics distinguishing between males and females in any society. Therefore, the gender roles of teachers may influence their instructional delivery in the classroom. It seems that male VTE lecturers are more detailed and experimental in trying out new pedagogical strategies than their female counterparts. Within the context of this study, it is assumed that male VTE lecturers are technically adept to utilise activity-based pedagogical strategies and interactive pedagogical strategies more than their female counterparts for teaching of vocational and technical education courses in tertiary institutions. However, this assumption needs to be supported by empirical evidence.

Closely related to lecturers' gender is their year of teaching experience. Years of teaching experience refers to the classification of more experienced and less experienced VTE lecturers in tertiary institutions. The researcher views less experienced VTE lecturer as one with below five years of professional teaching and more experienced VTE lecturer as one with more than five years of professional teaching. Given their years of professional service, one can assume that more experienced VTE lecturers may be competent in utilising innovative pedagogical strategies for teaching of vocational and technical education courses than less experienced VTE lecturers. However, this assumption needs to be supported by empirical evidence. It is against this backdrop that this study sought to determine the extent of utilisation of innovative pedagogical strategies for teaching of vocational and technical education courses in tertiary institutions in Delta State

Statement of the Problem

The main goal of teaching vocational and technical education courses in Nigerian tertiary institutions is to prepare students for the world of work through the acquisition of theoretical and practical skills. However, the rote learning and memorization attributes of traditional teaching strategies which have dominated vocational and technical education programmes in Nigeria could be responsible for students' inability to meet the requirements of the industrialized workplace upon graduation. Alarmingly, Odika and Tom (2020) submitted that most graduates of vocational and technical education programmes in Nigeria roam the street unemployed because they cannot get employed or establish their self-employment ventures as they lack the requisite skills due to poor technical training in tertiary institutions.

This implies that vocational and technical education graduates will find it difficult to adjust to the numerous demands of today's complex business world, if urgent steps are not taken

to ensure that innovative pedagogical strategies are utilised by educators across all levels of instruction in VTE programmes. The problem of this study, therefore is, that the extent to which VTE lecturers utilise challenge-based pedagogical strategies, activity-based pedagogical strategies and interactive pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State is not clearly known. This is the problem that this study sought to solve

Purpose of the Study

The major purpose of this study was to determine the extent of utilisation of innovative pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State. Specifically, the study determined the extent to which VTE lecturers in tertiary institutions in Delta State utilise:

1. Activity-based pedagogical strategies for teaching vocational and technical education courses
2. Interactive pedagogical strategies for teaching vocational and technical education courses

Research Questions

The following research questions guided the study:

1. To what extent do VTE lecturers utilise activity-based pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State?
2. To what extent do VTE lecturers utilise interactive pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State?

Hypotheses

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

1. VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of activity-based pedagogical strategies in teaching VTE courses in tertiary institutions in Delta State based on their gender.
2. VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of activity-based pedagogical strategies in teaching VTE courses in tertiary institutions in Delta State based on their years of teaching experience (1 – 5, 6 – 10, above 10 years)
3. Male and female VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of interactive pedagogical strategies in teaching VTE courses in tertiary institutions in Delta State.
4. VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of interactive pedagogical strategies in teaching VTE courses based on their years of teaching experience (1 – 5, 6 – 10, above 10 years).

Method

The study adopted descriptive survey research design. The researcher used descriptive survey research design for the study because it would survey the opinions of VTE lecturers in Delta State regarding the extent they utilized innovative pedagogical strategies for teaching vocational and technical education courses in tertiary institutions with the use of questionnaire to systematically describe the lecturers' characteristics on the utilization of innovative pedagogical strategies for teaching VTE courses. The entire population of 189 VTE lecturers in the five public-owned tertiary institutions was studied without sampling. A structured and validated

questionnaire containing 15 items on a five-point rating scale of Very Highly Utilised (VHU), Highly Utilised (HU), Moderately Utilised (MU), Slightly Utilised (SU) and Not Utilised (NU) was used for data collection.

The reliability of the instrument was determined through a pilot test. Copies of the instrument were administered to 20 VTE lecturers from tertiary institutions in Edo State who were not part of the research population. Cronbach alpha was used to measure the internal consistency which yielded reliability coefficients of 0.91 and 0.83 for clusters A and C respectively with an overall reliability coefficient of 0.87. The researchers together with five research assistants used direct delivery method to administer copies of the questionnaire to the respondents in the five public-owned tertiary institutions. Out of the 189 copies of the questionnaire administered, 161 copies (representing 85 percent) were successfully retrieved and used for data analysis.

Mean and standard deviation were used to answer the research question and determine the homogeneity or otherwise of the respondents' views. Decisions on the research questions were based on the grand mean in relations to the real limits of numbers. Therefore, items with mean ratings of 1.00 - 1.49 are rated Not Utilised, those with 1.50 - 2.49 are Slightly Utilised, items with mean ratings of 2.50 - 3.49 are rated Moderately Utilized, those with 3.50 - 4.49 are rated Highly Utilized and items with mean ratings of 4.50 - 5.00 are rated Very Highly Utilized. Inferential statistics of the t-test was used to test the null hypotheses at 0.05 level of significance. A hypothesis was accepted where the p-value is greater than the alpha level of 0.05 ($p > 0.05$), at an appropriate degree of freedom; otherwise, the null hypothesis was rejected.

Results

The results of the study are presented and analyzed in the following tables.

Research Question 1. To what extent do VTE lecturers utilise activity-based pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State?

Table 1

Mean Ratings on their Extent of Utilization of Activity-Based Pedagogical Strategies for Teaching Vocational and Technical Education Courses

S/N	Item statements	$\bar{X}$	SD	Remarks
1	Internship strategy	1.84	.42	Slightly Utilised
2	School based entrepreneurial ventures	1.32	.60	Not Utilised
3	Flipped classroom strategy	1.27	.51	Not Utilised
4	Discovery-based strategy	1.40	.73	Not Utilised
5	Project-based strategy	3.71	.49	Highly Utilizede
6	Apprenticeship strategy	1.13	.68	Not Utilised
7	Group investigation strategy	1.69	.75	Slightly Utilized
8	Experiential strategy	1.82	.54	Slightly Utilized

Data in Table 1 show that three out of the eight listed activity-based pedagogical strategies with mean ratings ranging from 1.69 to 1.84 were slightly utilised by respondents while four strategies were not utilised with mean ratings ranging from 1.13 to 1.40 but one strategy was highly utilised with mean rating of 3.71. The cluster mean of 1.77 indicates that VTE lecturers slightly utilised activity-based pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State. The standard deviations for the

items are within the same range which shows that the respondents are homogeneous in their opinions.

Research Question 2. To what extent do VTE lecturers utilise interactive pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State?

Table 2
Mean Ratings on their Extent of Utilization of Interactive Pedagogical Strategies for Teaching Vocational and Technical Education Courses

S/N	Item statements	$\bar{X}$	SD	Remarks
9	Brainstorming strategy	1.29	.37	Not Utilised
10	Buzz session strategy	1.10	.62	Not Utilised
11	Round-table strategy	1.17	.48	Not Utilised
12	Think-pair share strategy	1.23	.73	Not Utilized
13	Jigsaw strategy	1.34	.52	Not Utilized
14	Group discussion strategy	2.36	.39	Slightly Utilized
15	Critical debate strategy	2.21	.61	Slightly Utilized

Data in Table 2 show that five out of the seven listed interactive pedagogical strategies with mean ratings ranging from 1.10 to 1.34 were not utilised by respondents while two strategies were slightly utilised with mean ratings of 2.21 and 2.36. The cluster mean of 1.53 indicates that VTE lecturers slightly utilised interactive pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State. The standard deviations for the items are within the same range which shows that the respondents are homogeneous in their opinions.

Hypothesis 1. VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of activity-based pedagogical strategies in teaching VTE courses in tertiary institutions in Delta State based on their gender.

Table 3.
The t-test analysis of male and female VTE lecturers in Tertiary Institutions on the extent of utilisation of activity-based pedagogical strategies for teaching VTE courses

Gender	N	$\bar{X}$	SD	df	t-value	p-value	Decision
Male	94	41.37	8.53	159	.193	.901	Not Significant
Female	67	39.61	7.29				

Table 3 shows that the p-value of 0.901 at 159 degree of freedom is greater than the significant value of 0.05 ($p>0.05$). This means that the respondents did not differ significantly in their mean ratings on the extent of utilisation of activity-based pedagogical strategies for teaching VTE courses in tertiary institutions in Delta State as a result of gender. Therefore, the null hypothesis was accepted.

Hypothesis 2. VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of activity-based pedagogical strategies in teaching VTE courses in tertiary

institutions in Delta State based on their years of teaching experience (1 – 5, 6 – 10, above 10 years)

Table 4.
ANOVA summary on the extent of utilisation of activity-based pedagogical strategies for teaching VTE courses based on years of teaching experience

Source ofVariance	SS	Df	MS	F	p-value	Decision
Between Groups	78.32	2	11.70	.131	.110	Accepted
Within Groups	172.36	158	23.03			
Total	250.68	160				

Data on Table 4 shows that the F-value of 0.131 with p-value of 0.110 at degree of freedom of 2 and 158 is greater than the criterion value of 0.05 (p>0.05). This means that VTE lecturers did not differ significantly in their mean ratings on extent of utilisation of activity-based pedagogical strategies for teaching VTE courses in tertiary institutions in Delta State based on their years of teaching experience. Therefore, the null hypothesis was accepted.

Hypothesis 3. Male and female VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of interactive pedagogical strategies in teaching VTE courses in tertiary institutions in Delta State.

Table 5.
Summary of t-test Male and Female VTE lecturers on the Extent of Utilisation of Interactive Pedagogical Strategies for Teaching VTE Courses

Gender	N	$\bar{X}$	SD	df	t-value	p-value	Decision
Male	94	38.15	9.28	159	.640	.251	Not Significant
Female	67	31.94	10.17				

Table 5 shows that there is no significant difference in the mean ratings of male and female VTE lecturers on the extent they utilise interactive pedagogical strategies for teaching VTE courses in tertiary institutions in Delta State. This is shown by the p-value of 0.251, which is greater than the significance level of 0.05. The null hypothesis of no significant difference between the two groups is therefore accepted.

Hypothesis 4. VTE lecturers do not differ significantly in their mean ratings on the extent of utilisation of interactive pedagogical strategies in teaching VTE courses based on their years of teaching experience (1 – 5, 6 – 10, above 10 years).

Table 6.
ANOVA Summary on the extent of Utilisation of Interactive Pedagogical Strategies for Teaching VTE Courses Based on Years of Teaching Experience

Source ofVariance	SS	df	MS	F	P-value	Decision
Between Groups	17.44	2	9.87	.101	.126	Accepted
Within Groups	101.28	158	15.16			
Total	118.72	160				

Data on Table 6 shows that the F-value of 0.801 with p-value of 0.126 at degree of freedom of 2 and 158 is greater than the criterion value of 0.05 (p>0.05). This means that VTE lecturers did not differ significantly in their mean ratings on extent of utilisation of activity-based pedagogical strategies for teaching VTE courses in tertiary institutions in Delta State based on their years of teaching experience. Therefore, the null hypothesis was accepted.

Discussion of findings

Outcome of the study indicated that vocational and technical education lecturers slightly utilise activity-based pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State**.** The study disclosed that vocational and technical education lecturers slightly utilise internship strategy, group investigation strategy and experiential strategy. The outcome of this study agrees with the finding of Akkus (2015) who discovered that educators lack instructional support to employ activity-based pedagogical strategies for teaching because these methods involve the teaching of theoretical and practical aspects of subject matters within and outside the school. The finding of the study that vocational and technical education lecturers do not utilise school based entrepreneurial ventures, flipped classroom strategy, discovery-based strategy and apprenticeship strategy was supported by the study of James (2015) who reported that teachers do not utilize activity-based pedagogical strategies because they are time and task demanding to implement in the classroom. The slight extent of utilization of flipped classroom strategy, discovery-based strategy, group investigation strategy and experiential strategy among other activity-based pedagogical strategies means that VTE lecturers are not comfortable using these strategies for teaching. However, the study revealed that vocational and technical education lecturers highly utilise project-based strategy for teaching vocational and technical education courses in tertiary institutions in Delta State. This finding concur with Amaechi and Thomas (2016) which discovered that project-based strategy was utilized by vocational and technical educators because it is a teaching strategy that facilitates the mastery of workplace skills among students.

In addition, the study disclosed that VTE lecturers in Delta State do not differ significantly in their mean ratings on the extent of utilisation of activity-based pedagogical strategies based on their gender and years of teaching experience. This finding supports, James (2015) who discovered no significant difference in teachers' extent of utilisation of activity-based teaching strategies based on gender and years of teaching experience. The non-significant difference in the mean ratings of VTE lecturers on extent of utilisation of activity-based pedagogical strategies on the basis of their gender and years of experience implies that neither gender nor years of teaching experience affected the opinions of the respondents on this matter. This finding implies that VTE lecturers in Delta State are not ready to accommodate activity-based pedagogical strategies as part of their instructional delivery when teaching VTE courses.

Result of the study disclosed that vocational and technical education lecturers slightly utilise interactive pedagogical strategies for teaching vocational and technical education courses in tertiary institutions in Delta State. The outcome of this study agrees with the finding of Atanasescu and Dumitru (2013) which reported teachers rarely used interactive teaching strategies in their instructional delivery. The finding that vocational and technical education lecturers slightly utilise group discussion strategy and critical debate strategy agrees with Oyelekan, Igbokwe and Olorundare (2017) which stated that there are many interactive teaching strategies that teachers are currently not using for teaching in classrooms. The study further disclosed that vocational and technical education lecturers do not utilise think-pair share, buzz

learning session, brainstorming, jigsaw learning strategy and round-table strategy. This finding is consistent with Gabriela-Paula (2013) who discovered that teachers utilise interactive pedagogical strategies to a low extent. The finding of the study that vocational and technical education lecturers do not utilise interactive pedagogical strategies to a low extent for teaching vocational and technical education courses in tertiary institutions in Delta State could be as a result of their desire to use lecture-monologue approach of teaching.

Furthermore, the study disclosed that VTE lecturers in Delta State do not differ significantly in their mean ratings on the extent of utilisation of interactive pedagogical strategies based on their gender and years of teaching experience. This result tallies with the studies of Atanasescu and Dumitru (2013) and Gabriela-Paula (2013) which reported that teachers did not differ in their mean ratings on the extent of utilisation of interactive pedagogical strategies on the basis that, most educators lack the facilitation skills needed to organize students for an interactive teaching and learning classroom. This implies that gender and years of teaching experience have no significant influence on low extent of utilisation of interactive pedagogical strategies among VTE lecturers in Delta State. The non-significant difference in the mean ratings of VTE lecturers on extent of utilisation of interactive pedagogical strategies on the basis of their gender and years of teaching experience could be as a result of non-recognition of these pedagogical strategies in the curriculum of vocational and technical education in tertiary institutions.

Conclusion

The richness of vocational and technical education programme cannot be overemphasized because it is a breeding ground for inculcating students with practical workplace skills and attributes. Based on findings of the study, it was concluded that, VTE lecturers, irrespective of their gender and years of teaching experience slightly utilized activity-based pedagogical strategies and interactive pedagogical strategies when teaching VTE courses in tertiary institutions.

Recommendations

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

1. Innovative teaching strategies such as activity-based and interactive pedagogical strategies should be reflected in VTE curriculum to build the awareness and facilitate the utilization of these strategies by VTE lecturers in tertiary institutions from teacher training institutions. This would quicken the acceptance and integration of activity-based and interactive pedagogical strategies by VTE lecturers in tertiary institutions.
2. Professional conferences and in-service seminars should be organized for VTE lecturers to update their instructional competency on the utilisation of activity-based and interactive pedagogical strategies. This would increase VTE lecturers instructional efficacy and be more open to use activity-based and interactive pedagogical strategies for teaching VTE courses in tertiary institutions.
3. Management of tertiary institutions and VTE lecturers should go into partnership with corporate organizations for effective implementation of activity-based and interactive pedagogical strategies that will improve the acquisition of practical workplace skills among students. This will enables VTE students behave, work and learn like modern industrialists in the world of work upon graduation

References

Adepoju, S.A. (2014). *Basic technology teachers' perception of the availability and utilization of information and communication technology for teaching in secondary schools in Kwara State*. Unpublished masters' thesis, Department of Vocational and Teacher Education, Faculty of Education, Ahmadu Bello University Zaria.

Akkus, Z. (2015). Activity–based teaching in social Studies education: An action research. *Educational Research and Reviews, 10*(14), 1911 – 1921

Amaechi, O.J., & Thomas, C.G. (2016). Strategies of effective teaching and learning practical skills in technical and vocational training programmes in Nigeria. *International Journal of Scientific Research Engineering and Technology, 5*(12), 598 – 603

Anwer, F. (2019). Activity-based teaching, student motivation and academic achievement. *Journal of Education and Educational Development, 6*(1), 154-170

Atanasescu, C., & Dumitru, F. (2013). Interactive teaching-learning methods in the interdisciplinary approach of natural sciences from the mentor-teacher's perspective. *Current Trends in Natural Sciences, 2*(3), 11 – 20

Billett, S. (2015). *Integrating practice-based experiences into higher education*. Dordrecht, The Netherlands: Springer.

Ebeogu, C., & Ojo, E. O (2020). Assessment of the relevance of work-based learning in skill acquisition in business education programme in colleges of education, Lagos State. *Nigerian Journal of Business Education, 7*(2), 504 – 515

Gabriela-Paula, P. (2013). Teacher's opinion on the use of interactive methods/techniques in lessons. *Procedia - Social and Behavioral Sciences, 76*, 649 – 653

Giorgdze, M., & Dgebuadze, M. (2017). Interactive teaching methods: Challenges and perspectives. *International E-Journal of Advances in Education, 3*(9), 544 - 548

Hassan, A. M. (2016). *Effects of challenge–based and activity-based learning approaches on technical college students' achievement, interest and retention in woodwork technology*. Unpublished Doctoral Dissertation, Department of ITE, University of Nigeria, Nsukka.

James, T. (2015). Effects of activity-based instructional facilities utilisation on the learning experiences of secondary school biology students in Education District 2 of Lagos State. *National Journal of Inclusive Education, 3*(1), 72 – 79

Kettle, J, (2013). *Flexible pedagogies: Employer engagement and work-based learning*. UK: Higher Education Academy

Nwazor, J. C., & Onokpaunu, M. O. (2016). Strategies considered effective for transforming business education programmes to the needs of 21st century workplace in Delta State, Nigeria. *African Journal of Education and Practice, 1*(5), 74 – 82

Odika, E. M., & Tom, C. C. (2020). Electrical installation and maintenance works skills for sustainability amongst graduates of technical colleges in Rivers State. *International Journal of Innovative Education Research*, *8*(1), 1-10

Oyelekan, O. S., Igbokwe, E. F., & Olorundare, A. S. (2017). Science teachers' utilisation of innovative strategies for teaching senior school science in Ilorin, Nigeria. *Malaysian Online Journal of Educational Sciences, 5*(2), 49 – 65

Siaw, W. N. (2019). Using activity method to teach second year diploma students selected topics in biology: A case of ST. Monica's college of education, Mampong. *International Journal of Education, Learning and Development, 7*(2), 94-104

Udemba, N. F. (2015). *Business educators' rating of measures for making tertiary business education graduates self-employed in South East.* Unpublished masters' thesis, Department of TVE, Nnamdi Azikiwe University, Awka.

Yinusa, A. F. (2014). Assessment of teaching strategies adopted for effective implementation of science subjects and trade modules curriculum in Nigerian technical colleges. *Journal of Educational and Social Research, 4*(6), 391-399