



IMPACT OF PEER ASSESSMENT ON STUDENTS' PRACTICAL SKILLS ACQUISITION IN ELECTRONICS WORKS TRADE IN GOVERNMENT SCIENCE AND TECHNICAL COLLEGES OF ADAMAWA STATE NIGERIA'

P. C. Duhu & Ishaku Zechariah

Department of Electrical Technology Education

Modibbo Adama University of Technology, Yola, Adamawa State

Email: patrickchindad@gmail.com

ABSTRACT

The study assessed the Perceived Impact of Peer Assessment on Students' Practical Skills Acquisition in Electronics Works Trade in Government Science and Technical Colleges of Adamawa State Nigeria'. To carry out the study, two research questions and two hypotheses were formulated. Descriptive survey research design was adopted for the study. Eighty-nine respondents comprising of eighty-three students and six electronics works trade teachers of Government science and Technical Colleges (GSTCs) of Adamawa state formed the population of the study. No sampling was used because the population was manageable. The instrument for data collection was a 57-item structured questionnaire named: 'Impact of Peer Assessment on Students' Practical Skills Acquisition Questionnaire (IPSPSAQ) developed by the researcher'. The instrument was validated by three specialists from the Department of Electrical Technology Education. Cronbach Alpha formular was used to compute a reliability index of 0.89 for the instrument. The instrument for data collection was administered to the respondents with the help of two research assistants; data obtained were analyzed using Statistical Package for Social Sciences. Mean and Standard Deviation were used to answer the research questions; while t-test statistic was used to test the hypotheses at 0.05 level of significance. The findings of the study indicated that gender does not have influence on students' performance in electronics work trade in technical colleges in Adamawa state". The findings also revealed that, Peer Assessment enhances students' academic performance in Electronics Works Trade. Both the null hypotheses were upheld. The researcher recommended based on the findings that Electronics Works Trade teachers should adopt the use of Peer Assessment in assessing students since it has been found effective in improving students' skills acquisition in Electronics Works Trade. Government should organize workshops, conferences and seminars to train teachers on the use of Peer Assessment

Keywords: Peer Assessment, Students' Motivation, Practical Skills Acquisition, Electronics Works Trade.

INTRODUCTION

Assessment is the systematic process of gathering information from many sources to make appropriate educational decisions. It identifies student's strengths and needs and contributes to the design and implementation of effective strategies. Classroom teachers are in a better position to offer abundance of information regarding students in their classrooms. Assessments should form the basis of a comprehensive profile of student strengths and challenges (Darling-Hammond, 2010). Habib (2008) opined that in teaching and learning situation, assessment tries to determine the learners' performance or the changes that have taken place in their behaviour as a result of a particular learning task. Assessment can therefore be considered as the measurement of the degree of behavioural changes that have taken place in a learner. The teacher whose duty is to ensure effective teaching and learning has to be concerned with motivating students to begin and continue learning. He guides the direction of students' interests and efforts, as well as assesses their learning outcomes. It is very important that the students' learning outcomes should be properly assessed. This makes it imperative that for effective feedback in teaching and learning process to take place, students must be adequately and appropriately assessed.

In Nigeria, educational assessment is based on continuous assessment. This is stipulated in the National Policy on Education that educational assessment and evaluation will be liberalized by passing them in whole or part on continuous assessment of the progress of the individual [Federal Republic of Nigeria (FRN); 2013]. The successful implementation of continuous assessment in schools as opined by Abubakar (2009) is dependent on efficient use of variety of techniques in assessing students' learning outcomes. Among the various techniques are the Peer Assessment technique (PAT), Self assessment technique, portfolio Assessment technique, Observation assessment technique, school base assessment technique. Traditionally, students were seen as passive receivers of information in the classroom who were expected to provide samples of their knowledge in teacher-made tests. Teachers act as personnel who give out instructions and also as the judge who evaluates students' success.

There is a need to think about assessment in ways that align more closely with the ideals of constructivist learning theory. Self and Peer assessment can play an important role in this respect. Furthermore, active participation by students in assessment design, choices, criteria and making judgments is a more sustainable preparation for subsequent working life. (Ifeakor2009)

Peer assessment stimulates students' motivation and encourages deeper learning and understanding. Furthermore, peer assessment is a form of collaborative learning which encourages student interaction. Peer assessment requires that students of the same class and subject are given the opportunity to be involved in assessing their own learning outcomes. Peer assessment is a process consisting of various cognitive activities such as reviewing, summarizing, clarifying, providing feedback, diagnosing errors and identifying missing knowledge or deviations. With peer assessment, students become active participants who contribute in assessing their own learning outcomes under the direction of the teacher. (Miao &Kopper, 2007). Electronics works trade included in NBTE curriculum is intended to produce competent crafts men/women and technicians who can test, diagnosed service and completely repair faulty electronics equipment or device and systems following the manufacturer specifications. The skills acquire are expected to enable one become employable, or self reliant and should be able to proceed to higher level of education. The graduates of government science and technical colleges who are suppose to take up carrier in the technical trade of their training as competent technicians who will render technical services to the society and thereby earn living and or be able to proceed to higher level of education, but they end up as keke NAPEP drivers, taxi drivers, political thugs and others end up in diverse social vices. Rarely is the graduate of GSTCs in Adamawa state seen to open a shop or business in the area of his/her discipline as a result of the skills he has acquired from the college. This shows that the effort of government, teachers and students' time and resources invested is a waste. The end result of this situation is continuous wasting of government resources, failure to attend the aims and objectives of technical education as stipulated by

NBTE and jeopardy of the precious life of the innocent youths that are admitted into the Government Science and Technical Colleges.

This might have resulted from lack of use of effective and motivational techniques that can capture, engage and sustain students' attention and interest through the period of impartation of practical skills into the learners. However, there varieties of assessment techniques that are in used in Nigeria system of education. This include: performance assessment, portfolio, observations, demonstrations, constructed-response items, projects & exhibitions, interviews and writing samples, self-assessment, peer assessment (Obodo, 2014). Peer assess has the inherent potentials to reduce to minimize if not eradicates the problem of Electronics Works Trade graduates of GSTCs of Adamawa State. This is because; Peer assessment stimulates students' motivation and encourages deeper learning and understanding, through collaborative learning which encourages student interaction. It is a situation where students of the same class and subject are given the opportunity to be involved in assessing their own learning outcomes. Peer assessment is a process consisting of various cognitive activities such as reviewing, summarizing, clarifying, providing feedback, diagnosing errors and identifying missing knowledge or deviations (Miao & Kopper, 2007). It is a technique that is student-centered as well as active participation of the teacher

Training of learners with a view to raise competent technician in electronics works trade is time and energy consuming. This implies that teachers should have high ingenuity and motivational techniques to capture and sustain students' interest and attention for them to achieve that great task. This is why the researcher deems it necessary to study 'Impact of Peer Assessment on students' practical skills acquisition in Electronics works trade in Government Science and Technical Colleges of Adamawa State Nigeria'. Gender differences exist in career choice. It is observed that, most male students choose careers that can take them to top management or prestigious positions such as law, engineering, medicine, while most girls go for careers in caring and service sector, for instance, nursing, welfare, and teaching. The issue of

concern is the embedded belief that some careers are exclusive to a particular gender, a trend which limits individual's options and robs the society of possible benefits. Based on this background, learners of both genders react differently to techniques, methods and instructional materials due to their gender inclinations. In the traditional African setting, girls are over-protected and restricted to the homes, while boys are allowed and encouraged to explore the environment, play different games and do hard works. The differential attitude tends to expose boys to more scientific activities very early in life than girls. This attitude also unconsciously suggests to the males the subjects and professions especially meant for males and areas meant for females. Consequently, one will not be surprised to observe that girls shun the physical sciences and technology and will always be seen in good numbers offering biology, home economics, French language and other allied subjects. Anekwe (2008). This attitude and believe are not unconnected with electronics work trade which is seen to be much demanding in terms of time, cognitive ability and manipulative creativity.

In Nigeria secondary school system, this aspect of students being involved in their own assessment is virtually neglected. Teachers only get students involved when they want students to help them in marking exercise books. They do not see students' involvement as a learning of assessment technique, but an easy way of marking and recording their scores. Ifeakor (2009) noted that in the school system, many teachers employ peer assessment technique but most of them do not give thought to the efficacy of the technique. They are merely interested in using it to hasten the assessment and marking of students' scripts, especially the ones they would not like to record. It is in the light of opinions of researchers like (Okegbile, 2008; Othman, 2008Adeyemi, 2012.) that peer assessment technique can improve motivation, that the researcher develops interest to study its effectiveness in electronics works trade students. According to Kearney (2013), a number of important issues have been raised by students and teaching staff in higher education institutions around the limitations and risks of peer assessment. Students have a tendency to 'over-mark', particularly if the process takes place in small established groups and/or if the identities of assessor and

assessee are known. Aneakwe (2007) opined that under competitive learning, there is the tendency that some students will unfairly assess their colleagues. Some students will favour their friends with the intention that any day their friend will be assessing them they will do likewise. According to Maryam (2011), students' immaturity is the main reason advanced by teachers to account for not using of peer assessment. Many teachers who refuse to use peer assessment technique in the class feel that students are not yet trained to perform such professional skills as assessing class work. Othman (2008) summarized the above problems and proffers the following as solution: The teacher can correlate their (student') assessment scores with their actual performance to ascertain the honesty of the student. This is at the first instance. He can then caution those who are insincere with this practice, honesty (affective behaviour) are in the students.

Purpose of the Study

The purpose of the study is to find out the Impact of Peer Assessment on students' practical skills acquisition in Electronics works trade in Government Science and Technical Colleges of Adamawa State Nigeria'. The study intends to:

1. Determine the influence of gender on students' achievement in Electronics Works Trade when they are assessed using peer assessment.
2. Determine the perception of teachers' and students' on the use of peer assessment.

Research Questions

The following research questions were formulated in line with the specific purposes:

1. What is the influence of gender on students' academic achievement in Electronics Works Trade when they are assessed using peer assessment?
2. What are the perception of teachers and students on the use of peer assessment?

Hypotheses

Four null hypotheses have been formulated to guide the study which was tested at 0.05 level of significance.

1. There is no significant difference between the mean responses of teachers and students on the influence of gender on students' academic achievement in Electronics Works Trade when they are assessed using peer assessment.
2. There is no significant difference between the mean responses of teachers and students on their perception of the use of Peer assessment.

METHODOLOGY

Descriptive Survey research design was adopted for this study. The geographical area of the study was Adamawa State. The total population for this study is made up of 83 students and 6 teachers of Electronics Works trade across all the GSTC of Adamawa State. No sampling was employed for the study, as the entire population was manageable. The instrument for data collection was a 57-item structured questionnaire which was design by the researcher. The instrument was made up of two sections; section A sought information on personal data while section B was on the Influence of Peer Assessment on Students' Motivation for Practical Skills Acquisition in Electronics Works Trade. Five point likert scales was used to correspond with the level of agreement on each of the questionnaire items. The instrument was validated by three specialists from the Department of Electrical Technology Education; Modibbo Adama University of Technology Yola. The specialists were requested to consider the clarity of language, content, structure, relevance and adequacy of the items in collecting the required data. The researcher administered the Instrument to Government Science and Technical College Kumo teacher and students. Cronbach alpha procedure was used and the reliability for internal consistency of the instrument was found to be 0.89.

Data collected were analyzed using SPSS and the research questions were answered using Mean and standard deviation while, t-test statistic was used to test the hypotheses at 0.05 level of significance. The decision rule for the five point likert scale items were: any item with the mean value from 3.50 and above was rated agree and any item with the values below 3.50, were rated disagree. For the three point scale: 1.50 above was considered high. While, below 1.50 was considered low. For the

Impact of Peer Assessment on Students' Practical Skills Acquisition in Electronics Works Trade in Government Science and Technical Colleges of Adamawa State Nigeria'

hypothesis, the null hypothesis was accepted if the t-calculated was less than the t-tabulated, otherwise it was rejected.

RESULTS

Research Questions 1: What is the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment?

Table 1: Means and standard deviations of the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment.

S/N	ITEM	n = 89	TEACHERS		STUDENTS		T&S		REMARK
			\bar{X}_t	S_t	\bar{X}_s	S_s	\bar{X}_G	σ	
3	3								
	Where Peer Assessment is applied, female students want their work to be marked by their female colleagues.		0.84	4.11	1.16	4.06	1.00	Agreed	
3	4								
	With Peer Assessment, male students want their work to be marked by their male colleagues,		3.33	0.52	4.00	1.22	3.96	0.87	Agreed
3	5								
	Where Peer Assessment is used, female students contribute in group discussion when they are mixed with male students.		4.00	0.63	3.95	1.11	3.95	0.87	Agreed
3	6								
	Where Peer Assessment is used, Female students prefer group discussion than individual studies.		4.33	0.82	3.82	1.06	3.85	0.94	Agreed
3	7								
	Where Peer Assessment is used, male students prefer group discussion than individual studies.		4.33	0.52	3.86	1.18	3.89	0.85	Agreed
3	8								
	Where Peer Assessment is used, male students prefer group discussion than individual studies.		4.50	0.55	4.91	1.19	4.88	0.87	Agreed
3	9								
	Where Peer Assessment is used, male and female students discuss their academic challenges freely.		4.17	0.75	4.30	0.85	4.29	0.80	Agreed
4	10								
	Where Peer Assessment is used, male students want to groups in represent their presenting their work to the class.		4.33	0.52	4.12	0.98	4.13	0.75	Agreed
4	11								
	Where Peer Assessment is used, female students want to represent their groups in presenting their work to the class.		4.17	0.75	4.12	1.02	4.12	0.89	Agreed
4	12								
	Female students work better when they know their target in learning.		4.00	0.63	4.18	1.06	4.17	0.85	Agreed
4	13								
	Male students work better when they know their target in learning		4.33	0.82	4.37	0.96	4.37	0.89	Agreed
	Cluster mean		4.09	0.67	4.07	1.07	4.07	0.87	Agreed

N =number of respondents, \bar{X}_t =teacher mean, S_t =teachers' standard deviation, \bar{X}_s =students mean, S_s =students' standard deviation, \bar{X}_G =average of teachers' and students' mean and σ =average of teachers' and students' standard deviation.

The data presented in Table 1 shows Means and standard deviations of the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment. The responses revealed that, items: 33,34,35,36,37,38,39,40,41,42, and 43 have means ranging from 3.85 to 4.88 and standard deviations from 0.75 to 1.00 respectively. This implies that the respondents' opinion was agreed. The grand mean of 4.07 indicated that the respondents were of the opinion that there was no gender influence on students' academic performance by peer assessment. The grand standard deviation of the items was 0.87 indicating that the respondents were close to one another in their respective opinions.

Research Question 2: What are the perception of teachers and students on the use of peer assessment?

Table 2: Mean and standard deviation of the perceptions of teachers and students on the use of peer assessment.

S/N	ITEM	n = 89	TEACHERS		STUDENTS		T&S		REMARK	
			\bar{X}_t	S_t	\bar{X}_s	S_s	\bar{X}_G	σ		
4	Peer Assessment nurtures student-centered learning	4	5	0	0.84	4.42	0.59	4.43	0.71	Agreed
4	Peer Assessment encourages active learning	4	6	7	0.52	4.37	0.82	4.39	0.67	Agreed
4	Peer Assessment facilitates a deep approach to learning	4	1	7	0.75	4.22	0.80	4.22	0.78	Agreed
4	Peer Assessment encourages examination preparation techniques	4	6	7	0.52	4.30	0.92	4.33	0.72	Agreed
4	Peer Assessment allows students to develop critical thinking skills.	4	6	7	0.52	4.33	0.90	4.41	0.71	Agreed
4	Peer Assessment encourages students to learn the importance of objectiver	4	3	3	0.52	4.04	0.96	4.06	0.74	Agreed
5	Peer Assessment increases students' level of responsibility.	4	6	7	0.52	4.07	1.10	4.11	0.81	Agreed
5	Peer Assessment is an effective evaluation for learners who are at the same level and in the same field of study.	4	0	0	0.63	3.66	1.18	3.68	0.91	Agreed
5	Peer Assessment introduces studen	3	5	0	1.23	3.73	1.16	3.72	1.19	Agreed

Impact of Peer Assessment on Students' Practical Skills Acquisition in Electronics Works Trade in Government Science and Technical Colleges of Adamawa State Nigeria'

3	0	0	1.10	3.68	1.32	3.63	1.21	Agreed
3	6	7	0.82	3.54	1.36	3.55	1.09	Agreed
4	0	0	0.00	4.10	1.11	4.09	0.56	Agreed
3	5	0	0.84	3.77	1.35	3.75	1.09	Agreed
3	3	3	1.21	3.48	1.37	3.47	1.29	Disagreed
4	0	5	0.71	3.98	1.07	3.99	0.89	Agreed

n =number of respondents, \bar{X}_t = teacher mean, S_t =teachers' standard deviation \bar{X}_s =students mean S_s = students' standard deviation, \bar{X}_G = average of teachers' & students' mean and σ = average of teachers' & students' standard deviation.

Table 2 shows Mean and standard deviation of teachers' and students' perception on the use of peer assessment technique. The responses revealed that, items: 44,45,46,47,48,49,50,51,52,53,54,55 and 56 have means ranging from 3.55 to 4.39 and standard deviations ranging from 0.56 to 1.21 respectively. This implies that the respondents agreed showing that, teachers and students' perceptions were positive (agreed). Item 57 have mean 3.47 and standard deviations of 1.29 implies that, teachers and students' perceptions are negative (disagreed). The grand mean of 3.99 indicated that teachers' and students' perceptions were that, peer assessment was a good assessment technique. The grand standard deviation of the items was 0.86 indicating that the respondents were close to one another in their respective opinions.

Hypothesis 1: There is no significant difference between the mean responses of teachers and students on the influence of gender on students' academic achievement in Electronics Works Trade when they are assessed using peer assessment.

Table 3: Two tailed t-test of the difference between mean responses of teachers and students on the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment.

Group	N	\bar{X}	σ	df	t	p	Decision
Teachers	6	4.09	0.60	87	0.06	0.96	Uphold H_{01}
Students	83	4.07	1.04				

N = Number of respondent, \bar{X} = Mean, σ = Standard Deviation, df = Degree of Freedom t = Calculated value and P = Probability Value.

Table 3 shows the t-test of difference between mean responses of teachers and students on the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment. It was found that $t=0.06$ and $p=0.96$. $p>0.05$ (which is greater than the probability level). This indicates that, there is no significant difference between the mean responses of teachers and students on the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment. Therefore, the null hypothesis is upheld.

Hypothesis 2: There is no significant difference between the mean responses of teachers and students on their perception of the use of peer assessment.

Table 4: Two tailed t-test of the difference between the mean responses of teachers and students on their perception of the use of Peer Assessment.

Group	N	\bar{X}	σ	df	t	P	Decision
Teachers	6	4.04	0.51	87	0.15	0.88	Uphold H_{02}
Students	83	3.98	1.01				

N = Number of respondent, \bar{X} = Mean, σ = Standard Deviation, df = Degree of Freedom, t = Calculated value and P = Probability Value.

Table 4 shows the t-test of the difference between the mean responses of teachers and students on their perception of the use of Peer Assessment. It was found that $t=0.15$ and $p=0.88$. $P>0.05$

which is greater than the probability level. This indicates that there is no significant difference between the mean responses of teachers and students on their perception of the use of peer assessment. Therefore, the null hypothesis was upheld.

Major Findings of the Study

This study reveals the following findings based on the research questions and hypotheses formulated to guide the study:

1. The study indicated no gender influence on students' academic performance in Electronics Works Trade when they are assessed using peer assessment.
2. Teachers and students perceive that, the use of peer assessment enhances practical skills acquisition.
3. There is no significant difference between the mean responses of teachers and students on the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment.
4. There is no significant difference between the mean responses of teachers and students on the perception of the use of peer assessment.

DISCUSSION OF THE FINDINGS

The mean response of the respondents on research question three was agreed. The hypothesis that compares teachers' and students' responses on the influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment shows that there is no significant difference between their responses. This means that gender does not influence students' academic performance in Electronics Works Trade when they are assessed using peer assessment. This finding does not agree with that of Nwogu (2010) and Bosede (2010) which reveals that male students perform better in both achievement and acquisition of problem solving skills than female students in chemistry. It also contradicts the finding of Ariyo and Ugodulunwa (2007), which showed that girls performed better than boys in chemistry, and that the difference between their mean achievement score was significant. However when Eze (2011), Alade&Olagunji (2014) and Asuai (2013) carried out their studies using peer assessment, the findings of their studies conform to the finding of this study

which reveals that gender was not a significant factor on students' academic performance using peer assessment. It means that both genders can perform well where peer assessment is used.

The mean responses of the respondents on research question four were agreed except item 53 and 57. The disagreed in item 14 indicates approval of the technique because it is a negative item. Moreover, the hypothesis that compares Teachers' and students' responses on perception shows that there is no significant difference in their perception of the use of peer assessment. However, the grand mean was agreed. This agrees with findings of Adeyemi (2015), Alade and Olagunji (2014), Adeyemo (2013), Asuai (2013) and Eze (2011) who reported that peer assessment practice has a significant effect on the retention ability of the students. Adeyemo concluded that students performed better when peer assessment was used and that it was possible for students to self-assessed themselves with accuracy even in a very large class where assessment could be too tedious for the teacher to carry out regularly and effectively. On the aspect of students awarding more mark to their friend and less mark to their perceived enemies, this agrees with what Aneakwe (2007), who opined that under competitive learning, there is the tendency that some students will unfairly assess their colleagues. Some students will favour their friends with the intention that any day their friend will be assessing them they will do likewise.

Maryam (2011), in the same vein says that students' immaturity is the main reason advanced by teachers to account for not using of peer assessment. She continued by saying that, Many teachers who refused to use peer assessment in the class feel that student are not yet trained to perform such professional skills as assessing class work. However, Othman (2008) summarized the above problems and proffers the following as solution: The teacher can correlate their (student') assessment scores with their actual performance to ascertain the honesty of the students. This is at the first instance. He can then caution those who are insincere with this practice, honesty (affective behaviour) are in the students. With Othman's suggestion Peer Assessment can be used without fear of abuse.

CONCLUSION

Gender does not influence students' academic performance when they are assessed using peer assessment in electronics works trade. Also teachers and students do not differ significantly responses on influence of gender on students' academic performance in Electronics Works Trade when they are assessed using peer assessment and perception of the use of Peer Assessment.

RECOMMENDATION

Base on the findings of this study, the subsequent discussion and their implications, the following recommendations are made:

1. Electronics Works Trade teachers should adopt the use of peer assessment in assessing students since it has been perceive effective in improving students' motivation for skills acquisition in Electronics Works Trade.
2. Government should organize workshops, conferences and seminars to train teachers on the use of peer assessment.
3. Curriculum planners should include peer assessment in the curriculum of teacher Education for student teachers to be well trained peer assessment before graduation.
4. Teachers should painstakingly train students on the use of peer assessment technique to ensure its successful implementation. They should continue to monitor students to ensure they do not abuse the peer assessment.

Suggestions for Further Research

The findings of this study have generated some areas for further research. Against this background, further research could be undertaken to:

1. Impact of Peer Assessment on Students' Practical Skills Acquisition in Electronics Works Trade in Government Science and Technical Colleges in other States in Nigeria'.
2. Impact of Peer Assessment on Students' Performance in Electronics in tertiary institutions in Adamawa State, Nigeria.
3. Impact of Peer Assessment on Students' Academic Achievement in Electronics Works Trade in Government Science and Technical Colleges in Adamawa State, Nigeria'.

REFERENCES

- Abubakar, A. A. (2009). Continuous assessment in 6-3-3-4 system of education In Akpa, G.O. and Udoh. SU (Eds). *Towards implimenting the 6-3-3-4 system in Nigeria*.Jos; Tech-Source Electronics Press.
- Adeyemi, A. A. (2015). Relationship between learning outcomes and peer assessment practice in Obafemi Awolowo University, Ile-ife. *European scientific Journal* 11(16), 1857-7881.
- Adeyemi, E.O. (2012). Students, peers and teachers' strategies as a measure of effective classroom assessment and the value of triangulation. *A Paper Presented at the University of West Cape at the International Conference on Research and Capacity Building, March, 2012.*
- Adeyemo. E. O. (2013) Students, peers and teacher's strategies as a measure of effective classroom assessment and the value of triangulation. A paper presented at the University of Western Cape at *the International Conference on Research and Capacity Building, March 2013.*
- Alade, O. &Olagunju, A. M. (2014). The effect of peer - assessment strategy on students' achievement in senior secondary school economics. *International Journal of Education and Research* 2 (11), 40-55.
- Anaekwe, D.A. (2007). Effect of students' interaction pattern on cognitive achievement, retention and interest in Chemistry. *Unpublished PhdThesis*Nsukka.University of Nigeria.
- Anekwe, J.U. (2008). Effects of constructivist-based instructional model on students' interest and academic achievement in french language in anambra state. *Unpublished Ph.D. Thesis.* University of Port Harcourt.
- Ariyo, A. O. &Ugodulunwa, C. O. (2007). Effects of gender and school type factor on Nigerian junior secondary school students' performance in a science general aptitude test. *African Journal of Educational Research* 11(2), 1-9.

- Asuai, N. C, (2013). Impact of peer assessment on performance in mathematics among senior secondary school students in Delta state, Nigeria. *Journal of emerging trends in educational research and policy studies (Jeteraps)* 4(5), 719-725.
- Bosede, A. F. (2010). Influence of sex and location on relationship between students' problems and academic performance. *The Social Science*. 5(4), 340 – 345.
- Darling-Hammond, L. (2010). "Recognizing and developing effective teachers: What policy brief: Policy makers should know and do." Washington, D.C.: National Association of Education and American Association of Colleges for Teacher Evaluation.
- Eze, P.N. (2011). Effects of peer assessment on students' achievement and interest in French. *Unpublished PhD Thesis* Department of Science Education University of Nigeria, Nsukka.
- Federal Republic of Nigeria, (FRN) (2013). *National policy on education (revised)*. Federal Ministry of Education Abuja: NERDC. for learning" to enhance the student learning experience', Assessment & Evaluation in Higher Education 38.7: 875-891.
- Habib, G.W. (2008). Some effects of Reinforcement on achievement and behavior in regular classroom. *Journal of Educational Psychology* 63(3), 187-193.
- Ifeakor, A.C. (2009). Effects of commercially produced computer assisted instruction package on students' achievement and interest in secondary school chemistry. *Unpublished Ph.D. Thesis* University of Nigeria, Nsukka.
- Kearney, S. (2013). 'Improving engagement: the use of "Authentic self- and peer-assessment

- Maryam A.M. (2011). Constructivist and instructional design. *Education Technology*.
- Miao, B. G & Koper, L. L. (2007). *Discovery and inquiry methods*. In a Lewy (Ed). The International Encyclopedia curriculum oxford. Pergamom press
- Nwogu, E. (2010). An inquiry into the major difficulties expressed / exhibited by junior secondary school students in solving problems involving angles. *Unpublished BSc (Education/Mathematics) Project*, Department of Science Education, University of Nigeria, Nsukka.
- Obodo, G.C. (2014). *Principles and Practice of Mathematics Education in Nigeria (rev. ed)*. Enugu: Floxtone Press.
- Okegbile, A.S., (2008). The applicability of peer rating technique in the higher institutions. *Nigerian Journal of educational research and evaluation*, 8(2), 1-7
- Othman, G. (2008) *Curriculum implementation and instruction*. OnithsaUni-World Education Publishers (Nigeria) Limited.