Test-Taking Skills and Test Anxiety in Multiple-Choice Versus Essay Mathematics Tests: Perspectives of Senior Secondary Students and Teachers in Lagos State

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Abstract

The study investigates students' and teachers' understanding of test-taking skills and test anxiety of different test types in mathematics. A qualitative research design was employed for the study. Personal interviews were conducted with thirty-one participants, including fifteen teachers and sixteen students in Senior Secondary School II and III. The data were analysed with narrative, thematic and data visualisation techniques. Findings revealed that teachers and students expressed that before taking a test, students need adequate preparation by studying similar past questions, the method of answering questions, as well as where they previously made mistakes and errors from the marked scripts. Also, while taking a test, students require skills such as time management, organization, shortcuts method, several trials, being focused, and test-wiseness, among others. Furthermore, participants in the study expressed that students experience more anxiety in essay test types than in multiple-choice ones. In addition, many of the students indicate their preference to write an objective test rather than an essay test because of their perception that they can easily guess the answer. However, some students preferred the essay test because it allows them to show their work and get some marks. The study recommends that teaching must include test-taking and test practice under realistic conditions. Schools should also take into account accommodations to anxious students, such as extra time or the use of an alternate form of test, to ensure assessment equity.

Keywords: *text, test, anxiety, test-taking skills, test type*

1. Introduction

Assessment is described as a systematic process of collecting information about student progress towards the learning goals (Dixson & Worrell, 2016). Similarly, a good assessment should provide information about learners' behaviour as well as how well they have mastered instructional content, this information serves as feedback and can be used to improve the performance of the learners (Andrade & Brookhart, 2016). In addition, Lau (2016) asserts that when the assessment is aligned with the process of teaching and learning, it will have a positive effect on students' learning and motivation. Classroom assessment is important in teaching and learning processes and has been identified as a foremost method of improving learning outcomes.

The Nigeria National Policy on Education asserted that assessment at all levels of education shall be to measure accurately the abilities of students and improve learning among others (Adesemowo, 2005). Assessment is useful in the teaching of mathematics as it enables teachers to see how their students approach problems and at what level the students applied the knowledge when solving mathematical problems. Consequently, teachers need to understand students' potential, problems and learning difficulties in mathematics in order to provide appropriate remedy and feedback to attain meaningful learning.

A test is an assessment instrument for measuring the behaviour of students in all the domains of learning (Gronlund & Linn, 1990; McMillan, 2018). The achievement test focus on cognitive learning, and is usually for determining the degree of learning that has taken place after a series of delivery of instruction. There are basically two types of achievement tests: the essay type and the objective type. Experts have argued, however, that each of these test types has its strengths and shortcomings that affect the reliability and validity of the outcome. Learners must be proficient in test-taking in order for the test to serve adequately as a measure of their achievement level. By implication, to attain success in a test

situation, it is important for students to know and apply appropriate test ability strategies, ensure adequate preparation and effective time management (Bicak, 2013).

Test-taking skills are required by students and enable them to decide what to do before, during, and after the test. Also, test-taking skills could help students to translate and utilize knowledge acquired through classroom learning process to answer and respond to questions appropriately while taking tests. Test-taking skills are categorized into three skills: before during after test skills (Dodeen, Abdelfattah & Alshumrani, 2014). Before-test skills help in test preparation to practice similar question that may be presented during a test. During test strategies help in developing skills such structural organization, time management and testwiseness while after test strategies help students to make use of appropriate feedback from the purpose of improving learning.

Test-taking skills are transferable skills and if acquired, students are at a vantage point to use these skills across a variety of subjects and within different settings and conditions. Moreover, most test-taking skills are also useful in a students' practical life, highly beneficial to their effective use of time, empower them to set priorities, afford them with the ability to work both fast and accurately, and ensure ideas become directly evident. Additionally, test-taking skills can be useful to eliminate any feelings of tension and anxiety that may interfere with students' ability to communicate what they know in a test situation ((Dodeen, Abdelfattah & Alshumrani, 2014). The fact that students' achievement is measured by test scores points to the anxiety that they experience in a bid to do well.

Anxiety plays a vital role in giving a powerful signal to the individual about the level of preparedness for the test. Test anxiety can affect students' ability to perform optimally and prevent them also from demonstrating their knowledge on examinations optimally (Javanbakht & Hadian, 2014). Some students possess the knowledge of content to perform very well in testing situations, but are affected by excessive anxiety. Studies have shown that test-anxious individuals perform poorly under evaluative and stressful situations than low-test anxious persons (Busari, 2012). Learning to solve problems is ultimate in mathematics, which a student requires specific skills to show their proficiency in testing situations. In addition, some students could be familiar with the subject matter and perform poorly on tests due to poor test-taking skills. However, large number of students have not acquired the skills they need in mathematics tests.

The West African Examination Council (WAEC) Chief Examiner's reports in 2016, 2017 and 2018) highlight that the prominent weaknesses that candidates have in public examination are the inability to interpret word problems, and writing answers to the required degree of accuracy and logical reasoning among others. Many students encounter difficulties in applying their mathematical knowledge into finding the solution to problems, especially in text-based problems that demand comprehension skills in addition to mathematical thinking processes (Leonard, 2017).

In most testing scenarios, it is commonly assumed that student performance is primarily influenced by the test's content and difficulty, as well as the cognitive abilities of the test-takers. However, research shows that emotional and behavioural responses during testing particularly test anxiety and test-taking skills can significantly have an impact on outcomes (Cassady & Johnson, 2002; Malespina, Seifollahi & Singh, 2024). Students may fully understand the subject matter but still perform poorly due to inadequate strategies for managing time, interpreting questions, or coping with stress. Similarly, even well-prepared students may underperform because anxiety hinders their ability to think clearly or recall information.

These issues are especially concerning in mathematics, a subject where performance is often sensitive to confidence and clarity of thought. Moreover, the type of assessment used can influence student performance, as various formats may exacerbate anxiety or demand specific test-taking strategies. Since anxiety levels and test-taking skills can differ depending on the test type, relying solely on test scores to measure mathematical competence may be misleading. Therefore, the study explores the teachers and students' understanding of test-taking skills and test anxiety and how it affects mathematics performance in objectives and essay test types.

The study provides answer to the following questions:

i. What skills do students require to do well before, during and after taking a test?
ii. How does test type affect mathematics performance in essay and objectives test?
iii. How does anxiety affect the mathematics performance in essay and objective test type?
iv. How can test anxiety be addressed?

2. Theoretical Framework

Two theories, Dodson's Law of Drive Theory and DeSkeyer's Skill Acquisition Theory provided the framework for the study

2.1. Dodson's Law of Drive Theory

The study was informed by the Inverted-U-Principle theory, which was derived from Yerkes-Dodson's Law of Drive Theory (Yerkes & Dodson, 1908). The theory links arousal to performance; hence it is referred to as the theory of Arousal and Performance. According to McCandless (1967), 'arousal' is the level of excitement or activation generated in the central nervous system to trigger production of the energy required to perform the desired task. The level of arousal of energy experienced by the individual determines the effectiveness of that individual's performance on the task at hand. The underlying argument in the theory is that if arousal increases up to a certain level, performance on a task would increase as well; but if arousal became too great and continuous, then performance would deteriorate. This means that at the onset of the arousal state, the individual would still feel confident in his/her ability to control the arousal pressure, and desire to perform a task would continue to improve. But, once the arousal gets to a peak level, the individual would start to doubt his/her ability to cope, and her/his performance would automatically begin to drop.

Arousal leads to anxiety, and there is a progressive relationship between a person's level of anxiety and the ability to function effectively. However, when the anxiety level builds up too high, performance declines because the individual's attention will be focused on the feelings to the extent that he/she loses focus of the task at hand (Syokwaa, Aloka & Raburu, 2014). The arousal-performance process gradually builds up from a lower level to the optimum level (the top of the inverted U). Rathus and Nevid (1995) asserted that at each level the individual's functioning capacity is altered to conform to the arousal-performance interaction.

Deducing from the arousal theory, an easy or simple task such as adding simple numbers does not require focusing on several tasks simultaneously, and can be accommodated by high levels of arousal. On the other hand, a complex task such as solving a maths problem with many steps require attending to many factors at once. For this reason, complex tasks are better handled at lower levels of arousal. However, both over-arousal and under-arousal can have negative effects on performance.

In an attempt to explain the existence of individual differences in ability to cope with varied anxiety levels, Syokwaa *et al.* (2014) arrived at the concept of individualized zones of optimal functioning (IZOFs). They stated that each individual has an optimal level of pre-performance anxiety which resulted in peak performances. Accordingly, if the pre-performance anxiety lies outside the area of IZOF, whether too high or too low, the performance will deteriorate. The inverted U-principle also states that individuals who are exposed to the same anxiety energy are likely to react differently because of the difference in their IZOF's levels, a fact that accounts for differences noted in their academic performance outcome.

In relation to the Inverted-U principle, therefore, this study assumed that in a normal situation, a student would need some level of anxiety which will positively energize him/her to attend to academic pursuits. Their performance ability, either at mild and moderate anxiety levels is likely to bring forth desirable grades. But once the anxiety escalates and goes beyond optimum level, there is the possibility that the student's academic achievement would drop. This study, therefore, attempted to obtain a measure of

students' test anxiety levels, facilitating and debilitating anxiety and determine the connectedness with mathematics performance when tested on different test types.

2.2. DeSkeyer's Skill Acquisition Theory

The study is also guided by skill acquisition theory as developed by DeKeyser (2007). This theory draws on John Anderson's (1982) Adaptive Control of Thought (ACT) model which itself is a kind of cognitive stimulus-response theory (Ellis & Shintani, 2013). Parziale and Fischer (2009) described it as a neo-Piagetian theory that amalgamates elements of both cognitive and behaviourist theories. The ACT is also described as the most well-known models of skill-based theories (Taie, 2014). Adaptive control of thought (ACT) is a framework for skill acquisition comprising two major stages in the development of a cognitive skill, i.e., declarative and procedural stages.

Declarative learning is acquiring information that one can speak about while procedural learning focuses on habit and the knowledge exercised during the performance of some tasks. The basic claim of Skill Acquisition Theory, according to DeKeyser (2007), is that the learning of a wide variety of skills shows a remarkable similarity in development from initial representation of knowledge through initial changes in behaviour to eventual fluent, spontaneous, largely effortless, and highly skilled behaviour, and that this set of phenomena can be accounted for by a set of basic principles common to acquisition of all skills.

In order to build proficiency with a skill, the learner must constantly engage with the skill knowledge through large amount of practice or constant engagement with same or closely related tasks (DeKeyser, 2007). According to DeKeyser (2007), practice with a given task is marked by decreased reaction time and error rate and interference from other tasks. Further, practice with a given task gradually decreases reaction time and error rate. DeKeyser, (2007) defined practice as "repeated performance of the same (or closely similar) routines."

Also, Newell and Rosenbloom (1981), as cited in DeKeyser (2007), opined that practice is the subclass of learning which only deals only with improving performance on a task that had already been successfully performed. However, for practice (procedural) to be worthwhile, the practice should be brief, engaging, purposeful, and distributed (Rohrer, 2009). Too much practice can be ineffective or lead to mathematics anxiety (Ghoshal, 2005).

Mathematics is ultimately about problem solving, requiring that learners apply the learned rules (declarative knowledge) to work on specific tasks and express their knowledge (procedural knowledge). How well learners utilize the skills will affect their overall performance. In mathematics, procedural fluency support students' analysis of their own and others' calculation methods, such as written procedures and mental methods with the aid of tools like calculators, computers, and manipulative materials.

On the other hand, procedural fluency extends students' computational fluency as it applies to all areas of mathematics. In the same vein, students practice of worked examples can also be useful in developing appropriate skills to solve mathematics problems and equally discover what procedure can be most appropriate in a given situation. In the context of this study, the measure of students' test-taking skills provides their procedural knowledge through test-preparation, during-test and after-test skills.

3. Method

3.1. Design

The study adopted a qualitative research design to explore the teachers and students' perceptions about factors that promote or hinder the test taking skills, test anxiety and mathematics performance of students as well as possible interplay between the factors

3.2. Sampling

A sample size of thirty-one participants, including fifteen teachers and sixteen students, for the study is justified by qualitative research criteria set over the past. Creswell (1998) suggests 5 to 25 respondents, which is adequate for going into particular experiences, and Morse (1994) suggests 6 to 10 participants for in-depth interviews with profound data. Francis *et al.* (2010) further suggest that even ten participants are enough to confirm valid consensus. These hypotheses are indicative that the sample size will provide detailed information from both groups. The participants were picked using purposive sampling: fifteen mathematics teachers (five each from three district) were separately interviewed, and sixteen SSS II and SSS III students from two schools from two education districts were divided into three focus group discussion (FGD) sessions.

To achieve a suitably heterogeneous sample, the study intentionally selected participants from varied subgroups, considering factors such as age, gender, and academic level (SSS II and SSS III students), ensuring a broad spectrum of perspectives. To address non-response bias, follow-up contacts were made with initially unresponsive participants, and their reasons for non-participation were noted. This allowed for a clearer understanding of potential bias in the final sample.

In addition, the study ensured informed school administrator consent and individual child assent were obtained. Also, interviews were conducted within the school premises and in a comfortable classroom environment, protecting privacy and confidentiality. Ethical issues included safeguarding children's well-being, minimizing distress, and respecting their right to withdraw at any time.

3.3. Instrumentation

An interview guide was developed by the researcher to ascertain students' and teachers' understating of how test-taking skills and test anxiety affect mathematic performance. The use of interviews and open-ended questions helps to guide against restriction of information to enable a free flow of discussions Three FGD sessions were conducted for the students. The FGD is selected as a quicker method of data collection from several participants in a study at once. Each FGD session had in attendance eight participants both male and female students. Validation of interview guide (IGMTS) involved a trial testing procedure carried out by the researcher on teachers and students selected from a secondary school outside the sample coverage. To improve the reliability of the instrument, a pilot test was conducted among teachers in another school that is not part of the sample. The lesson learned from the pilot study helped in to improve dialogue during the main study.

3.4. Method of Data Analysis

The analysis followed Gillham's (2005) content analysis approach, which involves a systematic process of transcription, content examination, and inductive interpretation. The audio recordings were carefully transcribed into written form, with close attention paid to ensuring accuracy and completeness, every detail was transcribed during the process. Transcribed data were subjected to a combination of narrative and thematic analysis to identify patterns, recurring ideas, and meaningful themes emerging from participants' responses. Additionally, data visualisation techniques were employed to present the findings in a clear and accessible format, supporting the interpretation and communication of key insights.

4. Results

Analysis and extract of the participant's responses to the research questions are presented below.

4.1. Skills Required by Students for Essay Mathematics Test

The respondents were asked about test-taking skills that students require to do well before, during and after taking mathematics test. The data visual representation of the sub-themes deduces from responses from both the teachers and the students are presented in Figure 1.

4.1.1. Skill Required before Taking a Test

Teachers responded that students need adequate preparation before taking mathematics test and that they need to study with a textbook, solved problems ahead and may need to consult with their colleagues or teachers when they cannot solve the mathematics problems. Mathematics teachers emphasise that students need a combination of critical academic skills to succeed in tests. Also, problem-solving is essential, as students must logically analyze questions and apply appropriate methods rather than rely on memorization. Accuracy in calculations and attention to detail are crucial, as minor errors can lead to incorrect answers. Understanding mathematical vocabulary helps students interpret questions correctly.

Regular practice with a variety of problems fosters flexibility and critical thinking. Additionally, effective time management and quick recall of basic maths facts are necessary, as hesitation in foundational steps can hinder overall performance during a timed test environment. However, the students revealed that some of them only study when they are informed there would be a test, for instance one of the students reported that *"…. if I hear that there will be a test, I will prepare."*

It is also worth noting that some of the students indicate that they need to study very well and solve past questions before taking a test. Students feel that knowing formulas as a matter of concepts rather than mere memorization is the key to passing maths exams. Stressing the use of time in not hurrying is their emphasis. Practicing repeatedly with mixed problems reinforces confidence and preparedness. Also, remaining calm and alert while responding to the exam is necessary, as nervousness has a habitual inclination towards impairing recall and performance even after adequate study of the material.

4.1.2. Skills Required While Taking a Test

4.1.2.1. Teacher Responses

During mathematics tests, students are encouraged to **"***read each question carefully***"** to understand fully what is being asked, as misreading often leads to **"***simple but costly mistakes***."** Teachers emphasize that logical reasoning is vital - even if students forget a formula, they can still solve problems by thinking **"***step by step***."** Clear organization of work is also important; many lose marks not due to incorrect answers, but because **"**the examiner can't follow their process**."** Also, self-checking is considered a valuable skill, helping students identify and correct errors before submitting their test, which can greatly enhance their performance.

4.1.2.2 Students Responses

Students identify several key academic skills that help them perform better during mathematics tests. One student shared, "*I always try to underline key words in the question so I don't miss anything important,*" which is a strategy that helps maintain focus and avoid careless mistakes. Estimating answers is another useful skill; as one student explained, "*If my final answer looks way off, I know I probably made a mistake somewhere.*" Time management is also emphasized, with students choosing to "*skip really hard questions at first and come back to them later*" to avoid getting stuck. Additionally, "*writing neatly*" is seen as essential to prevent confusion and calculation errors.

The responses from both the teachers and students provide similar view on the skills required while taking test. These include, time management, organization, focus and testwiseness, among others. However, the teachers were able to provide specific skills required for different test type as can been

seen from their responses and presented in Fig 1. For the objective test, students required the ability to think fast, shortcuts, time saving and concentration. However, for essay tests, students required time saving, organization, and ability to attempt all questions among others.

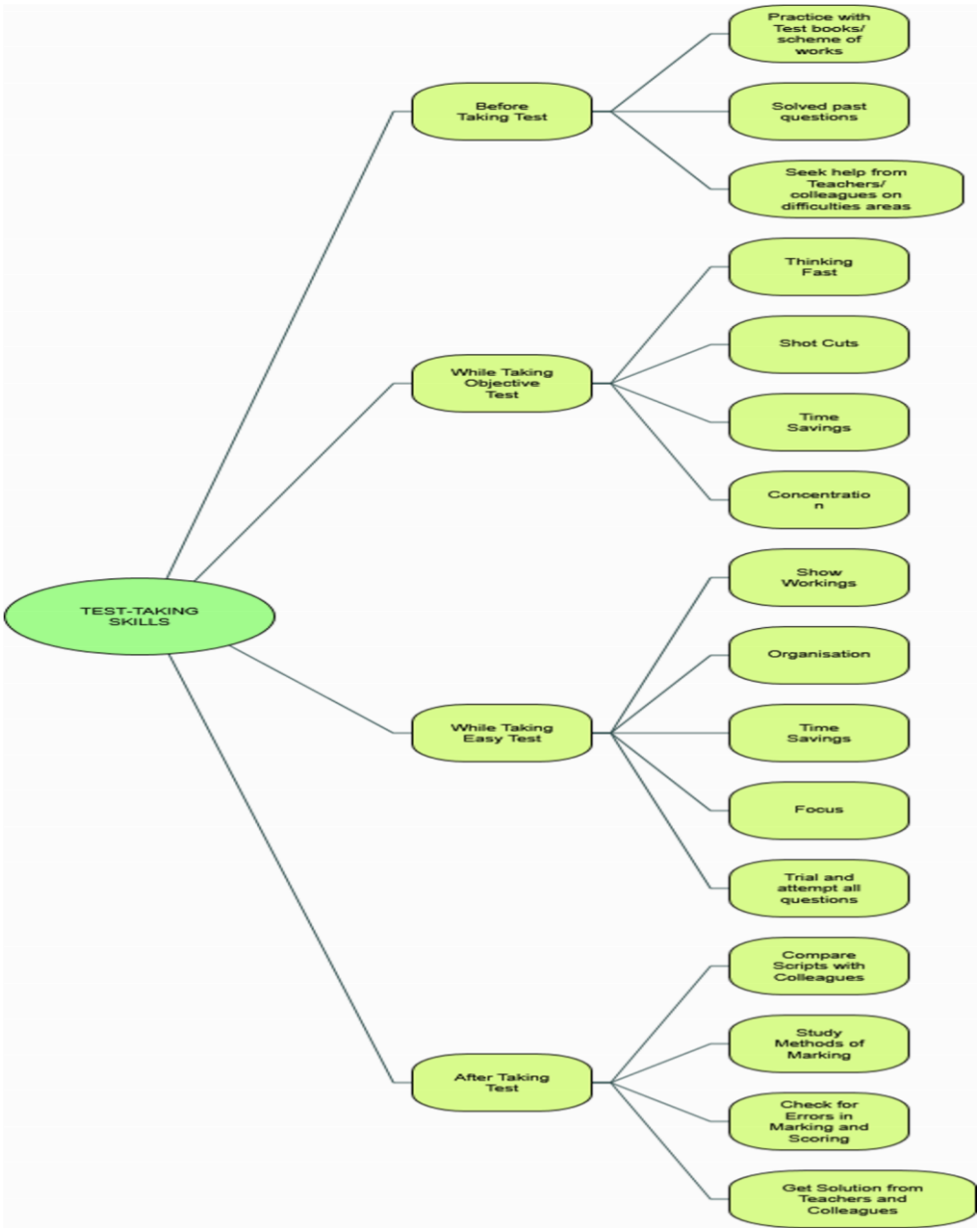

Figure 1: Skills Required Before, During and After Taking a Test; source: Field work, 2025

4.1.3. Skills Required after Taking a Test

The teachers were asked what they expect the students to do with returned marked scripts while students were also asked what they do with them. Some of the teachers commented that students are expected to "… *compare with colleagues."* Another one respond that to "… *study answer marking"* or "… *the method of marking."* This implies that teachers used the marked scripts as a form of feedback. Another teacher commented that *"... if a student knows a formula but in the process of substituting the value in the formula, he made a mistake, that doesn't mean the student will fail it, I like them to study it."*

Moreover, teachers expect students to study how the scripts are marked and score awarded, as one teacher commented that "…. *students should check whether the teacher marks and calculates their*

scores properly … [and] *expect them to see where they have made a mistake.*" The instructors underscored the reality that students require a fusion of thinking, reflective, and interpersonal skills after taking a maths test to aid in their study and development. One teacher commented that "… *students need strong analytical skills so that they can look back and think about what they did well or poorly on the test and where their thinking might have collapsed*." This exercise in reflection is directly linked to self-assessment, which another teacher summarised as being "… *examining their test and spotting patterns in their error.*" These are skills that help students identify their weaknesses and improve specifically.

Alongside reflection, emotional resilience is also considered crucial. One teacher described how "S*tudents thrive on having a growth mindset and perseverance, so they can learn from mistakes instead of getting discouraged*." This allows them to see mistakes as a means of development, and not as failure. Communication is also essential. One answer stressed that "*They should be able to explain their problem-solving process clearly, particularly when reviewing questions with their peers or teachers,*" which will assist collaborative learning and understanding.

Another skill emphasized by the teachers is effective time management. Learners must "… *assess how they spent their time on the test to better prepare for future tests*" so that they are able to accomplish tasks well and not do sloppy work in haste. Critical thinking is important. According to one teacher, students need to be able to "… *connect their test performance with broader maths concepts, not just worry about the test score*." It assists in putting what they know into a larger picture of mathematics, leading to long-term retention and application.

On the other hand, when students were asked what they do with returned marked script they revealed that they differ. As one student put it, "*I do the questions that I got wrong and try to see why I made them*," and this reflects a disposition to learn from mistakes. Another answered, "*I just look at the grade sometimes and put it away, but if I did not do well, I read the teacher's comments to figure out where I went wrong*," as a grade-based reaction with sporadic checking. Another student answered, "*I compare what I've written with the correct ones and ask the teacher or my friends if I still don't understand*," as a cooperative method of learning from error. Another student's response was **"…** *I used to keep the scripts, do nothing with.*" This implies that it could be possible that some of the students did not bother to study the marked scripts to check their mistakes and this could affect their subsequent performance.

Another student responded "*I will study my mistakes ... check my errors and correct myself* [when] *I get solutions from my teachers*" and "*I do keep the script and show it to my elder ones when I get home and they will correct me."* It can be deduced from the responses that many of the students used the marked script as feedback and take actions that will enhance their study habits and learning like comparing with colleagues, checking that the score awarded to the student is correct and looking at the weaknesses of others. In short, while certain students pay attention to learning from the feedback, others only hear the grade until motivated by poor performance.

4.2. How Test Types Affect Mathematics Performance

The respondents were asked to indicate their perceptions about how test type affects mathematics performance in essay and objectives tests. Teachers observed that the test format objective or essay impacts students' performance in maths significantly. One commented that "… *the essay shows more of the students understanding."* On the contrary, some of the teachers responded that "I don't think objective is a true picture, when they get a particular question, it doesn't mean they know it, it can be by gambling." Another said that "*Students perform better in objective tests because they can read the right answer even if they are doubtful about the procedure*."

Objective tests are also regarded as more effortless and time-saving to finish, with one teacher remarking that "*Students who work quickly get higher grades, even if their grasp is inadequate*." Guessing sometimes also yields marks, with "… *some students guess in objective tests and still receive*

marks." But essay questions are reported to be a better test of real understanding. One teacher said, "*Essay-type questions show more understanding, but students can't always explain themselves*."

Another described how "*Essay questions make students walk through all their steps, which is where they break down thinking-wise*." There are downsides, though, "*Poor writers lose credit on essay tests, even if they do the maths,"* and *"... test anxiety is increased with essay questions because students hate having to explain it all out in detail*." By implication, the teachers are of the opinion that the performance of the students in objective test type mathematics is not a true reflection of their level of understanding.

Consequently, using objective test types alone does not reflect the actual students' maths performance and would not also reveal students' weakness in a particular area of mathematics. Overall, teachers feel objective tests are effective for measuring recall and procedures, but essay tests more effectively measure reasoning and problem-solving abilities.

Also, when the students were asked which of the maths test type they would prefer and why, it was found that students have varied preferences for essay and objective type mathematics tests, most frequently based on comfort, test-taking strategy, and learning styles. Most students prefer objective tests, and one said, "*I like objective tests because they're faster to answer and sometimes you can guess if you don't know*," pointing to speed and the opportunity involved in multiple-choice formats. One student concurred and stated, "*Objective tests are less difficult for me since I am anxious when writing long explanations on essay questions*."

Some prefer the availability of showing comprehension in written solutions. One said, "*I prefer essay tests because I can show my working and receive some marks even if the final answer is incorrect*," valuing partial credit and process-oriented grading. In the same vein, another student responded, "*Essay questions assist me in understanding the steps, so I know the topic better*," indicating that essay tests encourage more thorough study. Another balanced view was one student's statement, "*Objective is preferred when there's not much time, but essay allows me to prove that I actually do know what I'm doing*," acknowledging the use of both modes by situation.

Another students' response was that "… *because objective you can guess, but I can pick anyone if I don't know the answer.*" Another student responded that "… right but in theory it is based on your working but objectives it can be based on guessing," "*I prefer theory test because in the objective, it is a game of play or lose,*" "*... objective, it has options and it is easy,"* and *"I preferred objective because it is easy, solve it, get the answer than the theory."*

These responses show that most of the students prefer objective test types because they can easily guess the answer(s). However, there were some who preferred theory (essay) test types in mathematics. As commented by some of them *"... theory, if you solve it, you can get more knowledge," "... I prefer the theory*", *"... theory shows you're working and if you make small mistake, then you can get it wrong"* and *"For theory, I will explain further, but the objective it is either I missed or I get the questions."* It can be observed that some of the students agreed that they prefer theory questions in mathematics as it gives them opportunity to show their working and at least get some marks, unlike the objective test type where they either get the answer right or not.

In general, there is variation but students favour balancing clarity, confidence, and fairness in deciding between test forms of essay and objective.

4.3. How Anxiety Affects the Mathematics Performance in Essay and Objective Test Types

The teachers were asked how anxiety affects the mathematics performance in essay and objective test types. Teachers widely agreed that anxiety does have an impact on students' performance on both essay and objective test forms of math, but differently. In essay tests, anxiety is more salient. As one teacher put it, "*Lots of students freeze on essay tests because they feel as though they have to defend every step, and that makes them even more anxious*." This anxiety frequently creates mental overload, another

teacher explaining, "*Essay tests cause nervous students to forget procedures they usually know because they get bogged down trying to justify them.*" Time management is also compromised, one explaining, "*Anxiety leads to time management issues on essay tests students take too long on one question and run out of time*."

Fear of doing something wrong is also a common source of anxiety. "*I have witnessed anxious students doing poorly on essay tests because they are afraid of getting something wrong in their written answer*," one instructor said, and another added, "*Essay-style questions generate anxiety among students because they think that they must be flawless in their calculations and presentations.*"

On the other hand, objective tests can reduce anxiety in some students because these require fewer written descriptions. "*There is less anxiety for some students in objective tests because they're only choosing an answer, not demonstrating how they arrived at it*," one of the teachers commented. Objective tests are not anxiety-free, however. Some are perplexed by similarly-sounding options "*Students who are test anxious second-guess more in objective tests, particularly when having similar options.*" Others might hurry: "*In objective tests, anxious students hurriedly answer the questions without fully reasoning them out."* One teacher saw the opposite, however: "*For anxious students, multiple choice provides some solace since there's always a possibility of getting it correct even when unsure*."

In general, anxiety impacts performance under both test forms, yet essay tests are more likely to generate heightened levels of stress since elaboration of responses is anticipated of them, whereas objective tests have some alleviation, though perhaps at a cost. Figure 2 presents data visualization of the deduction forms the responses on effect of anxiety on mathematics performance in the essay and objective test type.

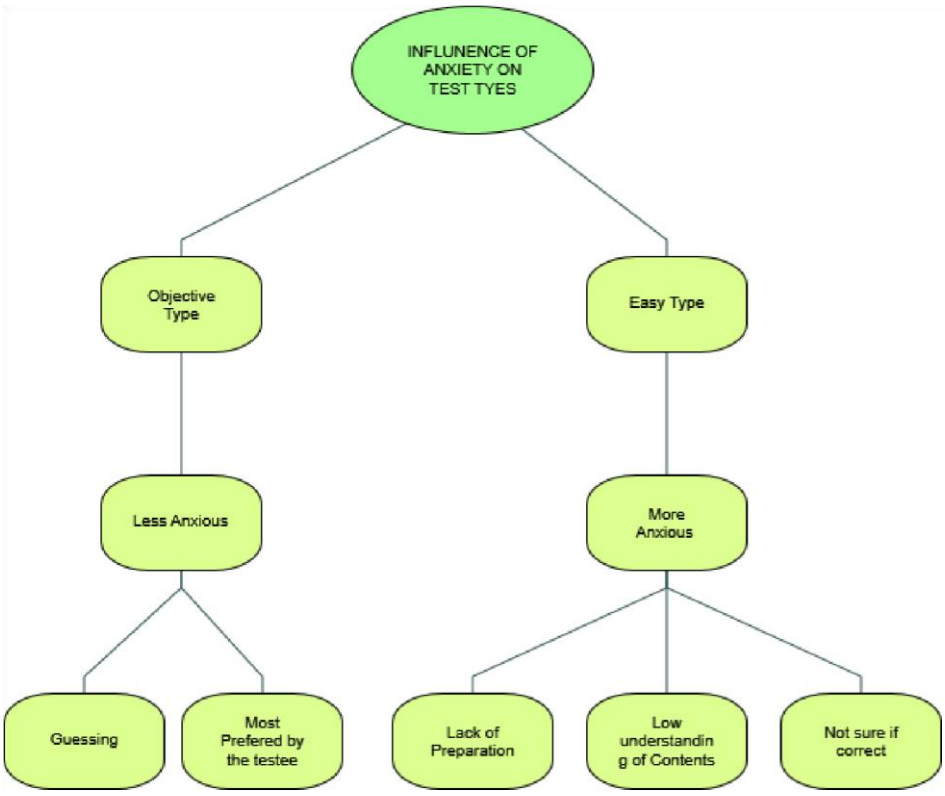

Figure 2: Anxiety and Mathematics Performance in Objectives and Essay Tests; source: Fieldwork

The students were asked which of the test types caused more anxiety during test situations. Students are worried to some degree based on the kind of mathematics test but are more worried when they are given essay tests. The biggest concern is that they may forget and not be able to articulate problem-solving

steps explicitly. As one student said, "*I get more anxious with essay tests because I fear that I won't be able to recall all the steps to arrive at the solution*."

Another added, "*Essay tests concern me because I have to write it all out, and I'm a bad writer*." Time pressure contributes further to increased anxiety in essay formats. One student pointed out, "*I get more anxious with essay tests because they take longer and I am worried I will not have enough time*," while another felt there was a concern with *"... a little error being able to affect the whole respons*e." Concern with clarity and interpretation also arose in this group with one student indicating that the reason for greater anxiety with essay tests is that "*I don't want the teacher not to understand my method if I don't write it down perfectly*."

While essay tests are normally more stressful, objective tests also turn out to be daunting for some students. One said, "*Objective tests stress me out more because the choices can be confusing and tricky*," and another said, "*Objective tests make me anxious because I always second-guess which one is right, especially if they look similar*." Objective tests, however, are seen as less stressful by some because one student said, "*I'm less stressed in objective tests because I can at least guess if I don't know it.*"

In sum, although both types of tests are anxiety-generating, students will feel more under pressure from essay tests since detailed explanations are called for, there is a time limit, and they are fearful of misunderstanding. From the comments, both the teachers' and students agreed that anxiety is higher in the essay test type because of inadequate preparation, lack of knowledge and mathematics phobia. In objective tests students can easily guess and are less anxious to take the test. However, some of the students also experienced anxiety in objectives test. One student commented "… *sometimes in objective tests, when you solve it you have the answers.*" Thus, it can be deduced that mathematics anxiety is experienced in both essay and objective test types, but more in the essay test type. This main reason for the mathematics anxiety is lack of knowledge and inadequate preparation on the part of the students.

4.4. How to Reduce Test Anxiety

Mathematics teachers suggest some simple strategies for helping students cope with and reduce test anxiety. One of the key strategies is to create a positive learning environment. As one of the teachers said, "*Teachers should create a supportive environment where students feel safe to make mistakes and learn from them*." This has the effect of calming students such that they view exams as part of learning rather than high-stakes tests.

Knowing test conditions is also considered to be significant. One of the teachers suggested, "*Preparation using previous questions and timed mock tests will get students accustomed to the test environment and alleviate anxiety."* Along with that, emotional control strategies can prove to be beneficial. A teacher suggested, *"Use relaxation strategies like slow breathing or positive self-statements before and during testing."*

Another approach is to shift students' mindset away from perfectionism. "*Get students to think effort and progress rather than the score,*" advised one teacher. Confidence-building is also highlighted, with another adding, "*Assist students in building confidence by practicing regularly and celebrating little wins.*"

Preparation and transparency can decrease anxiety too. "*Give clear instructions and tell students the test format beforehand so they can prepare,*" replied one teacher. Reducing pressure by test design was also cited: "*Reduce pressure by making assessments part of ongoing learning, not high-stakes testing only*."

Teachers also emphasize giving emotional support. "*Discuss students' concerns with them and teach them to manage stress," another* suggested. Exposure on a slow basis with low-pressure projects was another proposal: *"Utilize low-stress activities and quizzes to gradually acclimate to tests."* Severely affected students might need accommodation. As one of the trainers suggested, "*Provide additional*

time or adaptive settings for students with a history of difficulty with anxiety." Test anxiety must be addressed with a mix of emotional support, realistic preparation, paradigm changes, and, as appropriate, adaptive accommodations.

5. Discussion

The results from both student and mathematics teacher responses show that type e of test and test anxiety have great effects on student performance in maths tests. However, students find objective tests less fearful, mainly because they are able to make informed guesses or spot correct choices at times. One of the students said, "I'm less nervous in objective tests because I can at least make a guess if I don't know the answer." By contrast, essay tests cause more anxiety because of the need to write out detailed explanations and step-by-step working. As described by one student, "*I get anxious on essay tests because I fear I won't recall all the steps to reach the solution*." This is consistent with a study by Putwain and Daly (2013), which indicated that high-stakes tests involving written explanations were found to produce more anxiety, especially in mathematics.

Teachers also noted that anxiety interferes with students' capacity to show their actual knowledge, especially on essay tests. As one teacher highlighted, "*Essay tests can make nervous students forget processes they normally know because they get bogged down trying to describe them*." This is corroborated by a description in a study by Ashcraft and Krause (2007), where it was established that anxiety compromises working memory, but more specifically for multi-step problem-solving exercises.

Compared to managing anxiety, instructional as well as affective strategies were implemented. Teachers cited the importance of a positive classroom, with one saying, "*Teachers should provide a supportive environment where students can feel safe to make mistake*s." This is in agreement with Ramirez and Beilock's (2011) recommendation to alleviate anxiety by offering low-stakes practice and to promote a growth mindset.

Furthermore DeKeyser's (2007) Skill Acquisition Theory explains that with repeated, structured practice, learners move from effortful, declarative knowledge to automatic, procedural performance. This supports the teachers' view that regular problem-solving practice, textbook study, and collaboration build the foundational skills such as time management, organization, and logical analysis necessary for success in mathematics tests.

Yerkes-Dodson's Law (1908) further explains how moderate arousal enhances performance, while excessive anxiety especially during essay tests impairs it. This aligns with findings that students perform better on objective tests due to lower anxiety. Together, these theories highlight the need for both skill mastery through practice and emotional regulation to optimize test performance.

6. Conclusion

This study demonstrates that test anxiety and test-taking skills affect students' mathematics performance, with objective tests generally causing less anxiety than essay formats. Effective preparation, including practice, problem-solving, and time management, plays a crucial role in improving outcomes. However, the study is limited by its reliance on interviews as the primary method of data collection, which can introduce various forms of bias. The data depend on participants' ability to accurately recall and express their experiences, potentially leading to incomplete or distorted information. Additionally, the relatively small sample size may not fully capture the diversity of the broader student population, limiting the generalisability of the findings to other contexts or groups.

Future research should include larger, more diverse samples and consider longitudinal designs to better understand how anxiety and skills develop over time and impact performance.

The implications are that balanced assessment strategies are required to take both forms of test into account and to sustain students both emotionally and cognitively. The teaching must include test-taking

and test practice under realistic conditions. Schools must also take into account accommodations to anxious students, such as extra time or the use of an alternate form of test, to ensure assessment equity.

Follow-up studies might investigate the long-term effects of test anxiety experiences on mathematical performance across various age groups. Further, studies on the efficacy of certain intervention techniques e.g., mindfulness training, metacognitive training, or test format modification would offer greater understanding in minimizing mathematics test anxiety. Cross-cultural comparison studies or cross-educational comparative studies may further reveal how structural features shape students' mathematics testing anxiety experience.

7. References

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