(MIJ) 2021, Vol. No. 7, Jan-Dec **e-ISSN: 2454-924X; p-ISSN: 2454-8103**

EFFECT OF RUBRICS ASSESSMENT TOOL ON STUDENTS' ACHIEVEMENT IN BASIC SCIENCE IN JALINGO EDUCATION ZONE, TARABA STATE, NIGERIA

Igoh Sunday Adah
Department of Science Education Taraba State University, Jalingo, Nigeria

ABSTRACT

The study examined the effective use of rubric self-assessment tool in developing basic education students' achievement in basic science. Quasi experimental design was used for the study. The population of the study was 36,000 Basic education students. A sample size of 76 students. 2 intact classes of 42 and 34 Upper basic II students were used as sample of study. Three objectives, three research questions and three hypotheses were raised to guide the study. Basic Science Achievement Test (BSAT) developed by the researcher was used for data collection. Mean and standard deviation were used to answer the research questions while the hypotheses were tested using ANCOVA at 0.05 level of significance. Results obtained among others indicated that students under Rubric self-assessment tool scored higher than those taught using a conventional method. It was therefore concluded that Rubric self-assessment tool empowers students' learning in basic science. It was recommended among others that effective use of Rubric assessment tool should be used to enhance the teaching and learning of Basic Science.

Key words: *Basic Education, Basic Science, Students' Achievement, Rubrics Assessment tool, Gender*

INTRODUCTION

The Universal Basic Education (UBE) programme in Nigeria was launched in 1999, with the goal of providing "free, universal and compulsory basic education for every Nigerian child aged 6-15 years", UBE (2018).The onset of basic education programme in Nigeria ushered in Basic Science as one of the core subjects to be studied in order to pave way for the scientific and technological development of the nation. Basic Science is basic training in scientific skills which are required for human survival, sustainable development and societal transformation (Chukwuneke & Chinkwenze, 2012).This implies that effective teaching and learning of the subject could lead to the attainment of the sustainable development Goal of the nation.

Basic Science, as a core subject plays a major role in exposing learners to the world of Science and prepares them for higher education in Science and technology. The teaching of Basic Science enables learners to identify problems that are of scientific nature, analyse such problems, engage in critical thinking and thus

Presented at International Conference on Innovations in Multidisciplinary Research (ICIMR-2021)
Held on 23rd & 24th August, 2021

develop problem solving skills eventually. Basic Science is of great importance because early experiences in science help students to develop problem-solving skills that empower students to participate in an increasingly scientific and technological world (Guyana, 2009).This shows that acquisition of knowledge in Basic science could enable students to contribute to the development of the nation. Basic science provides students unique training in observation, reasoning and experiment in the different branches of science. It helps students to develop a logical mind (Prakash, 2012). This therefore means that adequate knowledge of the subject could enable the learner to become useful to himself and the society at large as well as prepare the learner for further study in science. It was reported in Baiki, (2010) and Agbo, (2018) that, basic science is the bedrock to advance studies in science, technology and engineering. This submission might have been derived based on the objectives of teaching and learning Basic Science as enshrined in the Basic Science curriculum.

According to FME (2012), the objectives of the Basic Science and Technology (BST) curriculum for the first nine (9) years of school are to enable learners to:

- Develop interest in science and technology, acquire basic knowledge and skills in science and technology,
- apply their scientific and technological knowledge and skills to meet social needs,
- take advantage of the numerous career opportunities offered by science and technology, become prepared for further studies in science and technology,
- Avoid drug abuse and related vices, and be safety and security conscious.

The learner is expected to achieve the set objectives of learning basic science by the end of the basic education programme and be ready for secondary school science.

Achievement is the accomplishment of something noteworthy, especially by superior ability, special effort and great courage. Academic achievement is a construct coined to explain and describes the end process of teacher-students' engagement, that is, the teaching and learning process in a formal class room setting guided by a curriculum.

Educational or academic achievement is the specified level of attainment or proficiency in academic work as evaluated by the teacher in a teacher made test or Standardized test or by a combination of both (Deepa & Chamundeswari, 2014). This implies students' academic achievement entails how well an individual learner has done in his or her cognitive task.

According to Duguryil (2012), recent reports show to the contrary that students do not perform well in basic science. Duguryil's view is obvious as shown in students' poor performance in secondary school certificate examination. The poor performance could be related to teachers' inability to use proper assessment tools such as rubrics in teaching basic science effectively.

Educators use assessment tools to make informed decisions regarding strategies to enhance student learning and performance in various subjects. Assessment tools are techniques used to measure a student's academic abilities, skills, and/or fluency in a given subject or to measure one's progress toward academic proficiency in a specific subject area. This could be one of the reasons behind the emphasis on data-driven decision making in education to hold schools accountable and improve the quality of education students are receiving (Mandinach & Jackson, 2012). The most important assessment tool used in Nigerian schools is Test. However, research has shown that tests alone are not a sufficient way of collecting data and determining if students are meeting standards (Mandinach & Jackson 2012).Tests can be a part of "assessment for learning;" yet, multiple types of assessments should be used when making academic decisions (Kortez, 2003). The use of assessment strategies are enhanced by the type of assessment tools utilized by the teacher. There are different types of assessment tools, one of which is the Rubrics assessment tool. It provides additional information about students' performance (Brookhart & Chen, 2014, Andrade & Du, 2005).

Rubrics are a prevalent grading tool used by teachers to assess and provide feedback to their students. As

scoring guides, they serve as a way to guide criteria-based assessment and encourage evidence-based decisions in the classroom. They are used in support of the movement toward "assessment for learning" (Mandinach & Jackson, 2012, p. 30). The prevalence of rubric use in both secondary and higher education is increasing. Not many years ago mentioning rubrics to faculty members in many fields may have brought forth looks of confusion, consternation, or disinterest. Today, however, the topic of rubrics can be found as part of regular faculty development programs, as standard expectations from accreditors, and as the focus of major cross-disciplinary higher education projects such as the Association of American Colleges and Universities (AAC&U) VALUE rubrics (Association of American Colleges and Universities, 2014). Rubrics are now seen as a way to bring to the surface and make transparent the criteria that faculty members value from assignments which can then serve as a pre-assignment guide, post assignment assessment, and a feedback tool for students. Nonetheless, critics of rubric use exist, often arguing that rubrics may disrespect a faculty member's evaluative expertise or that the focus on specific criteria, to the exclusion of other criteria, limits or constrains creativity which makes the assignment and feedback inflexible. Bloxham, den-Outer, Hudson, and Price (2016) for example, have argued that with detailed assessment criteria, it "is likely to make marking an overly onerous process, limit independent thought and originality in students and encourage middling grades if individual criteria are scored". Though these voices of dissent continue to grow weaker, they remain a reality in higher education because of the degree of independence often granted to faculty as subject matter experts. Rubrics is a collaborative process that requires discussion leading to evidence-driven consensus; a procedure where examples from students' work are used to justify scores leading to a shared understanding amongst raters. Though resistance remains, it could be argued that the use of rubrics to assess students' learning is becoming mainstream.

Research has shown that students portray a positive attitude and perception on the use of rubrics for its support in learning process (Eshun & Poku, 2013; Kulprasit, 2016; Raposo-Rivas 2016). As important as the benefits of the use of rubrics is to learning, students' gender could have an influence on basic science students' use of the assessment tool for learning. Gender is the range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine (female and male) population (Filgona, 2017). Nwona and Akogun (2015) noted imbalance against girls in science, technology and mathematics. Gender had no effect on academic performance of students (Eravwoke, 2011). Oludipe (2012) investigated the influence of gender on Junior Secondary School Student's academic achievement in basic science Findings of the study revealed that there was no significant difference between the academic achievement of male and female students. However, the results of Odagboyi (2015) showed that there was a significant difference between students' achievement in favour of the males. These findings gave room for inclusion of gender as a moderating variable for this study.

STATEMENT OF THE PROBLEM

In spite of the relevance of Basic Science as the basis on which scientific and technological studies rest, the achievement of students in the subject has been reported to be poor (Ochu & Haruna, 2015). Basic Science teachers are poorly trained in both content knowledge, assessment techniques and pedagogy (Ibe, 2008 as cite in Datom, 2015).This is possibly one of the factors responsible for poor achievement in secondary school science considering the fact that the subject remains the foundation of science education in Nigeria. Hence, there is a need to attempt other instructional strategies and assessment techniques such as rubrics as a self-assessment tool for enhancing teaching and learning.

PURPOSE OF THE STUDY

This research is aimed at encouraging the effective use of Rubric Self-assessment tool in developing Basic education students' interest in Basic science. Specifically the study intends to;

1. Find out the difference in the mean achievement scores of students assessed using rubric self-assessment and those assessed without the use of rubric self-assessment in Basic Science.
2. Find out the difference in the mean achievement scores of male and female students assessed using rubrics self-assessment in Basic science.
3. Find out the significant interaction effect of treatments and gender on students' achievement in Basic science.

RESEARCH QUESTIONS

1. Is there any difference between the mean achievement scores of students assessed using rubric self-assessment and those assessed without the use of rubric-referenced self-assessment in Basic Science?
2. Is there any difference between the mean achievement scores of male and female students assessed using rubric self-assessment in Basic Science?
3. Is there any significant interaction effect of treatments and gender on students' achievement in basic science?

HYPOTHESES

1. There is no significance difference in the mean academic achievement scores of students assessed using rubric self-assessment tool and those assessed without the use of rubric self-assessment tool.
2. There is no significance difference in the mean achievement scores of male and female students assessed using rubric self-assessment.
3. There is no significant interaction effect of treatments and gender on students' achievement in Basic science.

MATERIALS AND METHOD

This study adopted the quasi-experimental design. Specifically, the pre-test post-test non-equivalent control group design. The study was carried out in Jalingo education zone, Taraba State, Nigeria. The sample for the study was drawn using multi stage sampling technique. Out of the three local government areas in the education zone under study, Jalingo local government area was selected using simple random sampling. Two government owned co-educational schools with three streams of upper basic II classes were purposively selected. This was followed by the sampling of one intact classroom from each of the sampled schools using random sampling making a total of 2 intact classrooms. One of the two intact classes was designated experimental group while the other class was designated control group. A sample of seventy six (76) upper basic II science students drawn from the two intact classes out of which 44 are males and 32 females were involved in the study. From the sample size, 42 students were used for treatment group and 34 students were used for control group. The instrument used for data collection developed by the researcher was a 60-item multiple choice known as Basic Science Achievement Test (BSAT). The instrument covered the three main topics in the basic science curriculum: Work, Energy, and Power and Simple machines. This is because these topics are the basic main topics in the basic science subject. To control for possible pre-existing differences in overall ability between the experimental and control groups, a pretest was administered to both groups before the commencement of the experiment in the respective schools. The experimental group was taught with rubric self-assessment tool while the control group was taught with conventional strategy using the same content outline for four weeks. Research questions were answered using mean and standard deviation while the hypotheses were tested at 0.05 alpha level significance using analysis of Co-variance (ANCOVA).

RESULTS

Research Question 1:

Is there any difference between the mean achievement scores of students assessed using rubric-referenced self-assessment and those assessed without the use of rubric-referenced self-assessment in Basic Science?

Table 1

Mean Achievement and Standard Deviations of Pretest and Posttest of Experimental and Control Groups

Group	n	Pretest		posttest		Mean
		Mean	Std.Dev	Mean	Std.Dev	
Treatment	42	18.64	2.93	44.55	5.11	25.91
Control	34	18.79	2.91	41.79	6.08	23.00
Mean Difference		0.15		2.79		

Results of Table 1 show that the posttest mean achievement scores of students taught Basic science with Rubrics assessment tool is 44.55 with standard deviation of 5.11, while that of those taught without Rubrics assessment tool is 11.70 with standard deviation of 6.08. The difference between the pretest and posttest achievement mean scores of Rubrics assessment tool is 25.91.32 and that of without Rubrics assessment tool is 23.00. These differences show what were achieved by the two groups. There is also a difference of 2.76 between the posttest mean scores of the two groups; which is in favour of the Rubrics assessment tool; with mean gain of 2.91. The implication is that the students taught Basic science with the use of Rubrics assessment tool gained in achievement more than their counterparts who were taught without Rubrics assessment tool.

This further suggested that rubric self-assessment could enhance students' learning in basic science.

Research Question 2:

Is there any difference between the mean achievement scores of male and female students assessed using rubrics self-assessment in Basic Science?

Table 2

Mean Achievement and Standard Deviations of Pretest and Posttest based on Gender of Experimental Group

Group	n	Pretest		posttest		Mean
		Mean	Std.Dev	Mean	Std.Dev	
Male	42	18.54	2.95	43.46	4.43	24.92
Female	34	18.78	2.98	46.00	5.71	27.21
Mean Difference		0.24		2.54		

Results of Table 2 show that the posttest mean achievement scores of male students taught Basic science using Rubrics assessment tool is 43.46 with standard deviation of 4.43, while that of the female students is 46.00 with standard deviation of 5.71. The difference between the pretest and posttest mean scores of the male students is 24.92 and that of the female students is 27.21. These differences show what were achieved by the male and female students. The difference between the posttest mean scores of the two sexes is 2.54 and the mean gained in favour of the female students is 2.29. The implication is that the female students taught Basic science using Rubrics assessment tool gained in achievement more than their female counterparts.

Research Question 3:

Is there any significant interaction effect of treatments and gender on students' achievement in basic science?

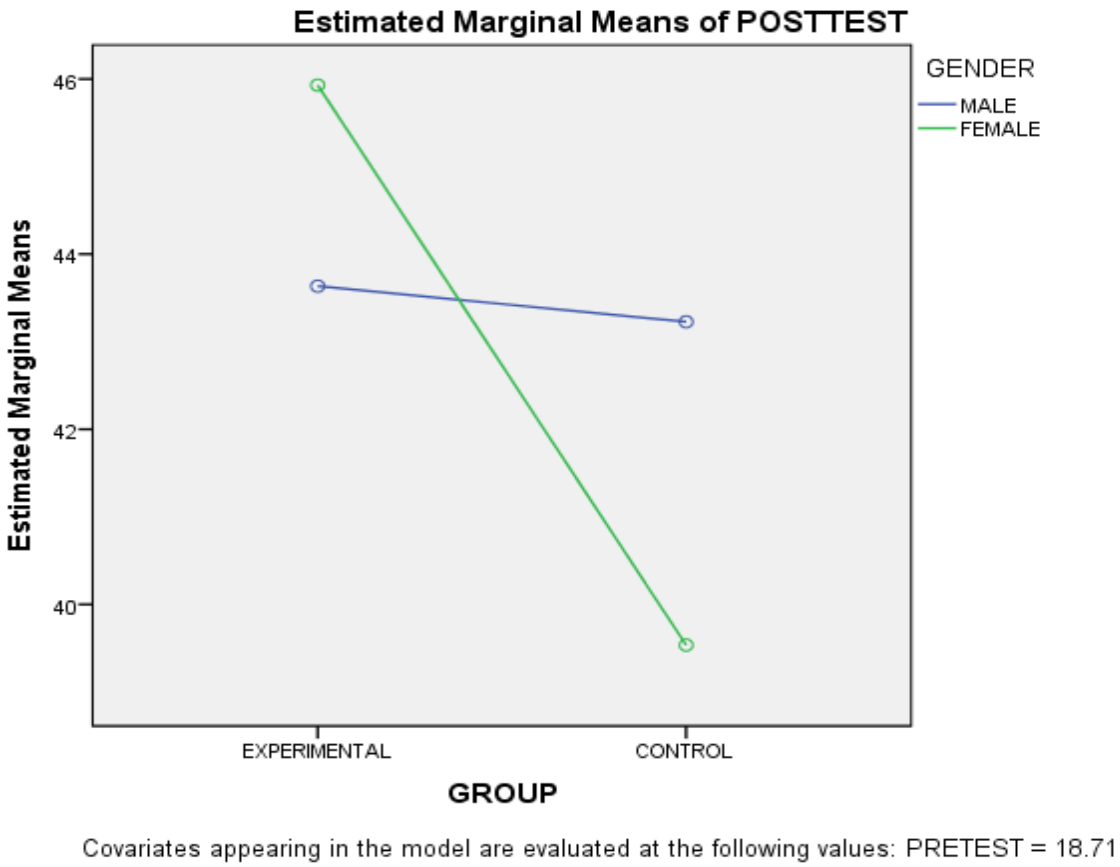

Figure 1: Interaction Effect of Treatments and Gender on Students' Achievement in Basic science

In Figure 1, the profile plot/graph shows the interaction effect of Treatment and gender on students' Achievement in Basic science. The interaction pattern shows that the plots for males and females intersect between Rubrics assessment tool (experimental group) and those without Rubrics assessment tool (control group). This indicates that there is interaction effect between treatments and gender. The interaction is tenable in this case when Rubrics assessment tool is used along with those without Rubrics assessment tool in Basic science class.

HYPOTHESES

The hypotheses that guided the study were tested at 0.05 level of significance and their results are placed in the tables below:

HO_1: There is no significance difference in the mean academic achievement scores of students assessed using rubric self-assessment tool and those assessed without the use of rubric self- assessment tool.

Table 3

One-way Analysis of Covariance of the Mean Achievement Scores of the Experimental and Control Groups

Sources of Variation	Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	949.604a	2	474.802	23.343	.000	.390
Intercept	851.787	1	851.787	41.878	.000	.365
Pretest	807.146	1	807.146	39.683	.000	.352
Group	160.597	1	160.597	7.896	.006	.098
Error	1484.597	73	20.340			
Total	145030.000	76				
Corrected Total	2434.421	75				

Table 3 is one-way ANCOVA between groups' analysis of covariance to compare the effect of Rubrics assessment tool and without the use of Rubrics assessment tool in Basic science. The result F (1, 73) = 7.896, P = .000 < 0.05 shows that the two groups differ significantly. Thus, the null hypothesis is not retained. Therefore, there is a significant difference between the mean achievement scores of students taught Basic science using Rubrics assessment tool and students taught without assessment tool. The effect size (eta square = .098) is very low and it indicates that 9.8% of the difference in the mean score is based on the assessment tool used.

HO_2 : There is no significance difference in the mean achievement scores of male and female students assessed using rubric self-assessment.

Table 4

One-way Analysis of Covariance of the Mean Achievement Scores of Male and Female Students taught Basic science using Rubrics self-Assessment tool

Sources of Variation	Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	271.96a	2	135.548	6.597	.003	.253
Intercept	914.467	1	914.467	44.507	.000	.533
EXP-Pretest	204.650	1	204.650	9.960	.003	.203
EXP-Gender	57.262	1	57.262	2.787	.103	.067
Error	801.308	39	20.546			
Total	84421.000	42				
Corrected Total	1072.405	41				

Table 4 is one-way ANCOVA between gender analysis of covariance to compare the effect of Rubrics Assessment on male and female students' achievement in Basic science. The result F (1, 39) = 2.787, P = .103 > 0.05 shows that the variation of scores for male and female students of Rubrics Assessment tool group is the same. Thus, the null hypothesis is retained. Therefore, there is no statistically significant difference between the mean achievement scores of male and female students taught Basic science using Rubrics Assessment tool. The effect size (eta square = .067) is very low and it indicates that 6.7% of the difference in the mean score is based on gender.

HO_3 : There is no significant interaction effect of treatments and gender on students' achievement in Basic science.

Table 5

ANCOVA of Interaction Effect of Treatments and Gender on Students' Achievement in Basic science

Sources of Variation	Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared
Corrected Model	1111.418a	4	277.855	14.811	.000	.457
Intercept	946.747	1	946.747	50.808	.000	.417
Pretest	666.170	1	666.170	35.751	.000	.335
Treatments	211.641	1	211.641	111.358	.001	.138
Gender	8.808	1	8.808	.473	.494	.007
Treatments X Gender	159.925	1	159.925	8.852	.005	.108
Error	1323.003	71	18.634			
Total	145030.000	76				
Corrected Total	2434.421	74				

Table 5 is two-way ANCOVA between groups analysis of covariance to assess the effect of the use of Rubrics Assessment tool and without the use of the tool on male and female students in Basic science. After adjusting the mean for the pre-test scores, the result F (1, 76) = 8.582, P = 0.005< 0.05 shows that there was significant interaction effect of treatment and gender on posttest scores of students in Basic science achievement test. This implies that the null hypothesis is rejected. Also, the effect size (eta square = .108) is low; hence the effect size is insignificant. The effect size indicates that only 10.8% of the difference in the mean score is based on the assessment tool used. However, the main effect for treatment: F (1, 100) = 111.358, p = 0.001 is significant. But for gender effect: F (1, 76) = 8.582, p = 0.494, it is insignificant.

DISCUSSION OF RESULTS

The results of this study revealed that the students taught basic science with rubric self-assessment tool (treatment group) performed better than the students taught with conventional method. In other words, the difference between the adjusted mean achievements of the treatment group was significant in favour of the treatment group. This difference was significant as revealed by the analysis of covariance (ANCOVA), F (1, 73) =7.896, P=.000<0.05. This implies that the use of Rubrics assessment tool in teaching Basic science is effective in enhancing students' learning achievement in the subject. This finding of the study is supported by Tshering and Phu-ampai (2018) study which showed that rubrics enhanced students' learning achievement which led to students' positive opinion towards rubric usage in Educational Assessment and Evaluation. Eshun and Poku (2013) also concluded that in terms of studio based learning, 86% of the students had a positive perception on the use of rubrics for its support in learning process. Similarly, in Raposo-Rivas‟ (2016) study, almost one in three students (72.4%) were satisfied with the use of rubric in their learning. Equally, Kulprasit (2016) also found that students showed a positive attitude toward the writing rubrics when rubrics were used as assessment for learning in English as Foreign Language (EFL). It is worthy to note that Students' involvement in development of rubrics empowers them to be more engaged and active in their own learning.

It is revealed in the study that the female students had a higher gain score (43.46) in achievement than their male (46.00) counterparts. However, the result F (1, 39) = 2.787, P = .103 > 0.05 shows that the variation of scores for male and female students of Rubrics Assessment tool group is the same. The difference was not significant as revealed by the analysis of covariance (ANCOVA).This findings agree with that of Eravwoke (2011) which showed that Gender had no effect on academic performance of students. This is consistent with Oludipe (2012) who investigated the influence of gender on Junior Secondary School Student's academic achievement in basic science. Findings of the study revealed that there was no significant difference between the academic achievement of male and female students. However, the results of Odagboyi (2015) showed that there was a significant difference between students' achievement in favour of the males, contrary to this finding.

Result of the findings also shows that there was significant interaction effect of treatment and gender on posttest scores of students in Basic science achievement test: F (1, 76) = 8.582, P = 0.005< 0.05. However, the main effect for treatment: F (1, 100) = 111.358, p = 0.001 is significant. But for gender effect: F (1, 76) = 8.582, p = 0.494, there is no significant difference. This implies that there is interaction effect of Rubrics assessment tool (treatment) and gender as revealed in the result. This equally agrees with the findings of Raposo-Rivas‟ (2016) study, which showed that almost one in three students (72.4%) were satisfied with the use of rubric in their learning, and that of Oludipe (2012) which revealed that there was no significant difference between the academic achievement of male and female students.

Rubrics self-assessment seemed to have provided an environment free from stress and boredom in which male and female students have achieved some level of equilibrium in basic science. This could be another tool for reducing gender gap in science education because rubrics self-assessment tool is innovative and have the potential to motivate learners towards learning Science.

RECOMMENDATIONS

i. Rubric assessment strategy should be used to enhance effective teaching and learning of Basic Science.
ii. Students should be encouraged to participate in the creation of rubric for Basic science learning.
iii. Teachers should be trained in routine based workshop to enhanced their skills for assessing learners

CONCLUSION

These findings have strong implications for the teaching and learning of Basic Science in Nigerian secondary schools. It therefore implies that effective use of Rubric self-assessment strategy have a positive effect on the students' achievement in basic science thereby encouraging students' interest in learning in basic science as a subject.

REFERENCES

1. Association of American Colleges and Universities (2014). VALUE Rubric. Retrieved from https://www.aacu.org/value-rubrics
2. Bloxham, S., den-Outer, B., Hudson, J., & Price, M. (2016). Let's stop the pretene of consistent marking: exploring the multiple limitations of assessment criteria, Assessment & Evaluation in Higher Education, 41:3, 466- 481, DOI:10.1080/02602938.2015.1024607
3. Chukwuneke, B.U. & Chinkwenze, A.R. (2012). Reform in Integrated Science Curriculum in Nigeria: Challenges and Prospects. Journal of Research and Development, 4 (1), 82-88
4. Datom, N.A. (2015). Effectiveness of Demonstration and Guided Discovery methods on Interest and Achievement of Upper Basic Science Students. Unpublished Ph.D. Thesis, Ahmadu Bello University, Zaria
5. Deepa Franky and S.Chamundeswari (2014) Psycho-social variables correlates of academic achievement of students. ISSN: 2347- 3215 Volume-2 Number 2 (February - 2014) pp.148- 158 www.ijcrar.com.
6. Duguryil, A. P. (2012).Effects of cognitive reasoning ability and prior exposure to content on students' achievement and retention in Basic Science. PhD thesis Faculty of Education, Benue State University, Makurdi-Nigeria
7. Eshun, E.F. & Poku, P.O. (2013). Design students‟ perspectives on assessment rubric in studio- based learning. Journal of University Teaching and Learning Practice, 10(1), 1-13. Retrieved January 8, 2017 from http://ro.uow.edu.au/jutlp/vol10/iss1/8/
8. Eravwoke O.U. (2011). The effect of concept mapping teaching-learning technique on teachers' attitude and students' achievement in chemistry. Unpublished M.Ed Thesis of University of Benin, Benin city
9. Federal Ministry of Education, FME (2012).
10. Filgona, J. (2017). Effect of Gender on Senior Secondary School Students' Academic Achievement in Geography in Ganye Educational Zone, Nigeria. European Journal of Education Studies 394–410. https://doi.org/10.5281/zenodo.400596 [11].
11. Kortez, D. (2003).Using multiple measures to address perverse incentives and score inflation. Educational Measurement: Issues and practice, 22(2), 18-26.Retrieved from http://online library.wiley.com/doi/10.1111/j.1745-3992.2003.tb00124.x/abstract
12. Kulprasit, W. (2016). EFL Students‟ attitudes toward authentic and formative assessment: The role of writing rubric. International Journal of Languages, Literature and Linguistics, 2(1), 32-37
13. Garfolo, B.T., Kelpsh, E.P., Phelps, Y., & Kelpsh, L. (2016). The use of course embedded signature assignments and rubrics in programmatic assessment. Academy of Business Journal, 8–20.
14. Haladyna, T.M., & Rogriguez, M.C. (2013). Developing and validating test items. New York: Ro9utledge.
15. Moskal, B.M. (2000). Scoring rubrics: what, when, how? Practical Assessment, Research & Evaluation, 7, 1–7.

16. Nwona, H.A., & Akogun, N.A. (2015). Breaking gender barrier in science, technology and mathematics education. Nigeria Journal of Research in Education, 98-108.
17. Odagboyi I.A. (2015). The Effect of Gender on the Achievement of Students in Biology Using the Jigsaw Method. Journal of Education and Practice Vol.6, No.17, 176-179 ISSN 2222- 1735 (Paper) ISSN 2222-288X (Online) www.iiste.org
18. Ochu, A.N.O., & Haruna, P.F. (2015). Challenges and prospects of creativity in a Basic Science classroom: The perception of the Basic Science teachers. British journal of education, society and behavioural science, 5(2), 237-243.
19. Oludipe, D.I. (2012). Gender difference in Nigerian junior secondary students' academic achievement in basic science Journal of Educational and Social Research 2(1) 93-98.
20. Universal Basic Education, UBE (2018).
21. Raposo-Rivas, M. (2016). University students‟ perceptions of electronic rubric-based assessment. Digital Education Review. Retrieved April l5, 2017 from http://revistes.ub.edu/index.php/der/article/viewFile/15442/pdf_1
22. Tshering, & Phu-ampai, S. (2018). Effects of using rubrics on the learning achievement of students in educational assessment and evaluation. Paper Presented at NIDA International Conference for Case Studies on Development Administration, Bangkok (8th September, 2017), December, 1-12. Thailand