

EFFECT OF TIMING IN MATHEMATICS TESTS ON STUDENTS' ACHIEVEMENT IN MAKURDI METROPOLIS

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Abstract

This study investigated the effect of timing in mathematics tests on students' achievement. One aspect of the study dealt with the effect of students' timing themselves during mathematics tests while the other aspect dealt with the effects of invigilators' adherence or non-adherence to the allocated time for the tests. Two multiple choice Mathematics Achievement Tests (MAT1 and MAT 2), based on SS2 scheme of work were administered on 250 students drawn from five secondary schools randomly selected from 30 secondary schools in Makurdi metropolis. Two-research hypotheses were raised for the study and tested at 0.05 level of significance. The student's t- statistics was used to test the hypotheses. The findings of the study showed that students who timed themselves during the test (MAT2) performed significantly better than the other students. Also, students who were given a little extra time by invigilators (for MAT 1) performed significantly better than the other students. The conclusion was that adequate time and students' timing of themselves were necessary ingredients for success in mathematics tests. The study therefore recommended that teachers should pay adequate attention to timing of tests and encourage students to time themselves during tests in mathematics.

Introduction

There is hardly any human discipline that does not embrace the use of mathematics. To stress its importance, mathematics has been made a compulsory subject in primary and post primary schools in many countries of the world (including Nigeria). The main objective of doing this is to give the pupils and students enough foundation to cope with the ever-increasing applications of mathematics in the world of today. As Amoo (2002) remarked, despite the recognition given to mathematics, most students in secondary schools in Nigeria exhibit nonchalant attitudes towards the subjects. Stressing this point further, Sanni and Ocheba (2002) reported that most students not only perform poorly in the subject but also show displeasure in studying it.

Some researchers have attributed the poor performance of students in mathematics to teacher's failure to use appropriate teaching methods (Adedayo, 2001), teachers' ineffectiveness (Amoo, 2000) and students' lack of interest in the subject (Amoo, 2002).

One aspect that may be contributing negatively to the students' performance in mathematics is the timing of the students in their mathematical tasks such as class exercise and tests. As Walter (1997) remarked, time is a precious and irreplaceable commodity. Thus the use of time can determine the success or failure of a given task. Walter therefore stressed that time management must be regarded as a crucial skill, which must be mastered for one to succeed on any assignment.

This is why Agbe and Akem (2000) pointed out that the teacher in "selling" his ideas to students must allocate sufficient time for finding out through evaluation how much of his idea students have "bought". In his own contribution, Reys, Suydam and Montgomery (1992) emphasized that a problem solving approach should pervade mathematics curriculum and that students must be given time to digest or think about a problem and time to explore solution strategies for any given mathematics problem. Similarly, Hewit and Whittier (1997) pointed out that effective time *Multidisciplinary Journal of Research Development Volume 14 No. 1 April, 2010*

management is a critical feature for conducive learning and that students' time management has no enormous impact on their success in the classroom.

Statement of the Problem

As Abakporo (2005), remarked, students' performance in mathematics in secondary schools has left much to be desired. A key factor in any evaluation is time, as pointed out in the previous paragraph. Many students complain of inadequacy of time allocated for their tests or examination. Does timing in tests really play any significant role in students' performance in mathematics?

Purpose of the Study

This research work was aimed at finding out the effect of timing on the performance of SS2 students in mathematics in Makurdi metropolis, specifically the study investigated the effect of teachers' adherence to allocated time for tests and students' self-timing during tests.

Research Questions.

The effects of timing on students' performance in mathematics was investigated using senior Secondary Two (SS2) students. To facilitate the investigation, the following research questions were raised:

1. To what extent does strict adherence to the time allocated for mathematics tests influence students' performance?
2. To what extent does self-timing by students during tests in mathematics affect their performance?

Research Hypotheses

Ho₁: There is no significant difference between the mean scores of students invigilated with strict adherence and without strict adherence of the allocated time in mathematics tests.

Ho₂: There is no significant difference between the mean scores of students who time themselves during mathematics tests and those who do not time themselves.

Research Methodology

Research Design:

The study used a descriptive research design. The design was used to find out if timing has any influence on students' performance in mathematics.

Population and Sample

The population of the study comprises all the 6,240 SS2 students in the 30 secondary schools in Makurdi metropolis. Using systematic sampling 5 schools were randomly selected out of the 30 schools. Fifty students were randomly selected from each school to give a total of 250 students involved in the study.

Research Instruments

Using SS2 scheme of work for the term, two Mathematics Achievements tests (MAT1 and MAT2) were developed by the researchers. MAT 1 was of 30 minutes duration and had 20 multiple-choice items while MAT2 was of 40 minutes duration and had 30 multiple-choice items.

The tests had difficulty indices of 0.57 (MAT1) and 0.61 (MAT2). MAT1 had a discriminating power of 0.55 and that of MAT2 was 0.58.

Procedure for Data Collection and Analysis

MAT 1 was administered at the end of the fourth week of the term with half of the students subjected to strict adherence to allocated time. MAT2 was administered at the end of the fifth week of the term with half of the students timing themselves during the test.

The tests were marked and scored for each student in percentages. The two hypotheses stated were tested using independent t- tests at 0.05 level of significance.

Table 1
Mean, Standard Deviations And 'T' Value of Scores of Students Invigilated With and Without Strict Adherence To Allocated Time For Tests

| Group | Number | Mean X | Standard Deviation (S) | Degrees of Freedom (df) | Calculated T-value | Critical value of t |
|--------------------------|--------|--------|------------------------|-------------------------|--------------------|---------------------|
| Without strict Adherence | 125 | 70.5 | 13.2 | 248 | 3.065 | 1.645 |
| With strict Adherence | 125 | 65.5 | 12.4 | | | |

From Table1 the calculated t-value (3.065) is greater than the critical values of t (1.645). The null hypothesis is therefore rejected. The result is that the students invigilated without strict adherence to the allocated time (X= 70.5) performed better than those invigilated with strict adherence to the allocated time (X=65.5).

Table2
Mean Scores Of Students Who Timed Themselves and those who Did Not Time Themselves During The Test (MAT2).

| School | A | B | C | D | E |
|-------------------------|------|------|------|------|------|
| Timed themselves | 71.5 | 61.0 | 73.5 | 69.5 | 62.5 |
| Did not time themselves | 75.5 | 53.5 | 74.0 | 57.0 | 55.0 |

From Table2 the mean score of the students who timed themselves during the test (MAT2) was 67.6 and that of students who did not time themselves was 63.0.

Table3
Means, Standard Deviation And T-Value Of Students Who Timed Themselves and those who Did Not Time Themselves During The Mathematics Test (MAT2)

| Group | Number (n) | Mean X | Standard Deviation (S) | Calculated value of t | Degrees of Freedom (df) | Critical value of t |
|--------------------------|------------|--------|------------------------|-----------------------|-------------------------|---------------------|
| Timed Themselves. | 125 | 67.6 | 10.2 | | | |
| Did not timed themselves | 125 | 63.0 | 9.8 | 3.602 | 248 | 1.645 |

From Table3 the calculated value of t is 3.602 while the critical value of t is 1.645. This means that the score of students who timed themselves was significantly higher than that of students who did not time themselves. The null hypothesis is therefore rejected. The conclusion is that students who timed themselves during the test performed significantly better than those who did not time themselves.

Discussion

The paper is interested in finding out the effect of timing in tests on SS2 student's performance in mathematics. The first aspect has to do with the invigilator's strict or non-strict adherence to the allocated time for the test (MAT1). As Reys (1992) observed, in mathematics students need to be given enough time to think about a problem and also time to explore various solution strategies before arriving at a final solution. This is what various model for problem solving have emphasized. The mean score of students without strict adherence to the allocated time (X=70.5) was significantly higher than that of students invigilated with strict adherence (X=65.5) to the allocated time for the test. This is an indication of the influence of timing on the students' performance in the test. The implication of this for teachers is that each test question must be solved and the optimum time for its solving determined before administering the test. This is why Hewit and Whittier (1997) emphasized that to give a learner every possible chance to be successful; the teacher must make the most appropriate use of the time.

The second aspect of the investigation has to do with students timing themselves during tests. The mean score of students who timed themselves during MAT2 was 67.6 compared to 63.0 for those who did not time themselves. This finding is in line with that of stakes (1993), who from her own study on effective examination preparations, suggested that students should budget time allocated for examinations very carefully if they want to be successful.

Recommendations

Too much time should not be given for a test. Timing should be done in such a way that the allocated time would just be adequate for the students to answer the required number of questions. This is one way of making provision for each student's success in a mathematics test.

Conclusion

The study has showed that management of time is an essential ingredient for success in mathematics tests. The students whose invigilators added a little extra time for them performed better than the other students. This is an indication that more attention should be given to providing adequate time for any mathematics tests. Students who timed themselves during the test (MAT2) also

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performed better than the other students. Students should therefore be encouraged to time themselves, taking into account the number of questions required during mathematics tests. This could be done by providing wall clocks in classrooms for students or asking them to come with wrist watches when they have tests and giving them practice in timing themselves.

References

- Abakporo, J. E.(2005). Effective problem solving in mathematics challenges and prospects. *Journal of issues on mathematics. The annual publication of mathematics panel of the Science Teachers Association of Nigeria (STAN) 8(1), 19-33*
- Adedayo,A.O (2001). The place of mathematics in Nigerian secondary schools. Course on effective teaching of mathematics Phrase 2, magodo, Lagos . Pp 1-7.
- Agbe,N.N & Akem, J.A.(2000). *Rudiments of measurement and evaluation in Education and Psychology. Makurdi: The retune press. Pp.61*
- Amoo, S.A.(2000). Secondary school mathematics teacher's characteristics and their teaching effectiveness. *Journal of primary science, LACOPED 2(1) 29-35.*
- Amoo, S.A.(2002). Analysis of students encountered in Teaching and Learning of mathematics in secondary schools. *ABACUS: the Journal of mathematics association of Nigeria , 27(1) 30-36.*
- Hewit, J.S & Whittier, K.S. (1997). *Teaching methods for today's schools. Collaboration and inclusion.* Need Ham Heights : Allan and Bacon Company. Pp.154-220.
- Reys, E.R.; Suydam, M.N. & Montgomery, M.L. (1992). *Helping children learn mathematics. Boston: Allan and Bacon company Pp 30*
- Sanni,S.O & Ochapa, L.A (2002). Effect of practical discussion outside the classroom on students' Performance in mathematics. *ABACUS journal of Mathematics association of Nigeria , 27(1) 45-49.*
- Stake,C.M.(1993). *Strategies for College Success.* New-Jersey: a Simon and Scaster company. Pp770.
- Walter, P. (1997). *How to study in college.* Washington : Houghton Miffling Company. Pp. 21.