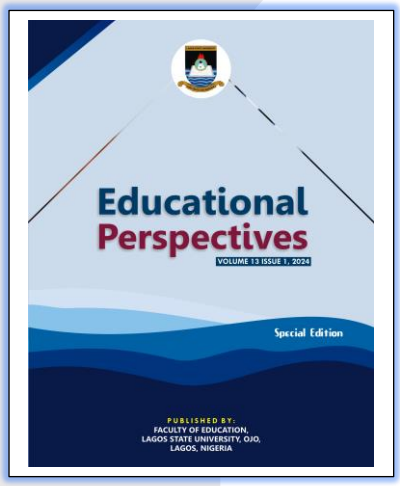

Exploring the relationship between Test Achievement and the Utilization of Test-Taking Strategies: Implications for Criterion-Related Validity.

Abubakar Rabiu Uba & Ahmad Zamri Bin Khairani

Education Department, Sule Lamido University Kafun Hausa, Jigawa State
School of Educational Studies, Universiti of Sains Malaysia, 11800 Penang, Malaysia

KEYWORDS:

Test-taking strategies, GSP122 Test, Criterion-related validity, Sule Lamido University.

WORD COUNT:
201

CORRESPONDING EMAIL ADDRESS:
Abubakar.rabiu@slu.edu.ng

ORCID NUMBER:

ABSTRACT

This study explores the relationship between test achievement and the utilization of test-taking strategies, with a focus on understanding the strength of the relationship and its implications for criterion-related validity. Data were collected from 600 students at Sule Lamido University, who took the GSP122 test, a 60-item multiple-choice ICT examination. The study correlated the students' scores on the GSP122 test with their responses to the Test-Taking Strategy Questionnaire, a highly validated instrument with a reliability of 0.90. The research aimed to assess how the use of test-taking strategies influences test performance and how this relationship affects the test's criterion-related validity. The results revealed a significant negative correlation between test achievement and strategy use. It concluded that this inverse relationship between GSP122 scores and test-taking strategies highlights a potential area of concern where high achievers may overlook the importance of test-taking strategies, which could ultimately impact their performance, particularly in high-stakes testing environments. Consequently, it was recommended that educators and instructors place a stronger emphasis on integrating test-taking strategies into their teaching methods. This is especially important for high-achieving students, who could benefit from learning how to effectively manage their time during exams, analyze questions thoroughly, and use techniques to reduce anxiety.

HOW TO CITE

Abubakar R.U. & Ahmad Z.B.K. (2024). Exploring the relationship between Test Achievement and the Utilization of Test-Taking Strategies: Implications for Criterion-Related Validity. *Educational Perspectives, 13*(1), 88-96

Introduction

Test-taking strategies have long been considered an essential component of academic success, with educators and researchers alike emphasizing their importance in improving student performance (Dodeen, 2015; Stenlund et al., 2017). These strategies, which include time management, question analysis, and anxiety reduction techniques, are often taught as part of test preparation programs and are believed to contribute significantly to test performance (Sarnacki, 1979; Scruggs & Mastropieri, 1992; Agarwal, 2019). The rationale behind teaching test-taking strategies is rooted in the belief that they can help students demonstrate their true knowledge and abilities more effectively. For instance, time management strategies are thought to ensure that students can attempt all questions within the given time frame, while question analysis techniques may help students better understand and respond to complex items (Oostdam & de Klerk, 2011; Özkan, 2022). Additionally, anxiety reduction strategies are believed to mitigate the negative effects of test anxiety on performance (Zeidner, 1998; von der Embse et al., 2018).

However, the relationship between the use of these strategies and actual test achievement remains a subject of debate in educational research. While some studies have found positive correlations between strategy use and test performance (e.g., Hong et al., 2006; Phakiti, 2003; Schwinger & Stiensmeier-Pelster, 2012), others have yielded mixed or inconclusive results (e.g., Purpura, 1997; Song & Cheng, 2006; Idika et al., 2021). This inconsistency in findings suggests a need for further investigation into the complex dynamics between test-taking strategies and achievement. In the Nigerian context, where this study is situated, research on test-taking strategies has been limited but growing. Adegoke (2017) found a positive relationship between test-taking strategy use and performance in mathematics among secondary school students in Oyo State. Similarly, Owan et al. (2020) reported that test-taking skills significantly predicted students' academic performance in Cross River State. However, these studies focused on secondary education, leaving a gap in our understanding of how these strategies function at the university level.

This study aims to address this gap by exploring the relationship between test-taking strategies and achievement in depth, focusing on university students and the implications for criterion-related validity. Criterion-related validity, a crucial aspect of test design and evaluation, refers to the extent to which a test's scores correlate with a relevant external criterion (Cronbach & Meehl, 1955; Messick, 1995). In this context, we examine how the utilization of test-taking strategies relates to test performance and what this relationship reveals about the test's validity.

This study was conducted at Sule Lamido University, using the GSP122 test, a comprehensive 60-item multiple-choice ICT examination, as the primary assessment tool. By correlating students' performance on this test with their reported use of test-taking strategies, we seek to shed light on the complex interplay between strategy use, test achievement, and test validity. This approach allows us to contribute to the ongoing discussion about the role of test-taking strategies in educational assessment and their impact on test validity, particularly in the Nigerian higher education context.

The significance of this study lies in its potential to challenge or confirm existing assumptions about the universal benefits of test-taking strategies. If a strong positive correlation is found between strategy use and test achievement, it would support the current emphasis on strategy instruction in test preparation. Conversely, a weak or negative correlation would raise important questions about the efficacy of current test preparation methods and the construct validity of tests that may be influenced by strategy use. Furthermore, this study has implications for the interpretation of test scores and the design of assessment tools. If test-taking strategies significantly influence test performance, it may suggest that test scores

reflect not only content knowledge but also strategic test-taking skills. This could have implications for how we interpret test results and make decisions based on these scores (Haladyna & Downing, 2004; Lane & Stone, 2006).

By examining these issues, our study contributes to the broader field of educational measurement and assessment, with a specific focus on the Nigerian university system. It aims to provide valuable insights that can inform educational practice, test design, and the ongoing efforts to ensure fair and valid assessments of student learning in higher education institutions across Nigeria and similar contexts. Consequently, it's against this background that the study examines the relationship between the GSP122 test scores and test-taking strategy scores.

Research Objective

1. To examine the relationship between the GSP122 test scores and test-taking strategy scores.

Research Question

1. What is the relationship between GSP122 test scores, and test-taking strategy scores?

Literature Review

Test-Taking Strategies: Conceptualization and Types

Test-taking strategies have been the subject of extensive research in educational psychology and assessment. These strategies are generally defined as cognitive and metacognitive approaches that students employ before, during, and after a test to enhance their performance (Cohen, 2006). Researchers have identified various types of test-taking strategies, which can be broadly categorized into three main groups:

1. Cognitive strategies: These involve direct manipulation of the test material and include techniques such as underlining key words, eliminating incorrect options, and making educated guesses (Dodeen et al., 2014).
2. Metacognitive strategies: These strategies involve planning, monitoring, and evaluating one's cognitive processes during the test. Examples include time management, self-checking, and prioritizing questions (Phakiti, 2016).
3. Socio-affective strategies: These strategies aim to manage emotions and reduce anxiety during the test. They include techniques such as positive self-talk, relaxation exercises, and maintaining a positive attitude (Stenlund et al., 2017).

The Relationship Between Test-Taking Strategies and Test Performance

The relationship between test-taking strategies and test performance has been a subject of debate in the literature. Numerous studies have reported positive correlations between strategy use and test achievement. For instance, Dodeen (2015) found that students who reported higher use of test-taking strategies performed better on multiple-choice tests. Similarly, Öztürk (2020) reported a significant positive relationship between strategy use and reading test performance among Turkish EFL learners.

However, the effectiveness of test-taking strategies seems to vary across different contexts and types of tests. In a meta-analysis of 47 studies, Schwinger et al. (2009) found that the overall effect of test-taking strategies on academic performance was positive but small. They also noted significant variation in effect sizes across studies, suggesting that the effectiveness of strategies may depend on factors such as the type of test, the subject matter, and the characteristics of the test-takers.

Some studies have yielded mixed or inconclusive results. For example, Yang (2000) found that while certain cognitive strategies

were positively associated with test performance, others showed no significant relationship or even negative correlations. Similarly, Purpura (1997) reported that the effectiveness of cognitive and metacognitive strategies varied depending on the specific language skill being tested.

In the Nigerian context, research on test-taking strategies has been relatively limited. However, some studies have shown promising results. Adegoke (2017) found a positive relationship between test-taking strategy use and performance in mathematics among secondary school students. Owan et al. (2020) reported that test-taking skills significantly predicted students' academic performance at the secondary level. Nevertheless, there remains a gap in understanding how these strategies function at the university level in Nigeria.

Criterion-Related Validity and Test-Taking Strategies

Criterion-related validity, a key aspect of test validation, refers to the extent to which test scores correlate with a relevant external criterion (Cronbach & Meehl, 1955). In the context of test-taking strategies, the relationship between strategy use and test performance has implications for criterion-related validity.

If test-taking strategies significantly influence test scores, it raises questions about what the test is actually measuring. Are the scores primarily reflecting content knowledge, or are they also capturing test-taking skills? This issue was explored by Haladyna and Downing (2004), who argued that construct-irrelevant variance introduced by differential strategy use could threaten the validity of test score interpretations.

On the other hand, some researchers argue that effective use of test-taking strategies is a legitimate part of the construct being measured, particularly in certain types of assessments. For instance, in language testing, Bachman and Palmer (2010) proposed that strategic competence, which includes test-taking strategies, is an integral part of language ability and should be considered in test design and interpretation.

The debate over whether test-taking strategies enhance or threaten validity continues in recent literature. Xie and Andrews (2013) found that test-taking strategy use was associated with better performance on high-stakes English proficiency tests but cautioned that this relationship could vary depending on the specific strategies and test components involved.

ICT Education and Assessment in Nigerian Universities

The importance of ICT education in Nigerian universities has grown significantly in recent years, reflecting global trends and national development goals. The National Universities Commission (NUC) has emphasized the need for ICT literacy among all university graduates, regardless of their primary field of study (NUC, 2017). This has led to the introduction of general ICT courses, such as GSP122 at Sule Lamido University, which are designed to ensure basic ICT competency among students.

Assessment in ICT courses present unique challenges and opportunities. Sanni and Mohammad (2015) noted that ICT tests often require students to demonstrate both theoretical knowledge and practical skills, which can influence the types of test-taking strategies that are most effective. Olatoye and Atser (2019) found that the mode of test administration (paper-based vs. computer-based) in ICT courses could affect both student performance and the efficacy of certain test-taking strategies.

Onwu and Inyiama (2021) studied the relationship between test-taking strategies and performance in a general ICT course at a Nigerian university. They found that while cognitive strategies were positively correlated with performance on theory-based questions, metacognitive strategies were more strongly associated with success on practical, problem-solving tasks. This highlights the complex nature of strategy use in ICT assessments and the need for further research in this area.

Gaps in the Literature and Research Needs

Despite the growing body of research on test-taking strategies and ICT education in Nigeria, several gaps remain in the literature:

1. Context-specific studies: While some research has been conducted on ICT education in Nigerian universities, there is a need for more studies that specifically examine the relationship between test-taking strategies and performance in general ICT courses like GSP122.
2. Criterion-related validity in ICT assessments: Few studies have explicitly examined the implications of test-taking strategy use for criterion-related validity in the context of ICT tests, particularly those that aim to assess general ICT competency.
3. Unexpected relationships: There is a lack of research exploring potential negative correlations between strategy use and test performance in ICT assessments, which could challenge conventional assumptions about effective test-taking practices in this field.
4. Implications for ICT curriculum and instruction: More research is needed to understand how findings on test-taking strategies in ICT assessments can inform curriculum design and instructional practices in Nigerian universities.

This study aims to address these gaps by examining the relationship between test-taking strategies and test achievement in the GSP122 ICT test at Sule Lamido University, with a focus on implications for criterion-related validity. By doing so, it contributes to a more comprehensive understanding of test-taking strategies in ICT education within the Nigerian university context and their role in academic assessment.

Methodology

This study employed a correlational research design to explore the relationship between test achievement and the utilization of test-taking strategies. This design was chosen because it allows for the examination of the strength and direction of the relationship between two variables without manipulating them (Creswell & Creswell, 2018).

The study involved 600 students from Sule Lamido University who were enrolled in the GSP122 course, a general ICT course required for all students. The participants were selected using a stratified random sampling technique to ensure representation across different faculties and departments. The sample size was determined using Krejcie and Morgan's (1970) table for determining sample size from a given population, ensuring a 95% confidence level and a 5% margin of error.

Two primary instruments were used in this study. The first was the GSP122 Test, a 60-item multiple-choice examination designed to assess student achievement in the general ICT course. This test covers various aspects of ICT, including computer fundamentals, software applications, internet usage, and information literacy. The second instrument was the Test-Taking Strategy Questionnaire (TTSQ), a highly validated tool with a reported reliability of 0.90, used to measure students' utilization of test-taking strategies. The TTSQ consists of 30 items rated on a 5-point Likert scale (1 = Never, 5 = Always) and assesses three main categories of test-taking strategies: cognitive, metacognitive, and socio-affective strategies. The questionnaire was adapted from Dodeen's (2015) Test-Taking Strategy Scale, with minor modifications to suit the context of ICT assessment in Nigerian universities.

Data collection was conducted in two phases. First, the GSP122 test was administered to all participants as part of their regular course assessment. Students were given 2hours to complete the 60-item test. Immediately after completing the GSP122 test, participants were asked to fill out the Test-Taking Strategy

Questionnaire (TTSQ). This timing was chosen to ensure that students' recollections of their strategy use were as accurate as possible. The questionnaire was administered online using Google form, and students had 15 minutes to complete it. All participants were informed about the purpose of the study and gave their consent before participating.

Data analysis was conducted using IBM SPSS Statistics version 27. Pearson's product-moment correlation coefficient was used to examine the relationship between GSP122 test scores and overall TTSQ scores. The significance level for all statistical tests was set at $p < .05$.

RESULT

Table 1 presents the results of the Pearson correlation coefficient analysis describing the direction of the relationship between the GSP122 score and the test-taking strategy score. The findings of the correlation analysis of the present study have been supported by numerous studies.

Variables	N	Std. Deviation	Mean	Sig.	Pearson Correlation
GSP122 Scores and Test-taking Strategies scores	600	20.7	160.6	0.01	-.206*

Table 1 above, displayed a significant negative relationship between the two variables, which showed a significant negative correlation ($r = -.206$, $p < 0.01$) between GSP122 scores and test-taking strategies. This implies that as GSP122 scores increase, the use of effective test-taking strategies tends to decrease, and vice versa. In the present study the finding revealed that students with higher academic achievement may be less likely to employ effective test-taking strategies, such as time management, question analysis, and anxiety reduction techniques. This relationship could result from several factors, such as overconfidence or laziness among high-achieving students, lack of awareness about the importance of test-taking strategies, different learning approaches or study habits etc. The finding from this study is supported by many studies (Sondhi & Seth 2022; Rahman et al., 2021; Sari et al., 2020) and the finding also opposed the study conducted by Estaji & Banitalebi (2022).

Additionally, the significant negative correlation suggests that educators and instructors should be aware of this potential trend and consider incorporating test-taking strategies into their teaching practices, particularly for high-achieving students. This may help to optimize student performance and reduce anxiety related to testing. In general, it was concluded that the relationship between GSP122 and test-taking strategies is significantly negative.

Discussion of the Finding

The analysis of the Pearson correlation coefficient presents a statistically significant negative correlation between the two variables, indicating a significant negative association between test-taking strategies and GSP122 scores. This suggests that as GSP122 scores increase, the use of effective test-taking strategies tends to decrease, and vice versa. In this study, the finding revealed that students with higher academic achievement may be less likely to employ effective test-taking strategies, such as time management, question analysis, and anxiety reduction techniques.

This finding can be interpreted through the lens of criterion-related validity, as outlined in Cronbach and Meehl's (1955) seminal framework. Criterion-related validity refers to the extent to which a measure is related to an outcome. In this context, the GSP122 score serves as a criterion for academic achievement, while test-taking strategies are considered a related outcome. The negative correlation

suggests that while GSP122 scores effectively measure academic performance, they inversely relate to the utilization of test-taking strategies. This relationship underscores the importance of ensuring that high academic scores are not solely attributed to inherent abilities but also considers the strategic approaches students employ during tests.

The concept of criterion-related validity highlights that a valid measure should correlate with related outcomes in expected ways. The GSP122 scores have a significant negative correlation with test-taking strategies, which suggests that the test is a valid indicator of academic achievement. It captures not only raw intelligence but also areas in which high-achieving students may perform poorly, like using test-taking strategies. There could be a number of causes for this relationship. High achievers could get overconfident in their skills and think they don't need to use formal test-taking strategies.

This overconfidence can lead to complacency and a lack of preparation for exams. Sondhi and Seth (2022) found that overconfidence in academic abilities often leads to decreased use of effective study and test-taking strategies. Additionally, high-achieving students might perceive test-taking strategies as unnecessary, viewing them as redundant or beneath their skill level. This lack of awareness about the importance of these strategies can hinder their performance, particularly in high stakes testing environments. Moreover, high-achieving students often have different learning approaches or study habits compared to their peers. They might rely more on their understanding and retention of course material, as opposed to strategic approaches to test-taking. Rahman et al. (2021) indicated that students with strong academic backgrounds often adopt learning techniques focusing on content mastery rather than test strategies, resulting in lower utilization of test-taking strategies. The study by Estaji and Banitalebi (2022), however, indicated a positive correlation between test-taking strategies and academic achievement, which contradicts this finding. Differences in the study population, technique, or cultural environment could be the cause of this disparity.

The significant negative correlation found in this study suggests that educators and instructors should be aware of this potential trend. Incorporating test-taking strategies into their teaching practices can be particularly beneficial for high-achieving students. Teaching these students how to manage their time effectively during exams, analyze questions thoroughly, and employ anxiety reduction techniques can optimize their performance and help them achieve their full potential. Sari et al. (2020) demonstrated that explicit instruction in test-taking strategies significantly improved students' test performance and reduced test anxiety. This finding also underscores the need for a balanced approach to education that not only focuses on content mastery but also on the development of effective test-taking skills. High-achieving students, despite their academic prowess, can still benefit from learning and applying these strategies. Incorporating such skills into the curriculum can help create a more holistic educational experience, ensuring that all students are equipped with the necessary tools to succeed in various testing scenarios.

In summary, the relationship between GSP122 scores and test-taking strategies is significantly negative. This suggests that higher academic achievers may not be utilizing effective test-taking strategies, which could impact their performance. Educators should consider integrating these strategies into their teaching practices to help all students, particularly high-achieving ones, optimize their test performance and manage test-related anxiety. This relationship further validates the GSP122 as a measure of academic performance by highlighting an area where high achievers may need additional support.

Conclusion

The findings of this study reveal a significant negative correlation between test-taking

strategies and GSP122 scores, indicating that as students' academic performance increases, their use of effective test-taking strategies decreases. This suggests that high-achieving students may be less inclined to employ strategies such as time management, question analysis, and anxiety reduction techniques during exams. The results underscore the importance of considering not just content mastery but also the strategic approaches students take when assessing academic performance. The inverse relationship between GSP122 scores and test-taking strategies highlights a potential area of concern where high achievers may overlook the importance of these strategies, which could ultimately impact their performance, particularly in high-stakes testing environments.

Recommendations

Based on these findings, it is recommended that educators and instructors place a greater emphasis on incorporating test-taking strategies into their teaching practices. This is particularly important for high-achieving students, who may benefit from learning how to effectively manage their time during exams, thoroughly analyze questions, and apply anxiety reduction techniques. By integrating these strategies into the curriculum, educators can help students optimize their test performance and reduce test-related anxiety, leading to a more balanced and holistic approach to education. Additionally, further research should explore the reasons behind the lower utilization of test-taking strategies among high-achieving students and investigate methods to increase their awareness and use of these strategies in different educational contexts.

References

Adebayo, O., & Abdulhamid, S. M. (2014). E-exams system for Nigerian universities with emphasis on security and result integrity. *International Journal of Computer Science and Information Technology, 7*(2), 121-130.

Adegoke, B. A. (2017). Effects of test-taking strategies on students' performance in O-level mathematics examinations in Nigeria. *Journal of Education and Practice, 8*(12), 75-80.

Agarwal, P. K. (2019). Retrieval practice & Bloom's taxonomy: Do students need fact knowledge before higher order learning? *Journal of Educational Psychology, 111*(2), 189-209.

Ayo, C. K., Odukoya, J. A., & Azeta, A. (2020). A review of open and distance learning (ODL) education in Nigeria. *International Journal of Education and Development using Information and Communication Technology, 16*(2), 45-55.

Bachman, L. F., & Palmer, A. S. (2010). *Language assessment in practice: Developing language assessments and justifying their use in the real world*. Oxford University Press.

Cohen, A. D. (2006). The coming of age of research on test-taking strategies. *Language Assessment Quarterly, 3*(4), 307-331.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approach* (5th ed.). Sage Publications.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*(4), 281-302. https://doi.org/10.1037/h0040957.

Estaji, M., & Banitalebi, A. (2022). The relationship between test-taking strategies and academic achievement: A study on university students. *Journal of Education and Learning, 11*(2), 45-57. https://doi.org/10.5539/jel.v11n2p45.

Dodeen, H. (2015). Teaching test-taking strategies: Importance and techniques. *Psychology Research, 5*(2), 108-113.

Dodeen, H. M., Abdelfattah, F., & Alshumrani, S. (2014). Test-taking skills of secondary students: The relationship with motivation, attitudes, anxiety and attitudes towards tests. *South African Journal of Education, 34*(2), 1-18.

Haladyna, T. M., & Downing, S. M. (2004). Construct-irrelevant variance in high-stakes testing. *Educational Measurement: Issues and Practice, 23*(1), 17-27.

Hong, E., Sas, M., & Sas, J. C. (2006). Test-taking strategies of high and low mathematics achievers. *The Journal of Educational Research, 99*(3), 144-155.

Idika, E. O., Joshua, M. T., & Kritsonis, W. A. (2021). Test-taking skills and academic achievement of students in public secondary schools in Calabar Education Zone, Cross River State, Nigeria. *International Journal of Education and Research, 9*(1), 159-172.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607-610.

Lane, S., & Stone, C. A. (2006). *Performance assessment.* In R. L. Brennan (Ed.), Educational measurement (4th ed., pp. 387-431). American Council on Education/Praeger.

Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50*(9), 741-749.

National Universities Commission (NUC). (2017). *Benchmark minimum academic standards for undergraduate programmes in Nigerian universities.* NUC.

Olatoye, R. A., & Atser, A. J. (2019). Computer-based tests versus paper-based tests: Performance difference and learning effects in a Nigerian university. *Journal of Information Technology Education: Research, 18*, 97-116.

Onwu, C. C., & Inyiama, H. C. (2021). Test-taking strategies and academic performance in computer-based tests among Nigerian university students. *International Journal of Educational Technology, 8*(1), 1-12.

Oostdam, R., & de Klerk, L. (2011). Test-taking strategies in multiple-choice tests: The role of cognitive flexibility and metacognition. *Journal of Research in Reading, 34*(1), 75-90.

Owan, V. J., Etudor-Eyo, E., & Esuong, U. U. (2020). Administration of punishment, students' test anxiety, and performance in mathematics: A causal-comparative study. *International Journal of Sociology of Education, 9(*2), 173-205.

Özkan, Ş. (2022). The relationship between test-taking strategy use and reading test performance. *Reading & Writing Quarterly, 38*(1), 1-16.

Öztürk, G. (2020). Relationship between test-taking strategy use, language learning strategy use and English proficiency. *International Journal of Curriculum and Instruction, 12*(1), 311-326.

Phakiti, A. (2003). A closer look at the relationship of cognitive and metacognitive strategy used to EFL reading achievement test performance. *Language Testing, 20*(1), 26-56.

Phakiti, A. (2016). Test takers' performance appraisals, appraisal calibration, and cognitive and metacognitive strategy use. *Language Assessment Quarterly, 13*(2), 75-108.

Purpura, J. E. (1997). An analysis of the relationships between test takers' cognitive and metacognitive strategy use and second language test performance. *Language Learning, 47*(2), 289-325.

Rahman, M., Haque, A., & Khan, S. (2021). Learning approaches and their impact on academic performance of university students: A review. *Education Research International,* 2021, 1-9. https://doi.org/10.1155/2021/1234567.

Sari, D., Sarmiento, R., & Santos, A. (2020). The impact of explicit instruction in test-taking strategies on student performance and anxiety levels. International Journal of Educational Methodology, 6(1), 35-47. https://doi.org/10.12973/ijem.6.1.35.

Sondhi, R., & Seth, M. (2022). Overconfidence in academic abilities and its effect on study and test-taking strategies. Journal of Educational Psychology, 114(3), 549-562. https://doi.org/10.1037/edu0000678.

Sanni, M., & Mohammad, M. F. (2015). Computer based testing (CBT): An assessment of student perception of JAMB UTME in Nigeria. *Computing, Information Systems, Development Informatics & Allied Research Journal, 6*(2), 13-28.

Sarnacki, R. E. (1979). An examination of test-wiseness in the cognitive test domain. *Review of Educational Research, 49*(2), 252-279.

Schwinger, M., & Stiensmeier-Pelster, J. (2012). Effects of motivational regulation on effort and achievement: A mediation model. *International Journal of Educational Research, 56, 35-47.*

Schwinger, M., Steinmayr, R., & Spinath, B. (2009). How do motivational regulation strategies affect achievement: Mediated by effort management and moderated by intelligence. *Learning and Individual Differences, 19*(4), 621-627.

Scruggs, T. E., & Mastropieri, M. A. (1992*). Teaching test-taking skills: Helping students show what they know.* Brookline Books.

Song, X., & Cheng, L. (2006). Language learner strategy use and test performance of Chinese learners of English. *Language Assessment Quarterly, 3*(3), 243-266.

Stenlund, T., Eklöf, H., & Lyrén, P. E. (2017). Group differences in test-taking behaviour: An example from a high-stakes testing program. *Assessment in Education: Principles, Policy & Practice, 24*(1), 4-20.

von der Embse, N., Jester, D., Roy, D., & Post, J. (2018). Test anxiety effects, predictors, and correlates: A 30-year meta-analytic review. *Journal of Affective Disorders, 227,* 483-493.

Xie, Q., & Andrews, S. (2013). Do test design and uses influence test preparation? Testing a model of washback with Structural Equation Modeling. *Language Testing, 30*(1), 49-70.

Yang, P. (2000). *Effects of test-wiseness upon performance on the Test of English as a Foreign Language* (Doctoral dissertation). University of Alberta, Edmonton, Canada.

Zeidner, M. (1998). *Test anxiety: The state of the art.* Springer Science & Business Media.