

THE USE OF MODERN ASSESSMENT TOOLS IN ENHANCING LEARNING IN THE 21ST CENTURY SECONDARY SCHOOL CLASSROOMS IN NIGERIA

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ABSTRACT

The 21st-century classroom is child-centered giving the students the responsibility to be active participants in their learning. Evaluation of learning outcomes in this type of classroom should therefore be child-centred through self and peer assessments. This requires the use of modern assessment tools which enhance learning like the rubrics and educational graffiti wall among others. This study investigated the effects of Rubrics and Graffiti walls in enhancing learning among secondary school students in Rivers State, Nigeria. The study adopted a quasi-experimental design with three research questions and three corresponding hypotheses. One hundred and thirty-five students participated in the study. Three (3) arms of Senior Secondary Two, SSIIA, SSIIB and SSIIC were used as experimental groups 1, 2 and control respectively. A pre-test was given to all the groups before the treatments and a post-test was given after the treatments. Data were analyzed using mean scores for the research questions, while one-way ANOVA and ANCOVA were used to test the hypotheses at a 0.05 level of significance. Results revealed significant differences in the performances of the students in the three groups with more effect from the use of rubrics. Recommendations were made based on the findings.

Keywords: Self-Assessment, Peer-Assessment, Rubrics, Graffiti Wall.

1. INTRODUCTION

Assessment of learning outcomes is an important and integral aspect of teaching and Learning. If one uses the best teaching methods, the right teaching aids, and a conducive learning environment but uses an ineffective assessment method, wrong decisions would be made with long-lasting consequences. The 21st-century classroom is designed to be student-centered where students are active participants in their learning. Gone are the days when the teacher alone is the custodian of knowledge and dishes it out to non-participant students who cram what the teacher says and reproduce them during examinations without proper understanding. Students were not challenged to think outside the box and learn problem-solving skills that can solve real-life problems. Though the western and eastern parts of the world have moved forward in letting students develop such skills, most African countries are yet to follow suit. Assessment in the 21st-century classroom is being tailored for student participation.

Assessment can be grouped into four basic types:

1. Prognostic: This is given at the beginning of a programme to determine the level of readiness for a programme. The entrance examination will fall under this category.
2. Formative: This takes place as the programme is still on and has the advantage of being used to enhance the programme. It checks if the objectives are being achieved and if mistakes made can be corrected.

3. Diagnostic: When problems are detected through formative assessment, there is always a need to pinpoint the problem a child is having so that the proper intervention can be given.
4. Summative: This is given at the end of the programme to find out if the stated objectives have been achieved.

Uses of Assessment

Assessment is used for three main purposes; of learning, for learning and as learning.

Assessment of learning: This is summative and is used to find out if students have acquired the necessary level of competencies for promotion, selection, and certification. etc.

Both assessments for and as learning are formative and help students to learn actively from feedback. When it helps teachers to redirect their teaching, assessment is for learning but when students use the feedback given by teachers to improve on what they can do then assessment is used as learning.

Assessment as learning mainly can be through self or peer assessment and modern tools used include; rubrics, graffiti walls, highlights, shout-outs, portfolios etc.

RUBRICS: These are grading tools as observed by Chowdhury in 2019 which help instructors grade works done by students in a more objective, consistent, unbiased and reliable way. It is a grading tool with success criteria showing what students are expected to do thereby helping students to learn. The history of rubrics shows it started with Christian monks when reproducing sacred literature in the mid-15th century. They headed each section with red letters giving it the name rubric- which is a Latin word for red/ (Chowdhury, 2019). It is a multipurpose grading guide used in the assessment of students' performance and products in different ways to enhance students learning and it is very effective in enhancing teaching. After a review of the literature on the advantages and challenges associated with the use of rubrics, Nkhoma et. al. (2020) concluded that rubrics are not just assessment tools useful to students but are also educational learning tools that help learners to choose the right learning approaches and also help teachers to better plan their teaching strategies.

A well-constructed rubric has four different parts; The task dimension which tells students what to do, the scale which gives levels of performance or mastery, the dimension or the characteristics to be rated and the descriptions of the dimensions at each level of mastery (Chowdling, 2019). Rubrics types can be single-point, holistic or analytic.

A review of studies using rubrics to enhance learning shows that while some experts have applauded it, some have misgiving about it. In 2012, He and Canty conducted a study on empowering students learning through Rubric-Referenced Self-Assessment on 259 Chiropractic students on an anatomy assignment. There were 130 students in the experimental group and 129 in the control group. After the first draft of the assignment, general feedback was given, and then the experimental group used the rubrics to amend the assignment before resubmission. Results showed that those in the experiment group had significantly higher scores.

Another by Tshering was conducted in 2018, titled Effects of Using Rubrics on the Learning Achievement of Students in Educational Assessment and Evaluation at the Royal University of Bhutan. 120 first-year students participated in the experiment using the Pre/Post-test approach. While the control group employed the conventional instructor evaluation, the experimental group's students were taught how to use rubrics for self-assessment. The outcome showed that

the experimental group's students did much better than the control group's students, and it was also discovered that the students had a favourable attitude towards the usage of rubrics. The results are expected as rubrics if well written give the students expectations of success criteria. The students see what the assessors are expecting and are guided in their responses. They see their strengths and weaknesses and improve on what they are doing.

In a study conducted by Miknis et al. (2020), the researchers examined the potential for enhancing students' learning outcomes through the use of self-assessment rubrics. Specifically, students enrolled in a higher education institution and using a computer programming mode were instructed to engage in self-assessment activities using identical rubrics as those employed by the assessors. By conducting a comparative analysis of the scores achieved by assessors and students, the lecturers were able to get insights into the anticipated scores of the students. Subsequently, they made enhancements to their educational techniques by modifying the structure and emphasis of classroom activities. The implementation of this intervention resulted in a significant improvement in both the academic performance and self-regulatory abilities of the pupils.

This confirms that the rubrics are useful both to the assessors and the students for both assessments for learning and as learning. The rubrics guide both learning targets and descriptive expressions of when these targets are met. In 2020, Panadoro and Jonsson carried out a critical review of the arguments against the use of rubrics to show the concerns some scholars have as limitations of using rubrics. They looked at 27 publications and 93 excerpts. Some authors observed listed limitations which are based on their evidence rather than empirical studies. They also noted that some of the critics of rubrics have a very narrow idea of what rubrics are while some believe that rubrics are.

A study on Examining the Impact of Self-Assessment with the Use of Rubrics on Primary School Students' Performance by Vasileiadou and Karadimitriou (2021) was carried out on 70 5th and 6th graders. Thirty-nine of them were in the experimental group and 31 were in the control group. The students in the experimental group used rubrics for self-assessment in language, History and Writing for 10 weeks while the control group did not. All the students took the pre and post-tests and the result showed that rubrics used for self-assessment significantly enhanced the performance of those in the experimental group, especially in writing. Considering the argument on how useful rubrics are in enhancing learning, English and Graham, (2022) conducted a study on Rubrics and Formative assessment in K-12 Education: A scoping review of the literature reviewed most support that rubrics enhance learning assessment and development of lifelong skills, especially when properly construct.

The Graffiti Wall

This is another assessment tool good for assessment and learning, it was originally for artists who could not access museums or art galleries and decided to use street walls for expressing their works. Some people see it as vandalism while others as an artistic expression which has become useful in the classroom as both a learning and assessment tool. It is just a piece of paper with questions to which students can respond. It might not necessarily hang on the wall; the students can place it on the table or floor and write. There are different types e.g. the tag, throw-up or bomb, letters which can be blockbusters or bubbles and masterpieces made up of pieces or characters.

Benefits of using Graffiti in the class: as noted by Ross and Lennon (2018)

1. It saves time as students can go around and respond to the questions as they are engaged.
2. Used to introduce new topics and students can identify objectives to be achieved.
3. The shy or reserved students can express their ideas freely.
4. Students can learn from the responses of their classmates.
5. You can use it to prepare students for group or class discussions.

Some studies have been done on the use of graffiti in the classroom.

In a study undertaken by Mwangi (2012), the focus was on the examination of graffiti writing and its possible implications for English language education in selected schools within the larger Laikipia East District in Kenya. This research aimed to explore the many varieties of graffiti present in educational institutions, while also analysing the communication tactics used in graffiti writing, aesthetic norms, symbolism, and visual metaphor. The data were obtained by the administration of surveys, the collection of written creative declarations, and the observation of artistic norms. The study was grounded in three primary tasks centred on a shared topic of personal identity. The results indicated a considerable improvement in students' knowledge of metaphors and their understanding of aesthetic conventions.

Most of these studies were on existing graffiti on school premises or the streets. A study by Phillips (2018) on Graffiti Boards inside Eastern Washington University on graffiti communication and Jepchirchir (2019) both on an analysis of graffiti as a communication strategy in selected public boarding secondary schools in Baringo Central School Kenya both concluded that they were used for self-expression which helps students to learn from each other and common types are gang-related messages being sent across.

In another vein, Manera (2019) studied Textual Analysis of School Graffiti in six Secondary Schools. Two hundred and sixty-five pictures and graffiti were randomly sampled and 125 respondents sampled by purposive and snowball reviewed the collected items. Results revealed that students expressed their opinions and emotions mainly in these major ways; communicating a message, revenge or self-expression for gang communication and territorial domination.

In Jordan however, Mohammed in 2021 had a Discourse Analysis Study of Graffiti at secondary schools. The work mainly investigated the regional meaning of graffiti written on desks and walls of public primary schools in the Directorate of Education for the Qasabat Irbid District in the 2020/2021 school year. A total of 207 pieces of graffiti taken from different areas were examined and the result showed the writings could be put into three areas: Politics, Emotional and Religion.

Not many empirical studies have been done on graffiti as a learning or assessment tool to the best of the researcher's knowledge.

2. METHOD

The study employed a quasi-experimental design using students in three intact classes in a secondary school. Purposively, a school with three arms in SSII was selected and SSIIA was given treatment 1 which was assessment with rubrics, SSIIB did their assessment with graffiti while SSIIC was the control using the traditional teacher assessment method; A total of 135 students participated in the study which took eight weeks of teaching English Language. All the students took a pretest before and a posttest after the treatments.

The English teacher in the school was first trained in the use of these assessment tools and he employed them during his normal lessons.

Group A = SSIIA was given scoring rubrics to score their assignments after each topic was treated.

Group B = SSIIB was asked questions on graffiti in the classroom which they responded to.

Group C = SSIIC after each topic was given assignments which were scored by the teachers.

At the end of the eight weeks, all the students took a post-test on the topics covered within this period.

3. RESULTS

Table 1: Distribution of respondents

Variables	n	(%)
Gender		
Male	55	41
Female	80	59
Groups		
Experimental Group 1 (Rubrics)	49	37
Experimental Group 2 (Graffiti)	45	33
Control Group	41	30
N	135	100

Table 1, shows the distribution of the respondents to the study. The table shows that 41% of the respondents were male while 59% of the respondents were female. The table also shows the distribution of the students into the two experimental groups and the control group, it shows that 37% of the students were in Experimental Group 1, 33% were in Experimental Group 2, and the remaining 30% made up the control group.

Research Question One: There is no mean difference in the English Language performance of students in Experimental Group 1, Experimental Group 2 and the Control Group as indicated by their Pre-Test scores

Table 2: Pre-test Mean Scores/Standard Deviation of Experimental and Control Groups

	Group	N	Mean	Std. Dev
Pre-Test Scores	Experimental Group 1	49	43.86	13.26
	Experimental Group 2	45	39.24	13.32
	Control Group	41	41.81	14.03
	Total	135	41.70	13.56

Table 2, shows the pre-test scores of all the experimental groups and control group, it shows that experimental group 1 had a mean of 43.86 and a standard deviation of 13.26, for experimental group 2 the mean was 39.24 and a standard deviation of 13.32, while the control group had a mean of 41.81 and a standard deviation of 14.03. This shows that experimental group 1 had the highest mean, the control group had the second highest mean, and experimental group 2 had the lowest mean.

Hypothesis One: There is no significant mean difference in English Language performance of students in Experimental Group 1, Experimental Group 2 and the Control Group as indicated by their Pre-Test scores

Table 3: One-Way ANOVA of Pre-Test Means Scores of Experimental and Control Groups

Analysis of Variance					
Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	499.798	2	249.899	1.367	.258
Within Groups	24122.750	132	182.748		
Total	24622.548	134			

Table 3 presents the results of a One-way Analysis of Variance (ANOVA) conducted to assess if there exists a statistically insignificant disparity in the means of Experimental Group 1, Experimental Group 2, and Control Group, as shown by their pre-test scores. The hypothesis was evaluated at a significance level of 0.05. The outcome of the analysis yielded a test statistic of $f(2, 132) = 1.367$, with a corresponding p-value of 0.258. The obtained result lacks statistical significance, as shown by the p-value of 0.258, which exceeds the predetermined threshold of significance of 0.05. This finding implies that there is no statistically significant difference in the mean scores of Experimental Group 1, Experimental Group 2, and Control Group, as revealed by the Pre-Test scores. Therefore, the null hypothesis was not refuted.

Research Question Two: There is no mean difference in the English Language performance of students in Experimental Group 1, Experimental Group 2 and the Control Group as indicated by their Post-test scores.

Table 4: Post-test Mean Scores/Standard Deviation of Experimental and Control Groups

	Group	N	Mean	Std. Dev
Post Test Scores	Experimental Group 1	49	74.61	14.68
	Experimental Group 2	45	63.22	15.45
	Control Group	41	44.95	10.65
	Total	135	61.81	18.36

Table 4, shows the post-test scores of all the experimental groups and control group, it shows that experimental group 1 had a mean of 74.61 and a standard deviation of 14.86, for experimental group 2 the mean was 63.22 and a standard deviation of 15.44, while the control group had a mean of 44.95 and a standard deviation of 10.65. This shows that experimental group 1 had the highest mean, experimental group 2 had the second highest mean, and the control group had the lowest mean.

Hypothesis Two: There is no significant mean difference in the English Language performance of students in Experimental Group 1, Experimental Group 2 and the Control Group as indicated by their Post Test Scores

Table 5: One Way ANOVA of Post-test score of Experimental and Control Groups

Analysis of Variance					
Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19773.680	2	9886.840	51.422	.000
Within Groups	25379.313	132	192.268		
Total	45152.993	134			

Table 5b: Scheffe Simultaneous Tests for Differences of Means of Posttest Score of Experimental and Control Groups

(I) Class	(J) Class	Mean Difference (I-J)	Std. Error	Sig.
Scheffe Experimental Group 1	Experimental Group 2	11.39*	2.86294	.001
	Control Group	29.66*	2.93484	.000
Experimental Group 2	Experimental Group 1	-11.39*	2.86294	.001
	Control Group	18.27*	2.99367	.000
Control Group	Experimental Group 1	-29.66*	2.93484	.000
	Experimental Group 2	-18.27*	2.99367	.000

The mean difference is significant at 0.05*

Table 5 presents the results of a One-way Analysis of Variance (ANOVA) conducted to assess if there exists a statistically insignificant disparity in the means of Experimental Group 1, Experimental Group 2, and Control Group, as shown by their post-test mean scores. The hypothesis was evaluated at a significance level of 0.05. The outcome of the analysis yielded a statistic of $f(2, 132) = 51.422$, with a p-value of 0.00 [3.0645E-17]. The importance of this finding lies in the fact that the calculated p-value of 0.00 [3.0645E-17] falls below the predetermined threshold of significance of 0.05. This observation implies that there exists a notable disparity in the means of Experimental Group 1, Experimental Group 2, and Control Group, as seen by their respective post-test mean scores. Therefore, the null hypothesis was rejected. A Scheffe simultaneous difference of means test was conducted to ascertain the presence of a statistically significant difference. Table 5b presents evidence of a statistically significant disparity between Experimental Group 1 and Experimental Group 2, Control Group and Experimental Group 1, as well as Experimental Group 2 and Experimental Group 3.

Research Question Three: There is no mean difference in the English Language performance of students in Experimental Group 1, Experimental Group 2 and the Control Group as indicated by Pre-test and Post-test scores.

Table 6: Pretest and Posttest Mean Score of Experimental Group 1, Experimental Group 2 and Control Group

Groups	N	Pre-Test Mean	Std. Dev	Post Test Mean	Std. Dev	Mean Difference
Experimental Group 1	49	43.86	13.26	74.61	14.68	30.76
Experimental Group 2	45	39.24	13.32	63.22	15.45	23.98
Control Group	41	41.80	14.03	44.95	10.65	3.51

Table 6 presents the pretest and post-test scores of experimental group 1, experimental group 2, and the control group. The table reveals that the pretest mean score for the participants was

43.86, with a standard deviation of 13.26. In contrast, the post-test mean score was 74.61, accompanied by a standard deviation of 14.68. Consequently, there was a mean difference of 30.75 observed for experimental group 1. The table presents the descriptive statistics for the pretest and posttest scores of two groups: the experimental group 2 and the control group. The pretest mean score for experimental group 2 was 39.24, with a standard deviation of 13.32. In contrast, the posttest mean score for this group was 63.22, with a standard deviation of 15.45. Consequently, the mean difference between the pretest and posttest scores for experimental group 2 was 23.98. For the control group, the pretest mean score was 41.80, with a standard deviation of 14.03. The posttest mean score for this group was 44.95, with a standard deviation of 10.65. As a result, the mean difference between the pretest and posttest scores for the control group was 3.51. The obtained outcome indicates the effectiveness of the therapies, with experimental group 1 demonstrating more efficacy compared to the control group using the standard technique.

Hypothesis Three: There is no significant mean difference in the English Language performance of students in Experimental Group 1, Experimental Group 2 and the Control Group as indicated by their Pre-test and Post-test scores.

Table 7: One-way ANCOVA Results for Experimental Group 1, Experimental Group 2 and Control Group

Tests of Between-Subjects Effects						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	
Corrected Model	20382.583 ^a	3	6794.194	35.932	.000	
Intercept	57523.428	1	57523.428	304.217	.000	
PreTest	608.904	1	608.904	3.220	.075	
Treatment	20084.779	2	10042.390	53.110	.000	
Error	24770.409	131	189.087			
Total	560874.000	135				
Corrected Total	45152.993	134				

a. R Squared = .451 (Adjusted R Squared = .439)

Table 7 presents the results of an analysis of covariance (ANCOVA) conducted to examine the statistical significance of the disparity between experimental group 1, experimental group 2, and the control group based on their pre-test and post-test scores. The analysis of covariance (ANCOVA) yielded a significant result, $F(2, 131) = 53.110$, $p < 0.001$, indicating a very significant relationship between the variables under investigation. The obtained result has significance due to the p-value of 0.00 [1.285E-17], which falls below the predetermined threshold of significance of 0.05. These findings show that the therapy had a notable impact, particularly in the experimental group when compared to the control group, as evidenced by the scores obtained in both the pre-test and post-test assessments. Therefore, the null hypothesis is rejected.

4. DISCUSSION

Table 2 on the pre-test means for the experimental groups 1, 2 and the control group to be 43.86, 39.24 and 41.81 respectively which when subjected to one-way ANOVA showed not to be

significant at f - the value of 1.369 and a p -value of .258 which is higher than 0.05 level of significance.

The mean post-test scores for experimental groups 1, 2, and the control group were found to be 74.61, 63.22, and 44.95, respectively. This difference in means was determined to be statistically significant, with an f -value of 51.42 and a p -value of .000 [3.0645E-17], which is below the conventional threshold of 0.05. Upon doing the Scheffe post hoc test, it was seen that there are statistically significant differences between experimental group 1 and experimental group 2, the control group and experimental group 1, as well as experimental group 2 and the control group. Upon analysis of the pre-test and post-test scores for each respective group, it was seen that experimental group 1 exhibited a mean difference of 30.76. Similarly, experimental group 2 displayed a mean difference of 23.98, while experimental group 3 exhibited a mean difference of 3.15. In contrast, the control group showed a mean difference of 3.15.

Table 7 presents the results of a one-way ANCOVA analysis examining the significant mean difference between experimental groups 1, 2, and the control group. The analysis was based on pre-test and post-test scores. The obtained F -value was 53.110, with a corresponding p -value of less than 0.05 (1.285 E-17). This finding is considered statistically significant since the p -value of 0.00 (1.285E-17) is lower than the predetermined threshold of significance (0.05). The findings indicate a notable impact of the interventions.

These results are in line with the findings of Tsherry (2018), Miknis et al (2020), Vasileiadu & Karadimitriou (2021) and English and Graham (2022) who all found rubrics to enhance learning. The result also collaborates with that of Matt (2013) who found that graffiti walls in the classroom can enhance students' understanding of artistic conventions, symbolism and visual metaphor. The present result is probably due to rubrics providing a guide on what students are expected to do. Again, both rubrics and graffiti afford opportunities for students to learn from each other more than teacher assessments which often are not explicit enough to show students what is expected of them.

5. CONCLUSION

The study concludes that both the rubrics and the graffiti walls when used for assessment enhance learning but the class that used rubrics outperformed those that used the graffiti walls.

6. RECOMMENDATIONS

Based on the findings, the following recommendations were made;

1. Teachers should embrace these modern assessment tools which are not expensive to use or construct.
2. Well-constructed rubrics with explicit success criteria should be used.
3. Graffiti should be used to help even the shy students who ordinarily will be quiet in class.

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