EFFECTS OF TEST ITEMS PRACTICE AND ITEMS COMPROMISE ON MATHEMATICS ACHIEVEMENT AND RETENTION AMONG STUDENTS IN TARABA STATE

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Abstract

This study was carried out to investigate the effect of test items practice and test item compromise on mathematics achievement and retention among secondary school students in Ardo-Kola local government area of Taraba State. Non-equivalent post-test control group of quasi experimental design was adopted for the study. Forty students were selected from two secondary schools to participate in the study. One standardized instrument was used for data collection. The instrument is post-test mathematics achievement (POMA). Two research questions were stated for the study and two hypotheses tested at 0.05 level of significant. The reliability co-efficient of 0.72 was established for the instrument using split half method. Data were analysed using mean, standard deviation and analysis of co-variance. Result from the study revealed that the items practice group performed higher (mean= 78.80, SD= 22.66) than the items compromised group (mean= 37.10, SD=13.91). Also, the retention score of the test items practice group is higher (mean= 81.15, SD=19.26) than the compromised group (mean=44.15, SD=10.68). There was also a significant difference in the academic achievement and retention scores of test items practice group and compromised group. Based on these findings, mathematics teachers and school administrators are to pay more attention to frequent practice of mathematics items at school and home to enhance students' retention and achievement than their involvement in compromising test items during examinations in our schools.

Keywords: Assessment, Item practice, Item compromised, Mathematics academic achievement, Retention

Introduction

The importance of assessment in teaching and learning cannot be over emphasis because assessment is the bedrock of education. Teaching and learning are meaningless without proper prompt and adequate assessment. Assessment involves documenting knowledge, skills, attitudes and beliefs, in measurable terms, with a view of improving learners' academic achievements (Anikweze, 2012). Classroom assessment can be formative or summative in nature. Formative assessment are tools that identify misconceptions, struggles, and learning gaps during the instructional

process. It is a method of assessing pupils while learning is happening rather than at the end of a topic or sequence of lessons It provides a room for teachers and students to discover areas where necessary improvement is needed by giving room for regular feedback that will enhance students' improvement. Summative assessment take place at the end of the instructional programme, as it helps in determining if the outlined objectives of a programme have been achieved. Effective assessment cannot take place in schools without the teachers engaging the students in meaningful activities that will enhance their level of retention and understanding in classrooms (Salako, 2014).

In addition, tools used for assessment especially achievement test must be adequate. Tests are tools used to elicit information about learners' ability which provide evidence that help in taking educational decision on each learner. These decisions help in determining if the students have reached a particular level of skill or not. Through this, evaluation of educational programme can be made about the next aspect of teaching and learning. Academic achievement according to Idika, Soghesan and Qgunsakin (2016) is a measure of the ability of learners to recall facts and information at a given time. It is however premised that the degree of this ability to recall learned experiences is a function of several environmental factors. These factors include socio economic status of parents, family background, school quality, environmental security. All these factors in different ways have effect on students' academic achievement. Academic achievement is important because it is strongly linked to valued positive outcomes. In the past in our educational system in the country, teachers' observation formed the bulk of assessment but today summation or numerical method of determining how well a student is performing is a recent invention which has helped our educational assessment. noted that students are being assessed in schools through homework, assignments, tests and examinations.

Furthermore, looking at the various factors affecting students' academic achievement today especially in sensitive subject like mathematics, it is important to look at various ways of making our learning more meaningful than before. The ability of test takers to be familiar with the test items may positively affect their academic performance especially in mathematics. Awajiokinir and Mohammed (2021) in their study affirmed that teachers' engagement in practice of test items provide intensive instruction and academic support to students who are not doing well in Mathematics as this will boost their interest in mathematics and improve their scores enough to meet expected level of improvement and on the long run have positive impact on their general proficiency in mathematics. In addition, Igbojiwaekwu (2021) also revealed that test item practice will not only improve learners' ability but also aids their retention. Michael, Joseph and Iornagh (2020) and Yavuz (2024) in their studies revealed that one of the biggest problems to overcome by students during examination is the ability to retrieve what they learned in classroom. Frequent test items practice not only help in academic achievement but also improves students' retention.

It is also very important to look at the security of test items when carrying out classroom assessment. With the quest of success by all means have forced schools and classroom teachers into item compromise which in turn rendered scores in such tests invalid. Item compromise is the exposure of test items to test takers prior to the actual examination (Iduka, Sogbesa &Ogunsakin2016). This inflation of students' scores do not reflect increase or improvement of learners' performance. Rather, these cases make students to be lazy in their studies and not willing to study hard. Test compromise may also include re-allocation of time or spending of more time on content taught during test administration. These practices might not lead to true success but rather provide false impression of inflated scores that defeat the goals of Education.

In addition, retention is the ability to remember things, task or what is learned previously when they are needed. This the ability to retain and later recall information or knowledge gained after learning. Hassan, Jamileh, and Baharam (2019) sees retention as the ability what one has learned in the past. For this to happen, different stages of human learning need to be considered. There must be intervening period when the initial learning took place and the time the information is needed. There is need for meaningful learning to take place before retention can be attained. Frequent test item practice will help students to retained what they have learned and retrieve them when needed. Esmat, Shakoori and Nakhel (2015) state that skill can eliminate test anxiety and anything that aids learning in schools will eventually improve retention. Report from Adolf and Imo (2022) shows that many students not less than 80% still failed Mathematics as a subject despite all the efforts of the government and stakeholders especially in Ardo- Kola local government area of Taraba State. There is need to look at strategies and classroom practices that can improve motivate and enhance academic performance of students in Mathematics. The question posed by this study is how effective is test items practice in enhancing students' academic achievement and retention in secondary schools in Ardo Kola local government area of Taraba State? The main purpose of this study is to:

1. Find the difference between the mean achievement score of mathematics students in test items practice group and those in test compromise group

2. Find the difference between the mean retention score of mathematics students in test items practice group and those in test compromised group.

Research Questions

1. What is the difference in the mean achievement scores of mathematics students in test items practice group and those in test items compromised group?

2. What is the difference in the mean retention scores of mathematics students in test items practice group and those in test items compromise group?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance.

1 There is no significant difference between the mean achievement scores of mathematics students in test items practice group and those in test items compromised group.

2   There is no significant difference between the mean retention scores of mathematics students in test items practice group and those in test items compromised group.

Methodology

The research design adopted for this study was Non-equivalent post-test control group design of quasi-experimental design. The population of the study consisted of 1021 upper basic 3 secondary school students in Ardo- Kola local government area in Taraba State. The sample of the study consisted of 40 mathematics students randomly selected in two secondary schools used for the study which was carried out in an intact classroom. Forty out of the total population were randomly assigned to two groups. These two groups are the test items practice group and the test items compromised group. These two schools were selected because of their willingness to participate in the study. One major instrument was used for data collection. The instrument is post-test mathematics achievement (POMA) test. This instrument was adopted from past Basic Education Certificate Examination (BECE). Reliability coefficient of 0.72 was obtained for the instruments after pilot testing was carried out. The two groups were not pre-tested because they have similar characteristics. Mathematics teachers from the two schools do the actual teaching while the researchers help in giving homework in the test items practices after each lesson. The researchers also exposed most of the test items to students in the test items compromised group, to see if they will perform better than the items practised group. The item compromised group were only taught and given classwork to solve in the class while the experimental group were given more time after each class to solve more mathematics items like the items that made up their final achievement test and more home works were given to this group. This treatment lasted for four weeks. At the end of four weeks, mathematics achievement test was administered to mathematics students in both schools. The test items were exposed to students in the items compromised group while test items were not exposed to students in the item practice group. After two weeks, the mathematics retention test was also administered to the two groups to determine the mean retention scores of both groups. The data collected were analysed using descriptive statistic of mean and standard deviation to answer the research questions while the hypotheses were tested using analysis of co-variance.

Results

Research Question One: What is the difference in the mean achievement scores of mathematics students in test items practice group and those in test items compromised group?

Table 1: Mean post-test achievement scores and standard deviation of item practised and compromise groups

Group	N	Mean	Standard deviation
Item Practised Group	20	78.80	22.66
Compromised Group	20	37.13	13.99
Mean difference		41.67	

Result in table 1 shows the mean achievement scores of mathematics students in test items practice (Experimental group) is 78.80 with standard deviation of 22.66 while that of the item compromised group is 37.13 with standard deviation of 13.99. The difference in the mean achievement scores is 41.67. The mean score of students in test item practised group is higher which shows that the students in test items practised group performed better than the test items compromised group.

Research Question Two: What is the difference in the mean retention scores of mathematics students in test items practice group and those test items compromised group?

Table 2: Mean retention scores and standard deviation of item practised and compromised groups

Group	N	Mean	Standard deviation
Item Practised Group	20	81.15	19.26
Compromised Group	20	44.15	10.68
Mean difference		37.0	

Result in table 2 shows the mean retention scores of mathematics students in test items practice is 81.15 with standard deviation of 19.26 while that of the Item compromised group is 44.15 with standard deviation of 10.68 The difference in the mean achievement scores is 37.0. The mean retention score of the item practised group is higher which shows that the students in test items practised group performed better than in the item compromised group.

Hypothesis One: There is no significant difference in the mean achievement scores of mathematics students in test items practice group and those in the items compromised group

Table 3: Result of one-way analysis of covariance of the mean achievement scores of mathematics students in items practiced and compromised groups

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	4031.700	3	502.264	30.883	0.00
Intercept	1054.020	1	18.649	18.649	0.00
Practised and Compromised	2061.700	1	502.264	36.519	0.01
Group	1026.718	1		20.647	0.02
Error	2727.500	57			
Total	133948.000	20			
Corrected total	9759.200	19			

Table 3 shows the main effect of test items practice on achievement score indicated by [F (1,57) =36.519)], P <0.005. This result affirmed that there is significant difference in the mean achievement scores of mathematics students in the test items practised group. Hence the null hypothesis is not retained

Hypothesis Two: There is no significant difference in the mean retention scores of mathematics students in test items practice group and those in items compromised groups

Table 4: Result of one-way analysis of covariance of the mean retention scores of mathematics students in control and experimental groups

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected del	3031.700	2	1108.121	9.884	0.00
Intercept	1054.402	1	6978.814	62.246	0.00
Retention	703.170	1	115.824	1.033	0.34
Group	2727.500	1	1465.915	10.399	0.02
Error	6390.609	57	112.116		
Total	133948.000	20			
Corrected total	9759.200	19			

Table 4 shows the main effect of test items practice on retention score indicated by [F (1,57) =10.399)], P <0.005. This result affirmed that there is significant difference in the mean retention scores of mathematics students in the test items practised group. Hence the null hypothesis is not retained

Discussion of Findings

The result of this study has shown that students in test items practice group performed academically better than students that are in the test items compromised group. The two schools used for this study has similar characteristics in term of teachers' qualification, school location and quality of students. The post-test scores

of students in test items practice group were found to be higher than those in items compromised group. The frequent practice of Mathematics items by students in the item practised group could be responsible for this result. In addition, the result revealed that the students in test items practice group were able to retain knowledge than those in the test items compromised group. The retention score of the test items practice group is higher than the control group. This result proved that frequent mathematics items practice has the ability of enhancing student's retention and understanding of Mathematics.

The result also affirmed that there is a significant different in the mean achievement and retention score of items practiced group and items compromised group. The result proved that the difference in the achievement and retention level is very significant. This finding is in line with the findings of Esmat, Shakoori and Nakhu (2015). Hassan, Jamileh and Baharun (2019) and Michael, Joseph and Iornyang (2020) who in their respective studies affirmed that frequent item practices and study skills training do not only improves learners' performance but also help in improving their retentions and interest in difficult subjects.

This finding is also in line with Idika, Sogbesa and Ogunsakin (2016) who affirmed that there are disadvantages and danger associated with compromising of test items as it makes the estimate of examinees performance to be inaccurate. The findings also established that students can perform better in any examination without cheating or engaging in any form of compromise if they concentrate and practised their mathematics exercises through classwork, homework, project and other classroom activities as indicated in the study.

Conclusion

In line with the findings above, the study concluded that test items practice enhances students' academic performance and also help students to retain the knowledge they acquire during classroom instruction especially in mathematics

Recommendations

Based on the findings, the following recommendations were made:

1. School administrators, curriculum planners and policy makers should focus more on mathematics item practice in school's curriculum

2. Mathematics teachers should engage and create more rooms for students to regularly practice mathematics items in schools and as homework.

3. Parents should also encourage their wards to practice more mathematics test items at home and during holidays to boost their interest and retention.

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