

Students, Peers and Teacher's Strategies As a Measure of Effective Classroom Assessment and the Value of Triangulation

By

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Abstract

The study examined the rate of secondary school students performance in mathematics using self, peer and teachers assessment strategies. It also assessed the impact of the combination of the three strategies with a view of determining the value of Triangulation. The study adopted survey design using pre-test and post-test quasi experiment. The sample size consisted of 60 students in Senior Secondary School Class Two. The instrument was a Mathematics Teacher's developed items administered to students thrice and assessed at intervals of four weeks of instructions, by teacher, peers and students self assessment strategies. This was followed by a post-test administered and scored by the class teacher. The students scores were recorded and analyzed using descriptive and inferential statistical analysis. The results revealed that there was a significant linear relationship between students' performance and peer assessment $r=0.632$, $P < 0.05$) and between students' performance and teacher's assessment strategy $r=0.527$, $P < 0.03$ while student assessment correlation with performance was low $r=0.372$ $P < 0.05$. The triangulation effect of the three class assessment strategies on students performance revealed the best approach with the coefficient of determination (R-square) of 0.49. When the three strategies were loaded on linear regression analysis with enter method the self assessment fails to influence students performance (0.053) $P > 0.05$. Since the coefficient for determination in triangulation was the highest, (R=0.49) the study concluded the combination of the three strategies.

1. Introduction

To ascertain the extent to which instructional objectives are achieved in educating the learners, there is the need for assessment. Assessment has been viewed by a number of scholars to be an effective tool of promoting student achievement, hence the role of assessment in teaching-learning process cannot be over emphasized. Onjewu (2006) viewed assessment to include all the processes and the products which describes the nature and extent of learning, its degree of correspondence with the aim and objectives of teaching, the relationship with the environment which are designed to facilitate schooling and learning.

Assessment at any level gives the individual concern some indication of actual achievement, identify trends among groups and helps to gather information made about the progress of students. An institution that is committed to continual improvement would be committed to continual assessment. Effective Assessment gives the feedback on how well students understand the information on what they need to improve while helping teachers better design instruction.

Assessment becomes more relevant when students take an active role in developing the scoring criteria, self evaluation and goal setting readily accept the fact that assessment is adequately measuring their learning.

Several studies had proved that assessment could enhance good performance and that it also serves as poor performance remedy (Onuka and Oludipe 2004, and 2006). A good assessment in most cases result to a corresponding improvement in learning. Also Ross, Rotheiser and Hogabam Gray (2002) opined that the internal consistency of self assessment is typically high

A major problem that is common to many Nigerian Schools is overcrowding of the classroom. This make the task of teachers in assessing and evaluating learners become increasingly tedious. This was captured in the words of Osasona (2005) that “marking of students tests, assignment and examination scripts is an uphill task for teachers teaching in a large class. Effective teaching, learning and marking becomes difficult in these large classes. It can easily be deduced that teachers do little or no teaching, evaluation in many cases may be below, the demand of educational authorities”. Teaching effectiveness which in the extent to which the teacher activities fulfill its intended purposes, functions and goals may be hindered. There are several reasons why teachers may perform below the demands of education authorities when faced with the problem of large classes. Several challenges and constraints teachers battle with are inadequate time, insufficient materials, and infrastructure. There could also by the problem of lack of effective classroom management. Longer time is consume in process of assessing, marking and grading of students response. These challenges have restricted the teachers and school administrators to rely majorly on the test taking i.e. examination as a measure of learning outcomes, neglecting the active participation of students in their own assessment, or the combination of two or more of these strategies which is referred to as triangulation.

The process of triangulation involves multiple entities assessing the same outcome, using different methodology, to validate findings. Triangulation is a strategy used for the purpose of assessing and improving the validity of research findings. The method relies on using multiple data sources and approaches to support a finding by showing that independent measures of it agree with or at least don't contradict it. (Miles and Hubernam (1984). This strategy increases the comprehensiveness and completeness of the research and enhances ability to confirm trends. It also identifies inconsistencies and improves the reliability and validity of findings. Triangulation is thought to be more reliable because it compensates for the inadequacies that may be related to any assessment method.

Self, Peer and Teachers involvement are part of the assessment strategies used to assess classroom performance. Self assessment requires students to formally judge their own skills, ability or performance. Peer assessment is the assessment of student work by his/her fellow mate (through exchange). These strategies are used as formative assessment method and are less commonly summative.

In view of the fact that assessment is an important part of any teaching method, much of what happens in the classroom is driven by it. Assessment therefore is central in the overall quality of teaching and learning in the classroom. A well defined assessment sets clear expectations, establishes a reasonable workload on teachers, provides students the opportunity to self-monitor their work unlike the teachers made test and the standardized test which provide little information about students learning. Strategies like the peer and self assessment expose some hidden potential in the students. It is with this view Brown (2004) highlighted that the methods used to assess teachers-centered assessment limit the opportunity for the students to fully understand the educational objectives and also limit the opportunity to develop critical evaluation skills.

Despite widespread of different assessment strategies, teachers have doubts about the value, validity and accuracy of these techniques and strategies. They relied so much on the assessment carried out by themselves as the most accurate and reliable; while neglecting the fact that students feel happy and belong when they too are involved in assessing themselves and curried along in the trend of their performance. There is the need therefore to explore self, and peer strategies to determine the one that would produce consistent results; in relation with the combination of two or more. In view of this, the following objectives were raised.

- i to examine the rate of students performance in mathematics using student self assessment strategy
- ii. to examine the rate of students performance in mathematics using peer assessment strategy

- iii. to determine the rate of secondary school student performance in mathematics with teacher assessment strategy
- iv. to assess the impact of the combination of peer, self and teacher assessment strategies in the performance of secondary students in Mathematics.

2. Methodology

The research design was survey using pretest and post test quasi experiment. The sample size consisted of 60 students from secondary school form two The Research instrument for this study was Mathematics Teachers' made test with the items selected based on the contents of the school syllabus and the topics taught within the period of the research. Mathematics was specifically chosen because all the students offer the subject.

A pretest was first conducted on the students to determine the level of academic performance of the students their scores in this pretest were recorded. The students were taught and examined at three different stages of 4 weeks intensive teaching each. After the first 4 weeks of instruction, they were examined on the topics taught. The marking of their work were done by the students themselves while the teachers provided the key to the items. Their scores were recorded. The teacher taught the students again for another 4 weeks after which test were administered on them. The students exchanged their works for marking, making sure that nobody marks his/her work. Their scores were also recorded. The teacher also taught them for the last 4 weeks and gave them test on the topics, the marking and grading was done by the teacher and their scores were recorded. A post test was conducted, using the combinations of all the questions given them at each stage of the instruction while the marking and scoring was done by the subject teacher. The student scores for each of the peer self and teachers assessment were compared for significant relationship using appropriate statistical analysis.

3. Results

Correlation between Student Performance and Assessment Strategies

Table 1.1 Correlation between Student Performance and class Assessment Strategies

	N	Correlation Coefficient	Sig
Students Self Assessment	94	0.372	<0.001
Peer Assessment	94	0.632	<0.001
Teacher's Assessment	94	0.527	<0.001

Table 1.1. shows the correlation coefficients between students' performance and various assessment strategies. According to the table, there is significant linear relationship between student performance and self assessment strategy ($r=0.372$, $P<0.05$), between students' performance and peer assessment strategy ($r=0.632$, $P<0.05$) and between students' performance and teacher's assessment strategy ($r=0.527$, $P<0.05$).

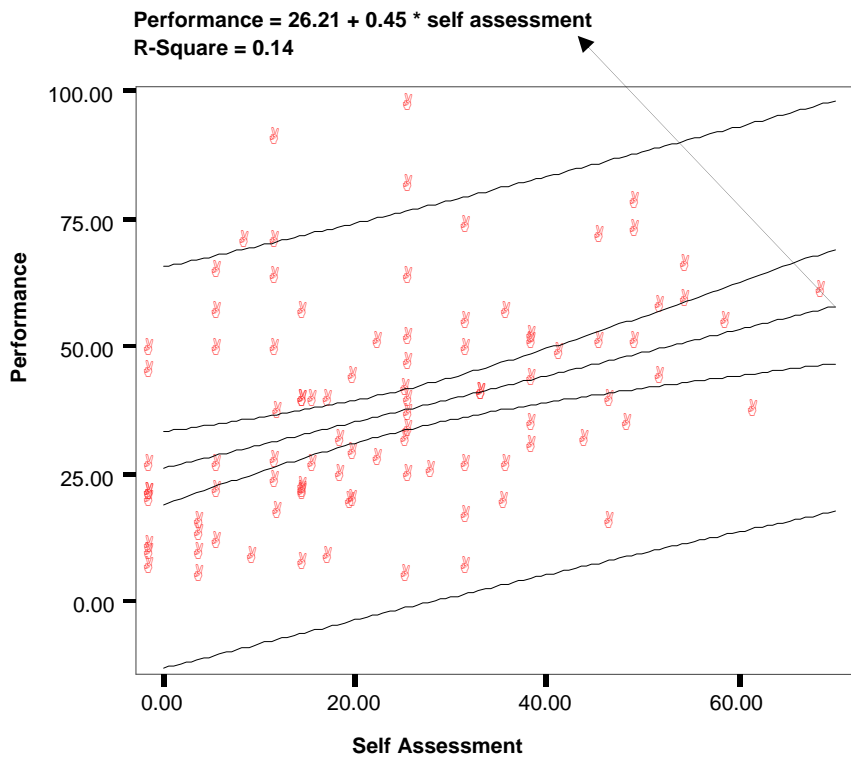
I- Effect of Self Assessment Strategy on Students' Performance

Table 1.2 Effect of Self Assessment Strategy on Students' Performance

Model	Regression Coefficients (β)	Standard Error	P value	R Square
Constant	26.21			
Self Assessment	0.45	0.12	<0.001	0.14

Table 1.2 shows the result of regression analysis of the effect of self assessment strategy on students' performance. As shown in the table, self assessment significantly predicts student's performance. The unstandardized regression coefficient indicates that a unit increase in self assessment strategy will lead to an increase in student performance by 0.45, holding all other factors constant. Hence, the R square, which is the coefficient of determination, explains that 14% of the variation in students' performance is accounted for by self assessment exercise.

The effect of self assessment on students' performance is illustrated using scatter plot as shown in figure 1.1. The arrow indicated the regression line of the regression equation showing the effect of relationship between self assessment and students' performance.



Linear Regression with 95.00% Mean Prediction Interval and 95.00% Individual Prediction Interval

Figure 1.1 Scatter plot of students' performance on self assessment strategy with regression line and 95% confidence interval.

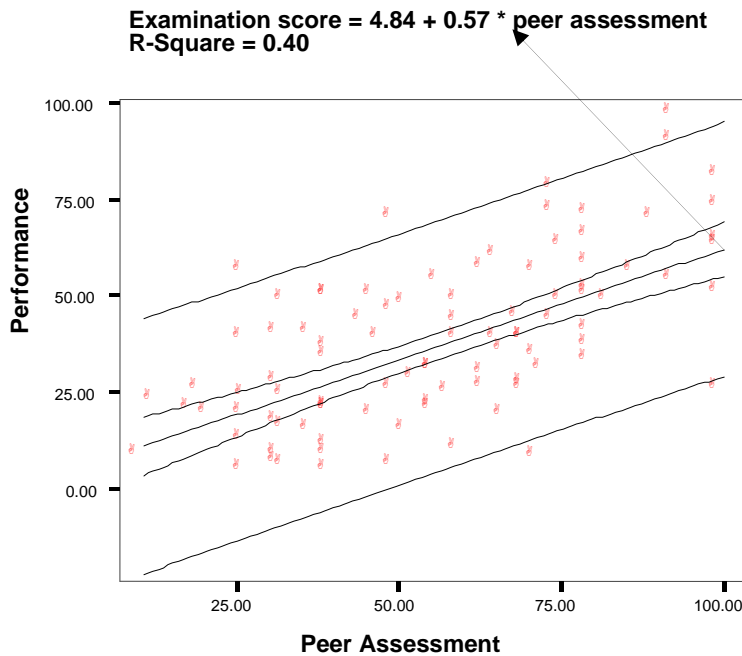
II Effect of Peer Assessment Strategy on Students' Performance

Table 2. Peer Assessment Strategy on Students' Performance

Model	Regression Coefficients (β)	Standard Error	P-value	R Square
Constant	4.84			
Peer Assessment	0.57	0.07	<0.001	0.40

Table 2 shows the regression analysis of the effect of peer assessment strategy on students' performance. The result indicates that peer assessment significantly influences student's performance. The unstandardized regression coefficient indicates that a unit increase in peer assessment strategy will lead to an increase in student performance by 0.57, holding all other factors constant. Hence, the R square, which is the coefficient of determination, explains that 40% of the variation in students' performance is accounted for by peer assessment exercise.

The effect of peer assessment on students' performance is illustrated using scatter plot as shown in figure 1.3; the arrow indicated the regression line of the regression equation showing the effect of relationship between peer assessment and students' performance.



Linear Regression with 95.00% Mean Prediction Interval and 95.00% Individual Prediction Interval

Figure 1.2 Scatter plot of students' performance on peer assessment strategy with regression line and 95% confidence interval.

III Effect of Teacher's Assessment Strategy on Students' Performance

Table 3 Teacher's Assessment Strategy on Students' Performance

Model	Regression Coefficients (β)	Standard Error	P-value	R Square
Constant	23.26			
Teacher's Assessment	0.56	0.09	<0.001	0.28

As shown in table .3, the regression analysis of the effect of teacher's assessment strategy on students' performance indicates that teacher's assessment significantly predicts student's performance. The unstandardized regression coefficient indicates that a unit increase in teacher's assessment strategy will lead to an increase in student performance by 0.56, holding all other factors constant. Hence, the R square, which is the coefficient of determination, explains that 28% of the variation in students' performance is accounted for by teacher's assessment exercise.

The effect of teacher’s assessment on students’ performance is illustrated using scatter plot as shown in figure 1.3; the arrow indicated the regression line of the regression equation showing the effect of relationship between teacher’s assessment and students’ performance.

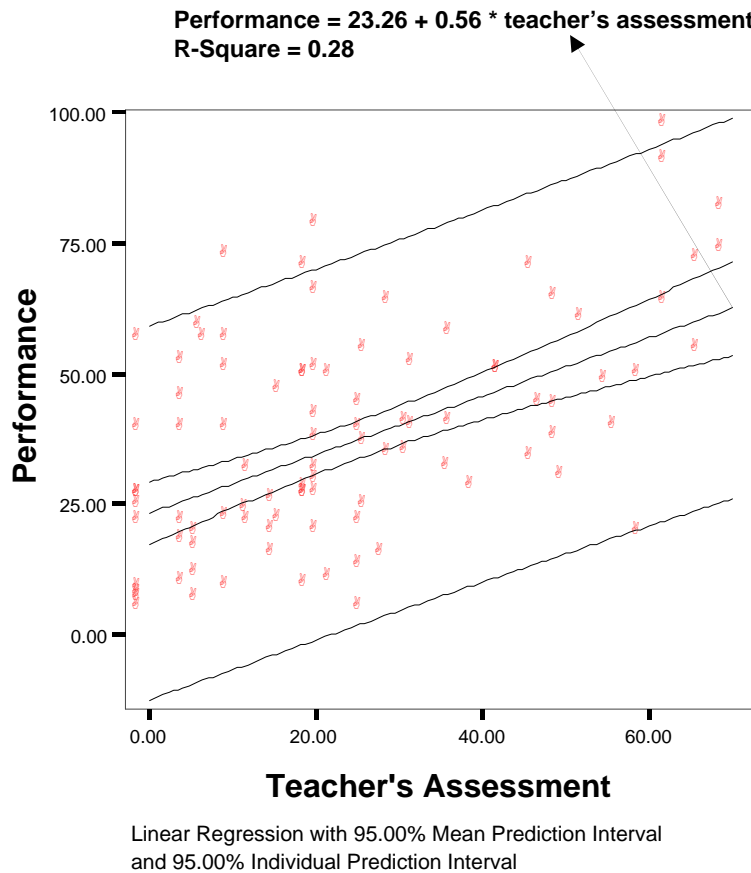


Figure 1.3 Scatter plot of students’ performance on teacher’s assessment strategy with regression line and 95% confidence interval.

IV. Effect of Triangulation Strategy on Students’ Performance

Table 4 Triangulation Strategy on Students’ Performance

Model	Regression Coefficients (β)	Standard Error	P-value	R Square
Constant	1.812			
Self Assessment	0.19	0.098	0.053	0.49
Peer Assessment	0.28	0.093	0.003	
Teacher’s Assessment	0.42	0.079	<0.001	

Table 4 shows the triangulation effect of the three class assessment strategies on students’ performance. As shown in the table, when the three class assessment strategies were loaded on linear regression analysis with enter method the self assessment fails to influence students’ performance significantly ($P>0.05$), while peer ($P<0.05$) and teacher’s assessment ($P<0.05$) significantly influenced students’ performance. The unstandardized regression coefficients also indicate the level of effect of each class assessment strategy on performance of student in secondary school. Hence combinations of peer and teacher’s assessment strategies are the best, for improving students’ performance. The coefficient of

determination (R square) indicates that 49 percent of the variation in student performance is explained by the three class assessment strategies.

4. Discussion

The significant linear relationship between students performance and the three assessment strategies was an indication that the three methods are viable strategies for assessing students performance. This validated the work of Berk (2005). On the regression equation, self assessment contributed minimally and the correlation coefficient was weak. The standard error (0.12) was the highest among the three methods. The weak correlation could be bias caused by students in scoring themselves against the scoring rubrics provided. This is an indication of weakness in using only student- self assessment strategy. Single theory, single investigation, single standard or single unit of analysis of studies often suffer from intrinsic deficiencies; among which is the lack of different data set that would enable researcher draw comparison (Hesse-Biber and Leavy (2006), Hilton (2003).

Peer assessment strategy significantly influences students performance. 40% of the variation of students performance was accounted for by peer assessment strategies. The regression coefficient indicated that a unit increase in peer assessment strategy resulted to 57% increase in students performance. However, the average standard error was higher than teachers' assessment strategy. This indicated that peer assessment strategy was not totally free from bias, even though lesser than of students assessment strategy.

Teachers' assessment correlates significantly with the students performance. It has an average of standard error or 0.79. This implied that teacher assessment was not totally free from bias which could arise from lack of objectivity in scoring and any other intrinsic deficiencies. The triangulation effect of the three assessment strategies on students performance revealed that both peer and teachers' assessment strategies contributed highly to student performance with $P < 0.05$. The coefficient of determination (R-square) for the triangulation was the highest of all the strategies. This implied that the combination of the three strategies significantly influenced students performance. The combination of these three approaches will make for errors in either one; since findings could be corroborated and any weakness could be compensated for by the strength of other strategy. This findings supported Salsali (2005) that several observations of phenomena are better than only one and will likely yield a more accurate, valid and reliable measure than when such observation rest solely on the use of a method or source.

5. Conclusion

There is need therefore for the use of the three assessment strategies to assess students performance. It will be a relief for teachers handling large classes to effectively assess the students. In situations where bias is needed to be brought to the barest minimal, two of these strategies (peer and teachers' assessment) is recommended for use in Nigerian secondary schools where there are large classes.

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