# EFFECTS OF PEER ASSESSMENT ON STUDENTS' ACADEMIC ACHIEVEMENT IN COMPUTER STUDIES IN JUNIOR SECONDARY SCHOOLS IN MAKURDI METROPOLIS, BENUE STATE, NIGERIA

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**Abstract**
*The role of assessment in engendering teaching-learning process cannot be over-emphasized. This study evaluated the effect of Peer Assessment Technique (PAT) on students' academic achievement in Junior Secondary School Computer Studies in Makurdi metropolis, Benue State, Nigeria. Two research questions and a null hypothesis were formulated for the study. The study adopted a quasi-experimental research design, specifically the non-randomized pretest and posttest control group design. The population comprised of 2712 JS3 students in the twenty six co-educational secondary schools in the metropolis. Two secondary schools were randomly selected from the twenty six in the metropolis. In each of the two schools, two intact classes were randomly selected and altogether, comprised of 136 students as the study sample. The two intact classes in one of the schools were assigned to the experimental group, while the two in the other school were assigned to the control group. Computer Studies Achievement Test (CSAT) was used to collect data for the study. The reliability coefficient of CSAT was found to be 0.79 using Kuder Richardson formula 20. The CSAT was administered as pretest to the two groups. Treatment lasted for 4 weeks of 12 lesson periods for each group. After the treatment session the same instruments were rearranged and re-administered as posttest to the same subjects. The data obtained were analyzed using mean and Standard Deviation for research questions, while ANCOVA was used in testing the hypothesis. Findings revealed that the effect of PAT on students' achievement in Computer Studies was significant. It was concluded that PAT was more effective in engendering Computer Studies achievement. Thus, it was recommended that Computer Studies teachers could adopt the use of PAT in assessing students. Also, the Government and other relevant organs could organize workshops, conferences and seminars to train teachers on the use of PAT.*

**Keywords:** Peer assessment, Assessment tool, Computer Studies, Achievement

## Introduction

The extent to which the teaching activities fulfil its intended purposes, functions and goals, matter so much in teaching and learning processes. An institution that is committed to continual and meaningful improvement would be

committed to continual and effective assessment. Assessment as an integral part of learning process is defined by Adikwu, Aduloju and Agi (2016) as the process of gathering information for the purpose of decision making; it involves the collection of information about individual's knowledge, skills, attitudes, judgment, interpretation and using the data for taking relevant decisions about individuals, instructional process, curriculum or programme. Also, Emaikwu (2011) defined assessment as data-gathering strategies, analysis and reporting processes that provides information that can be used to determine whether or not intended outcome are being achieved. Assessment can therefore be considered as the measurement of the degree of behavioural changes that have taken place in a learner. This is normally carried out by the teachers in the school system. Assessment when effectively carried out gives a comprehensive feedback on how well students understand the information and also helps the teachers to improve the design of the instruction. Assessment therefore is viewed to be an effective process for promoting students' achievement.

In Nigeria, educational assessment is based on Continuous Assessment (CA). It is stipulated in the National Policy on Education that educational assessment and evaluation shall be liberalized by their being based in whole or in part on Continuous Assessment of the progress of the individual (Federal Republic of Nigeria (FRN, 2013). Adejoh and Obinne (2015) refer to Continuous Assessment is the regular and periodic assessment of learners by classroom teachers using a variety of methods to sum up all students' performances throughout the period of the course. The successful implementation of Continuous Assessment in schools as opined by Khadijeh (2010) is dependent on efficient use of a variety of techniques in assessing students' learning outcomes including Peer Assessment Technique (PAT).

Peer Assessment is a process whereby students assess assignments or tests of their peers based on teacher's benchmark (Sadler & Eddie, 2006). Peer assessment is a technique which is generally considered to be effective in promoting students' higher cognitive skills, since students use their knowledge and skills to interpret, analyze and evaluate others' work in order to clarify and correct it. Similarly peer assessment includes processes which require students to provide either feedback or grades (or both) to their peers on a product, process, or performance, based on the criteria of excellence for that product or event which students may have been involved in determining. It enables students' involvement in the assessment of their classroom activities and such involvement is an essential component of successful learning. Students' involvement includes contributing during discussions, initiating ideas, clarifying points among students, students paying individual attention to their fellow students, asking and answering questions. All these are done under the supervision and direction of the teacher.

There are different forms or models of peer assessment as identified by Miao and Koper (2007). One of them is the Meta-model which has four stages or steps that includes design assessment; do assignment; give feedback; and reacts to feedback. There is the VALUED model in Hodgman (1995) where the letters VALUED mean:

Valued Assessments Links Understanding of Evaluation and Design. Another form of peer assessment model is the nine-step model by Offorma (1998). The nine-step model include selection of objectives; identification of what the students have learnt; identification of what they have not learnt; identification of the problem they encountered during the lesson; self-assessment; construction of assessment instrument; administration of the instrument to the students; peer assessment; and collation of scores and feedback. In this form of peer assessment; at the end of the test, the teacher collected the exercise books in rows and gave them back to the students in a reshuffled manner to mark and ensured that no student got his or her exercise book. The correct responses were discussed with the students. The teacher gave the marking guide. The teacher collected the exercise books marked by the students and vet what the students had done and collated the scores. The exercise books were distributed back to the students for corrections and to see the extent they have performed. This study adopted eight out of the nine-step model by Offorma (1998). This is because the ninth step (self-assessment) involved assessing oneself, and the students in this study are not required to assess their individual work but their peers' work.

However, the logistics of peer assessment procedure to be implemented depends on its relevance to the group under study. Falchikov (2007) maintained that whatever form of peer-assessment used, ideally the method should allow learners to practice making reasonable judgments about the extent to which their peers have achieved the expected outcomes. The role of the classroom teacher in Nigerian Secondary Schools does not give students so much opportunity of being involved in their own learning. The 'chalk and talk' practice prevalent in Nigerian Secondary Schools has made the role of the student a passive one. The student is regarded as the recipient of learning while the teacher is the giver. Onukaogu and Arua (as cited in Eze, 2009) submitted that the student in this regard sits and swallows what the teacher has to give in terms of narration, exposition, instruction, classification, definition, among others. When the teacher needs to assess the success or the failure of the learning experience through class exercises, mid-term test or examination, the material is regurgitated on demand. The conventional assessment being used in schools i.e. the Teacher Assessment Technique (TAT) does not give room for students' active participation in their own learning and assessment. In contrast to Teacher Assessment Technique (TAT), where the teacher solely takes responsibility of assessing the students' achievement, Peer Assessment provides a strategy which offers students the opportunity of being involved in the learning and assessment process. Peer Assessment Technique develops analytical skills and increases level of responsibility and engagement, it therefore behoves on researchers to study its effectiveness in the Junior Secondary School in every school subject including Computer Studies.

Computer Studies is of paramount importance to national development and it is on this premise that the government of Nigeria introduced Computer Studies in the education system from primary to tertiary institutions. During the 32 Ministerial

Council Meeting of the National Council on Education in 1987, the Federal government of Nigeria decided to introduce Computer Education into the nation's Secondary School Curriculum (Jegede & Owolabi, 2003). The National Examinations Council (NECO) in the Basic Education Certificate Examination (BECE) syllabus (first edition) confirmed that Computer Studies at the Upper Basic Education (Junior Secondary School) level is one of the core pre-vocational subjects which prepare students fully for computer literacy and their further studies. Computer Studies is a skill-acquisition subjects that enables the students to be knowledgeable in computer applications for social, economic and national developments.

Today the world is continuously dominated by Information and Communication Technology (ICT). The computer, a major component of the ICT is a tool that has singularly and dramatically changed the behavioural pattern of people and corporate entities by determining their interaction around the world. In realization of the important role which computer plays as an agent of National development and globalization, students' poor achievement in Computer Studies over the years in both internal and external examinations in Junior Secondary Schools has attracted a lot of concern. Performance of candidates in Computer Studies at the Basic Education Certificate Examination (BECE) 2010-2016 in Benue State indicated that 37.05% and 62.95% of students scored A-C and P-F grades respectively, this revealed students poor performances in Computer Studies. There has been agitation for more functional and qualitative assessment in Computer Studies in our Junior Secondary Schools (Eze & Akubugwo, 2016). It becomes imperative that a strategy that has the efficacy of contributing to students' high academic achievement be adopted.

Peer Assessment Technique (PAT) is a technique that has been successfully employed in a variety of academic disciplines, which is considered to be effective in developing student's higher cognitive skills, some efforts have been made to explore its efficacy here in Nigeria. For instance, Alade and Olagunju (2014) applied it in Economics among Senior Secondary School Students in Bariga Local Development Council of Lagos State; Adeyemo (2014) studied it efficacy on teaching and learning in a large class among Senior Secondary School Students Osun State; Asuai and Adeleye (2013) investigated it in Senior Secondary School Mathematics in Delta State; Onuka (2007) applied it in English Language and Mathematics in Junior Secondary Schools in Kogi State; Eze (2009) studied its efficacy in French in Junior Secondary Schools in Onitsha Education Zone of Anambra State. The findings from the studies proved that PAT had significant effects on students' achievement in the different subject areas it was applied. In seeking for several means of enhancing the performance of students in Junior Secondary Computer Studies, there is the need to find out the effects of PAT on students' academic achievements in Computer Studies in Junior Secondary Schools. The purpose of this study was to determine the effects of Peer Assessment Technique on students' academic achievement in Computer Studies in Junior Secondary Schools in Makurdi metropolis. Specifically the study sought to:

1. determine the mean achievement scores of students exposed to Peer Assessment Technique and students exposed to Teacher Assessment Technique.
2. compare the mean achievement scores of students assessed using Peer Assessment Technique and students exposed to Teacher Assessment Technique

**Research Questions**

The following research questions were posed to guide the study:

1. What is the mean difference in the pretest and posttest achievement scores of students exposed to Peer Assessment Technique and students exposed to Teacher Assessment Technique?
2. What is the difference in the mean achievement scores between the groups exposed to Peer Assessment Technique and Teacher Assessment Technique?

**Hypothesis**

Based on the research questions, a null hypothesis was put forward in this study and tested at 0.05 level of significance.

1. There is no significant mean difference in the Computer Studies Achievement Test (CSAT) scores of students exposed to Peer Assessment Technique (PAT) and those exposed to Teacher Assessment Technique (TAT) after controlling for pretest scores

**Methodology**

The study adopted a quasi-experimental research design, specifically the non-randomized pretest–posttest control group design. It is a quasi-experimental study because it was not possible for the researcher to have a complete randomization of the subjects. Subjects were not assigned to groups, rather intact classes were randomly assigned to experimental and control groups. This is to avoid the disruption of school programmes. The population of the study comprises all the 2,712 students in Junior Secondary class three (JS3) in the 26 public Secondary Schools in Makurdi Metropolis (Makurdi Education Zone, Area Office, 2017). Two schools were randomly sampled using balloting, in each of the two schools; two intact classes were randomly selected and altogether, comprised of 136 students as the study sample. The instrument for data collection in this study is a Computer Studies Achievement Test (CSAT) comprising thirty multiple choice questions with five options (lettered A—E), adopted from the Computer Studies NECO Basic Education Certificate Examination question papers. The instrument was subjected to face and content validity**.** A measure of internal consistency of CSAT was determined using the Kuder Richardson Formula 20 technique. Data obtained from the trial testing was subjected to reliability analysis, estimate of $r = 0.79$ was obtained for the CSAT. The research questions were answered using mean and standard deviation. The hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA). The decision rule was to reject the null hypothesis if the p-value is less than the alpha value ($p<0.05$), otherwise failed to reject.

## Results

**Research Question One:** What is the mean difference in the pretest and posttest achievement scores of students exposed to Peer Assessment Technique (PAT) and students exposed to Teacher Assessment Technique (TAT)?

To answer research question 1, the analyzed Computer Studies Achievement Test (CSAT) scores of students is presented below:

**Table 1:** Mean Difference in Pretest and Posttest of CSAT Scores of Students exposed to PAT and TAT

| Group | N | Pre-test | | Post-test | | Mean Difference |
|---|---|---|---|---|---|---|
| | | $\overline{X}$ | SD | $\overline{X}$ | SD | |
| **PAT** | 68 | 39.91 | 6.65 | 56.09 | 4.07 | **16.18** |
| **TAT** | 68 | 39.74 | 8.19 | 43.35 | 7.9 | **3.61** |

Data presented in Table 1 shows that the group assessed using peer assessment technique had a mean of 39.91 with a standard deviation of 6.65 at pretest and a mean of 56.09 with a standard deviation of 4.07 at post-test. The mean difference in the pretest and post-test score using peer assessment technique was 16.18. It also showed that the group assessed using teacher assessment technique had a pretest mean score of 39.74 with a standard deviation of 8.19 and the post-test mean score was 43.35 and standard deviation was 7.90. Therefore, the mean difference in the pretest and post-test score was 3.61 as shown.

**Research Question Two:** What is the mean difference between the groups exposed to peer assessment technique and teacher assessment technique?
To answer research question 2, the analyzed CSAT scores of students is presented in table 2.

**Table 2:** Mean Difference in Pretest and Posttest CSAT Scores of Students exposed to PAT and TAT

| Group | N | _ Pre-test | | _ Post-test | |
|---|---|---|---|---|---|
| | | X | SD | X | SD |
| **Peer Assessment Technique** | 68 | 39.91 | 6.65 | 56.09 | 4.07 |
| **Teacher Assessment Technique** | 68 | 39.74 | 8.19 | 43.35 | 7.9 |
| **Mean difference** | | **0.17** | | **12.74** | |

The result in Table 2 reveals the mean difference between the scores of students assessed using peer assessment technique and teacher assessment technique at pretest and post-test as 0.17 and 12.74 respectively.

**Hypothesis One:** There is no significant mean difference in the Computer Studies Achievement Test (CSAT) scores of students exposed to PAT and those exposed to TAT.

**Table 3:** Analysis of Covariance (ANCOVA) of students' assessed with Peer Assessment Technique and those with Teacher Assessment Technique in CSAT

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Corrected model | 8457.000[a] | 2 | 4228.500 | 239.889 | .000 |
| Intercept | 2774.990 | 1 | 2774.990 | 157.429 | .000 |
| PRETEST | 2942.618 | 1 | 2942.618 | 166.939 | .000 |
| **GROUP** | **5418.041** | **1** | **5418.041** | **307.373** | **.000** |
| Error | 2344.382 | 133 | 17.627 | | |
| Total | 347012.000 | 136 | | | |
| Corrected Total | 10801.382 | 135 | | | |

The result in Table 3 shows that F(1, 133)= 307.373, P=.001, this revealed that P<0.05. Therefore, the null hypothesis of no significant difference was rejected. This implies that there was a statistically significant difference between the two groups of students (in favour of PAT) after adjusting for the covariate-pretest, as measured by the students' mean CSAT scores using Analysis of Covariance (ANCOVA).

**Discussion of Findings**

The result of the mean achievement score of students taught and assessed with peer assessment technique with respect to research question 1 indicates that students taught and assessed with peer assessment technique achieved higher. However, Table 2 revealed the mean difference when peer assessment technique and teacher assessment technique were used to be 12.74 which indicated that students in the peer assessment group achieved higher than students in the conventional teacher assessment group. The findings of this study as witnessed could be that, when students are taught and assessed using peer assessment technique they learnt better. To confirm whether the observed difference in the mean scores of the two groups was statistically significant; this result was strengthened with a test of related hypothesis

in table 4, which revealed a significant difference between the mean achievement scores of students when peer assessment technique and teacher assessment technique were used.

The study revealed that students assessed using peer assessment technique achieved significantly better than students assessed using Teacher Assessment Technique. The finding of this study corroborates the finding by Asuai and Adeleye (2013), who in their study observed a statistically significant difference in Mathematics test among experimental conditions, the students taught and assessed using peer assessment performed better. The finding of this study also agrees with Adeyemo (2014) whose finding revealed that students performed significantly better when peer assessment strategy was used and it was possible for students to assess themselves with accuracy even in a very large class where assessment could be too tedious for the teacher to carry out regularly and effectively. The findings of this study also conforms with the findings of Onuka (2007) whose finding revealed that peer assessment technique facilitated significant improvement in students' academic achievement in both Mathematics and English language. Thus, the higher achievement of students assessed using peer assessment technique could be attributed to the fact that the students were involved in their own learning starting from setting of criteria to assessment of their fellow students' work. This could excite them and boost their enthusiasm to learn Computer studies. This could be the reason why Burgess and Mellis (2015) revealed that Peer Assessment helps students to: develop their analytical skills, increase their level of responsibility and engagement and improve the quality of their writing. The students' achievement in peer assessment could also be explained on the basis of expectations from fellow students, coupled with the fact that a student's achievement will be made known to other students. This could also be why Shepard (2000) recommended peer assessment technique as one of the effective approaches for classroom assessment.

The findings of this study have far reaching educational implications for students, teachers and ministry of education. As an evaluative study, the findings provide useful feedback on the relative efficacy of peer assessment technique. This feedback will provide the basis upon which computer studies teachers could build to enhance the efficacy of their instructional practice.

**Conclusion**

As evident from the findings of this study, peer assessment technique has significant effect on students' achievement in Computer Studies. It enabled students to achieve better than their counterparts who were also taught Computer Studies but assessed using the conventional teachers' assessment technique. Peer assessment technique was more effective than teacher assessment technique in engendering the students' academic achievement.

**Recommendations**

The following recommendations were made based on the findings of this study:

1. The fact that high mean achievement scores were recorded through PAT, calls for Junior Secondary School teachers to acquaint themselves with PAT, with a view to adopting and using it for enhancing students' achievement. This could be done through seminars, conferences and workshops organized through agencies such as National Information Technology Development Agency (NITDA) and professional bodies like Nigerian Computer Society (NCS) and Curriculum Organization of Nigeria (CON).
2. Innovations like PAT demand well-trained personnel and make training and retraining of staff imperative. Heads of teacher training tertiary institutions may include PAT as one of the methods of assessment and could impart the usage to the student teachers.
3. The Ministry of Education in Nigeria could organize seminars, workshops and conferences for Computer Studies teachers on how to use PAT in teaching and assessment of computer studies students.

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