



Relationship Between Test-Taking Behaviour and Performance in Mathematics Among Junior Secondary School Students in Kaduna State, Nigeria

Luka K. Maude & Jimoh K. Agbaiyero

kehindeagbaiyero@yahoo.com

Department of Educational Psychology and Counselling, Ahmadu Bello University, Zaria, Nigeria

Corresponding Author: kachia2maude@gmail.com

Abstract

Mathematics is a core subject at the Upper Basic level of learning and provides the much needed foundation for learners to adequately study any choice of discipline at the Senior Secondary School level. However, the subject has recorded weak performance in recent years and this is a source of concern to stakeholders. This study, therefore, using three research questions and hypotheses examined the relationship between Test-Taking Behaviour and performance in Mathematics among junior secondary school students in Kaduna-State, Nigeria. Correlational research design was adopted for the study. The population of the study comprised of 5003 students. The sample size was 350 respondents selected through simple random sampling method. The instruments used for data collection were; Test-Taking Behaviour Self-Report Questionnaire which was adapted, pilot tested and yielded a reliability coefficient of 0.82 while the Basic Education Certificate Examination result was used to measure their performance in Mathematics. Pearson Product Moment Correlation (r) was used to analyze the data. The results indicated significant positive relationship between test-taking strategies and students performance in Mathematics ($r = 0.624$, $p = 0.002$). There was significant positive relationship between test-motivation and students performance in Mathematics ($r = 0.201$, $p = 0.000$). There was significant negative relationship between test-anxiety and students performance in Mathematics ($r = -0.146$, $p = 0.004$). It was concluded that relationship exists between Test-taking behaviour and performance in Basic Mathematics. Thus, it was recommended among others that, there is need for Mathematics teachers with adequate training in the subject to always guide the students on the appropriate strategies to adopt before and during test, Parents and Counselors should properly counsel the students on how to reduce anxiety before test for optimal performance in Mathematics etc.

Keywords: Anxiety, Basic Mathematic Students, Motivation, Strategies, Test-taking behaviour

Introduction

Academic performance entails outcomes that indicate the extent to which a student has accomplished specific goals that were the focus in the instructional activities in every academic setting such as schools and institutions of learning the world over which are measurable via tests and examinations. Academic performance is the student ability to demonstrate knowledge and skills in a variety of settings or situation, both within and outside the classroom. Academic performance is the extent to which a student, teacher, or an institution has achieved their short term or long term goals. Both academic achievement and performance are form of academic assessment and evaluation done in the classroom situation. The output which is measured can be done regularly or periodically. Academic performance is measured frequently for instance at the

end of a lesson while academic achievement is measured after a long period of instruction say at the end of a term, semester or session or at the end of the whole program. That is performance is measured within a short time while achievement took a much longer time before it is measured (Kumar & Rout, 2016).

Learning Mathematics is often linked to using one's problem solving skill. While strong conceptual understanding is also important in learning the subject, the need for students to learn how to use their knowledge effectively in solving problems in Mathematics can not be overemphasized. The subject is usually considered a basic requirement in learning both arts and sciences. It is not just computation but a tool for understanding structures, relationships and patterns to produce solutions for complex real life problems

(Mondragon & Acelajado, 2022). However, the subject has often be perceived as challenging, this perception of the subject by many students lingers decades ago until now leading to un-necessary anxiety and reduced interest in the subject. This narrative by most students negatively affects their achievement in Mathematics. Thus, academic Performance in Mathematics generally refers to the level of success or proficiency a student or researcher attains in the field of Mathematics through their academic pursuits. It is typically measured by various indicators such as grades, test results, research publications, awards and recognition. To achieve academic success in Mathematics, individuals may need to demonstrate a strong understanding of key concepts and principles in Mathematics as well as proficiency in applying them to real-world scenarios.

However, students' performance in Mathematics in Kaduna State, Nigeria has been on the decline over the years. Efforts put forward by stakeholders in the educational sector to improve students' performance have yielded little or no appreciable results as envisaged. Diverse reasons have been adduced for this perennial problem, some scholars' view the problem as that of gender apathy, others view the problem as systemic while some emphasized pedagogical factor. Different factors responsible for the consistent poor performance of students in Mathematics include; lack of proper digestion and utilization of research findings by Mathematics teachers, sex-stereotyping, transfer of poor attitudes of older students to younger ones and poor self-concepts like phobia and anxiety (Ajogbeje, 2013).

However, irrespective of resources deployed, there are situations whereby students' academic performance is not commensurate with measures deployed and processes that took place. These imbalances have attracted several researches that attempt to establish the possible causes. One of the possible causes as found in the literature is students' factors. Thus, students' factors for the attainment of academic performance could be internal or external; the internal could be learning style, average study hour, emotional control, stress management, course satisfaction among others while external factors include hours spent with friends, resources consulted and technology used (Sukor & Mohammed, 2017). Considering the importance of students' academic achievement resources of various kinds are deployed and explored by the school for optimal performance to

enhance the processes through which students acquire specified contents of their course of study.

The concept of performance test entails systematic procedures that involve series of questions, exercises or other means of measuring the skill, knowledge, intelligence, capacities, aptitude or any other sampled behaviour of an individual or group of people. Tests are the most common assessment tools in most of the educational systems the world over. Thus, most students are not interested in test taking but it has become compulsory for them once they found themselves in the educational setting. According to (Anikweze, 2014), a test is a specific instrument of systematic procedures for observing and describing one or more characteristics using either a numerical scale or a classification scheme. It can involve either paper and pencil instruments or observations. But Oluseyi, (2018) described test as an instrument which can be utilized in detecting some qualities, traits, characteristics, attributes etc. possessed by a person, an object or thing. Test-taking Strategies are cognitive abilities to deal with any testing situation in appropriate manner and to know what to do during tests. Example of these strategies are managing time effectively, surveying all questions before responding, solving easy questions first, checking and reviewing answers, underlying key words or concepts in questions, eliminating wrong options and others (Dodeen, Abdelfattah & Alshumrani, 2009).

Performance test motivation is the tendency for an individual to strive for excellence and attain goals in a school setting that provides clear expectations, recognition and support for achievement. It is characterized by a desire to demonstrate competence, accomplish tasks and receive positive feedback from others. Test-taking Motivation refers to the extent to which testees give their best effort to the test with the goal being to accurately representing what a student knows or can do in the content that are covered by the tester in the subject matter. Test-taking motivation implies the extent to which examinees give their best effort to the test, with the goal being to accurately represent what one knows and can do in the content area covered by the test (Stenlund, 2017). Test-taking Anxiety is the state of fear constitutes in the mind of students before, during and after a test which universally caused poor academic performance. This adversely affects the outcome of a student's performance in tests thus, making the school surrounding uncomfortable for weak learners. Abdulfatah, (2010) Opined that test anxiety can have

adverse effects on testees especially when it involves testing for academic purposes.

Upper basic level of learning is the foundation for senior secondary education, especially Mathematics which is a compulsory subject plays a key role to every choice of discipline in learners' academic pursuit. As a result, successive governments of Kaduna State have put in both human and material resources in her quest to improve the standard of teaching and learning at the junior school level of education with more emphasis to Mathematics and English language the core and general subjects to entrench high standard and quality of learners. Despite these efforts, Mathematics has recorded weak performance in recent years as observed by the researcher, teachers, parents and school community members during the preliminary investigations on this study. Similar studies have been conducted in other states of the country to the neglect of Kaduna State; this is a source of concern to stakeholders. Therefore, this study examined the relationship between Test-taking behaviour and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria

Literature review

Dodeen, Abdefatah and Alshumrani (2014) assessed the relationship between students' test-taking skills and each of the following variables: Motivation to learn Mathematics; Mathematics anxiety, attitudes towards Mathematics; and attitudes towards tests among secondary school students. The results of the study revealed a positive and significant relationship between students' test-taking skills and each of the variables used; student's motivation to learn Mathematics, attitudes towards Mathematics, and attitude towards tests, while Mathematics anxiety was showed a significant negative relationship with test-taking skills. The present study is different from this study because while the reviewed used senior secondary school students the present study used junior secondary school students; the reviewed study also used the variable test-taking skills while the present study used test-taking behaviour. In addition, the variable test-taking strategies were not among the variables considered by the reviewed literature. Therefore, it is important that similar studies is been replicated at the junior secondary school level and variables like test-taking strategies were also assessed.

Akanni, Emeri and Oketade (2019) studied the Impact of test-taking skills in Mathematics on adolescents' academic performance among senior

secondary school students. This study revealed that the use of test-taking skills in Mathematics significantly impact adolescents level of test anxiety, motivation, attitude and academic performance. Hence, the study concluded among others that test-taking skills remain a viable tool in adjusting students' perception towards Mathematics. The reviewed study was on senior secondary school students while the present study is on junior secondary school students. It also made use of the variable test-taking skills while the present study used test-taking behaviour. The reviewed study was conducted in the south-west while the present study was conducted in the north-west, Nigeria. It pertinent that such study is replicated in the north-west, Nigeria Abdulkarim (2024) carried out a research on relationship between test-taking behaviour and achievement in Business Studies among junior secondary school students. The results of the study revealed high correlation and positive relationship between test-taking strategies and achievement in Business studies. It also revealed high and positive relationship between test-taking motivation and achievement in Business studies among the junior secondary school studies. The findings of the study showed low correlation and negative relationship between test-anxiety and achievement in Business studies among the population studied. The reviewed study used the subject Business Studies while the present study used Mathematics, the reviewed study also used the component achievement in Business Studies while the present study used performance in Mathematics. Though achievement and performance are sometimes used interchangeably but it is important that this present study used the performance because is the subject Mathematics.

Research Questions

The following Research Questions guided the Study

1. What is the Relationship between test-taking strategies and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria?
2. What is the Relationship between test-taking motivation and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria?
3. What is the Relationship between test-taking anxiety and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria?

Hypotheses

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

- H₀₁:** There is no significant relationship between test-taking strategies and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria.
- H₀₂:** There is no significant relationship between test-taking motivation and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria.
- H₀₃:** There is no significant relationship between test-taking anxiety and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria.

Methodology

Design

This study adopted a correlational research design. Correlational design is concerned with the extent to which two or more variables are related, this means to study whether an increase or decrease in one variable corresponds to an increase or decrease in another variable (El-Kalla, 2011). It allows one to generalize the findings from the sample to the population, which is the whole purpose of a survey research. The magnitude of the relationship was determined through the use of coefficient correlation.

Sample and Sampling Techniques

The population of this study comprised of all public junior secondary school year 3 (JSS3) students in Kaduna State, Nigeria with a total number of five thousand and three (5003) students. From the population, Two Thousand Three Hundred and One (2301) were males while Two Thousand Seven

Hundred and Two (2702) were females. The researcher used El-Kalla, (2011) table for determining the sample size of Three Hundred and Fifty (350) covering schools selected from the three senatorial districts of the entire state.

Multistage sampling technique was adopted in selecting the sample for the study. For choosing the appropriate representative sample size of 350 for the study, cluster sampling technique was used and the 23 Local Government areas were clustered according to their respective senatorial zone (A, B and C) Kaduna North, Central and South respectively. Simple random sampling technique was also adopted to select a school from each of the clustered Local Government to give every school the equal chance of being selected. Then quota or proportionate to size was employed to obtained the number of students based on each selected school.

Instruments for Data Collection

Two instruments were used for the purpose of this study; Test-Taking Behaviour Self-Report Questionnaire (TTB-SRQ) with 30 items with three sections having 10 items each measuring; test-taking strategies, motivation and anxiety which was adapted from the work of Driscoll, (2015) and Mathematics Performance, where Basic Education Certificate Examination (BECE) was obtained with the permission of ministry of education Kaduna-State, Nigeria. The Test-Taking Behaviour Self-Report Questionnaire (TTB-SRQ) validated by one expert in the Department of Educational Psychology and Counselling, Ahmadu Bello University, Nigeria and another expert from Institute of Education, University of Ibadan, Nigeria. The TTB-SRQ was pilot-tested and yielded a reliability coefficient of 0.82.

Method of Data Analysis

Pearson Product Moment Correlation (r) was used to analyze all the three hypotheses at 0.05 level of significance.

Results

Hypotheses Testing:

Hypothesis One:

Table 1: Pearson Product Moment Correlation (r) on the Relationship between Test-taking Strategies and Performance in Mathematics

Variable	N	Mean	SD	r	p
Test-Taking Strategy	350	62.31	7.110	.624	0.002
Performance in Mathematics	350	40.30	6.340		

Table 1 shows that test-taking strategies has significant positive relationship with performance in Mathematics as indicated by $r = .624$ and $p = 0.002$ which is lower than 0.05 level of significance. The degree of correlation value is high and the correlation coefficient shows that the higher the application of test-taking strategies the higher the performance in

Mathematics of the junior secondary school students and vice-versa. Therefore, the null hypothesis which states that there is no significant relationship between test-taking strategies and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria is hereby rejected.

Hypothesis Two:

Table 2: Pearson Product Moment Correlation (r) on the Relationship between Test-taking Motivation and Performance in Mathematics

Variable	N	Mean	SD	r	p
Test-taking Motivation	350	63.41	9.230	0.501	0.000
Performance in Mathematics	350	40.30	6.340		

Table 2 shows that test-taking motivation has significant positive relationship with performance in Mathematics as indicated by $r = .501$ and $p = 0.000$ which is lower than 0.05 level of significance. The degree of correlation value is moderate and the correlation coefficient shows that the higher the test-taking motivation the higher the performance in

Mathematics of the junior secondary school students and vice-versa. Therefore, the null hypothesis which states that there is no significant relationship between test-taking motivation and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria is hereby rejected.

Hypothesis Three:

Table 3: Pearson Product Moment Correlation (r) on the Relationship between Test-Taking Anxiety and Performance in Mathematics

Variable	N	Mean	SD	r	p
Test-taking Anxiety	350	38.14	6.340	-.146	0.004
Performance in Mathematics	350	40.30	7.110		

Table 3 shows that test-taking anxiety has significant negative relationship with performance in Mathematics as indicated by $r = -.146$ and $p = 0.004$ which is lower than 0.05 level of significance. The degree of correlation is inverse and low and the correlation coefficient shows that the higher the test-taking anxiety the lower the performance in Mathematics of the junior secondary school students and vice-versa. Therefore, the null hypothesis which states that there is no significant relationship between test-taking anxiety and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria is hereby rejected.

Mathematics among junior secondary school students in Kaduna State, Nigeria. This finding is similar with the findings of Akanni, Emeri and Oketade (2019) who studied the Impact of test-taking skills in Mathematics on adolescents' academic performance among senior secondary school students and the study revealed that the use of test-taking skills in Mathematics significantly impact adolescents level of test anxiety, motivation, attitude and academic performance. Hence, the study concluded among others that test-taking skills remain a viable tool in adjusting students' perception towards Mathematics.

This study also concluded that significant positive relationship exists between test-taking motivation and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria. This finding is similar with the findings of Dodeen, Abdefatah and Alshumrani (2014) who

Discussion

Based on the findings of this research, it is concluded that significant positive relationship exists between test-taking strategies and performance in

assessed the relationship between students' test-taking skills and each of the following variables: Motivation to learn Mathematics; Mathematics anxiety, attitudes towards Mathematics; and attitudes towards tests among secondary school students and the results of the study revealed a positive and significant relationship between students' test-taking skills and each of the variables used; student's motivation to learn Mathematics, attitudes towards Mathematics, and attitude towards tests, while Mathematics anxiety was showed a significant negative relationship with test-taking skills.

The study further concluded that significant negative relationship exists between test-taking anxiety and performance in Mathematics among junior secondary school students in Kaduna State, Nigeria. This finding is similar with the findings of Abdulkarim (2024) who under took a study on relationship between test-taking behaviour and achievement in Business Studies among junior secondary school students. The results of the study revealed a significant positive relationship between test-taking strategies and achievement in Business studies. It also revealed a significant positive relationship between test-taking motivation and achievement in Business studies among the junior secondary school studies and also revealed a negative relationship between test-anxiety and achievement in Business studies among the population studied.

Recommendations

Based on the findings of this study, the following recommendations were proffered:

1. There is need for Mathematics teachers with adequate training in the subject to always guide the students on the appropriate strategies to adopt before and during test.
2. Government, teachers and parents must support the students through the provision of adequate time and resources in teaching/learning of Mathematics to stimulate learners' motivation.
3. Parents and Counselors should properly counsel the students on how to reduce anxiety before test for optimal performance in Mathematics.

References

H. Kumar, and S. K. Rout, (2016). Major tools and Techniques in Educational Evaluation. Ed. Mani, A. *Measurement and Evaluation in Education*. PP. 4, and 54.

- M. C. Mondragon, & M. J. Acelajado, (2022). *Blended Learning Station – Rotation Model: Effects on Grade 10 Students Performance in and Attitude toward Mathematics*. Retrieved on 27th October, 2023 from <http://www.blendedlearningstation>.
- O. J. Ajogbeje, (2013). Effect of formative testing with feedback on students achievement in Junior secondary school mathematics in Ondo State Nigeria: *International Journal of Education Research*, 2, 8-20.
- R. Sukor, & M. N. Mohammed, (2017). Influence of Students Motivation on Academic Performance among Non Food Science Students Taking Food Science Course. *International Journal of Academic Research in Progressive Education and Development*, 6(4) 104-112
- J. U. Anikweze (2014). *Effects of Constructivist – Based Instructional Model on Students Interest and Academic Achievement in French Language in Anambra State*. Unpublished Ph.D Thesis. University of Port-Harcourt.
- E. A. Oluseyi, (2018), *Equating the State Unified and West African School Certificate Mathematics Examination Items*. DOI: 10.30845/aijcr.v8n4p10
- H. M. Dodeen, F. Abdelfattah, & S. Alshumrani, (2009). Test-Taking Skills of Secondary Students: The Relationship with Motivation, Attitudes, Anxiety and Attitudes towards Tests. *South African Journal of Education*; 34(2). Retrieved on 27/08/2023 from <http://www.sajournalofeducation.co.za>
- T. Stenlund, (2017). *Group Differences in Test-Taking Behaviour: An Example from a High-Stakes Testing Program*. <https://doi.org/10.1016/j.cnsns.2010.05.030>.
- F. Abdulfatah, (2010). The Relationship between Motivation and Achievement in Low-stakes Examinations. *Social Behaviour and Personality*, 38(2), 159-168. Doi:10.2224/sbp.2010.38.2.159
- I. L. El-Kalla, (2011). *Error Estimate of the Series Solution to a Class of Nonlinear Fractional Differential Equations: Communications in Nonlinear Science and Numerical Simulation*, 16, 1408-1413. <https://doi.org/10.1016/j.cnsns.2010.05.030>.
- R. Driscoll. (2015). Accelerated Desensitization and Adaptive Attitudes interventions and test gains with academic probation students. ERIC. 13 Pp.
- O. O. Akanni, P. N. Emeri, & O. Oketade, (2019). Impact of Test-Taking Skills in Mathematics on Adolescents Academic Performance in Lagos, Nigeria: Assessment and Sociological Implications. *International Journal of June, 2019 Development Strategies in Humanities, Management and Social Sciences* Vol. 9(4). Retrieved on 27/08/2023 from <http://internationalpolicybrief.org/journals/international-scientific-researchconsortium>
- S. Abdulkarim, (2024). *Relationship between Test-taking behaviour and achievement in Business Studies among Junior Secondary School Students in Kaduna State, Nigeria*. Un-Published M.Ed. Dissertation, Ahmadu Bello University, Zaria, Nigeria