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RELATIONSHIP BETWEEN TEST-WISENESS AND ACADEMIC ACHIEVEMENT OF ECONOMICS/MATHEMATICS STUDENTS IN COLLEGES OF EDUCATION IN NORTH CENTRAL NIGERIA

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ABSTRACT

The study investigated the relationship between test-wiseness and academic achievement of Economics/Mathematics Students in Colleges of Education in North Central Nigeria. It addressed two objectives, research questions, and hypotheses respectively using a correlational survey design. From a population of 26,344 Students, a sample of 379 was selected through multi-stage sampling procedure and the Krejcie and Morgan table of sample size determination. Two instruments were used for data collection for this study. They include; a questionnaire of 45 items which comprised of a Self-constructed "Test-Wise-ness Questionnaire (TWQ)" which comprises of 15 items and "a "Profoma". The instruments were validated by five (5) experts. Cronbach Alpha method was used to determine the mean reliability coefficient of 0.75 for the instruments. Data were analyzed with the use of Pearson Product Moment Correlation Statistics. Relationships were interpreted as follows: 0.01-0.39 (low), 0.40-0.69 (moderate), and 0.70-1.00 (high); significance was based on p-values ($p \geq 0.05$ = not significant, $p < 0.05$ = significant). The results showed a high positive and

significant relationship between test-wiseness and academic achievement, and positive relationships between test- wiseness with academic achievement base on both male and female students in Economics/Mathematics in Colleges of Education in North Central Nigeria. This study concluded that test-wiseness has positive relationship with Economics/Mathematics students' academic achievement in Colleges of Education in North Central Nigeria. The study recommended that teachers/lecturers should apply different methods to encourage test wise-ness among students to facilitate and improve their academic achievement and in the administration of tests and during students' orientations, teachers/lecturers should lay more emphasis on female genders' needs to be wise as this will enhance their academic achievement.

KEYWORDS: Economics, Mathematics, Test-wiseness and Academic Achievement.

INTRODUCTION

Mathematics and Economics are taught in schools all over the world. At colleges of Education, they are offered as a programme (Economics/Mathematics). Mathematics is among the compulsory subjects offered in schools in Nigeria, especially at the primary and secondary school levels. It is also one of the core courses required by JAMB for the entry into tertiary institutions in Nigeria. While Economics is a core subjects offered by social science students in both secondary and tertiary levels of Nigerian education. The importance of Mathematics as a field of study is enormous; it is responsible for the advancement of science and technology (Otukpa, Obinne & Adikwu, 2024). Mathematics as the queen of science subjects cannot be completely separated from sciences because of its application to physical sciences. A good knowledge of Mathematics further helps adequate grasp of other subjects. Mathematics shapes and influences nearly every object around us, no facet of man's endeavor will be without Mathematics and mathematics cannot be separated from other subjects. Mathematics is very important to human life. Students who ignore Mathematics do that at their own risk to forfeit many future career opportunities that they could have. Most of degree courses in the universities require Mathematics as one of the prerequisite subjects for their admission and entry requirement. Wilbur, Craig and Menso (2024) regard Mathematics as a science of structure and a major component for the creation and utilization of modern science and technology that basically distinguishes developing nations from the developed nations of the world. That is to say the standard of living of a nation depends greatly on the level of science and technology of that nation.

Economics is social science discipline concerned with the production, distribution and consumption of goods and services (www.investopedia.com). It is a core subject for students offering social science courses in tertiary level of education in Nigeria, it is important to students studying Economics, Accounting, Banking and Finance, Marketing, Taxation among other social science courses. Students with sound knowledge in Economics have better chances of performing very well in their respective disciplines. Economics is a crucial field that enables individuals, households, firms and business organizations to carryout budgeting and financial decision about investments, it helps in public policies, international trade among others. The importance of Economics can never be overemphasized as we know that is the engine room for economic growth and sustainable development. Therefore, the inclusion of Mathematics and Economics as core subjects in secondary school as well as the inclusion of Economics/Mathematics as a department in Colleges of Education is a wise decision and an attempt by the policy makers to solve certain quantitative and economic problems.

Test-wiseness refers to any skill that allows students to choose the correct answer on an item in a test without knowing the correct answer. This has to do with the students' capacity to utilize the characteristics and formats of the test and the test-taking situation to obtain high scores. It is independent of the students' knowledge of the subject matter for which the items supposedly measure, but if test takers are wise enough, it enhances positively their chances of passing the test (Morse, 2018). Basically then, test wiseness suggests a cognitive ability (or abilities) that one may employ on several tests, regardless of the nature of the tests' subjective content. Students may utilize their wise-ness during preparation and while writing tests to obtain high scores. Its development consists of a synthesis of the literatures of test construction principles and problem-solving styles of examinees. Test-wiseness encompasses both the method of measurement (tests testing situation) and characteristics of examinees (Mustapha,2019). Test-wiseness is independent of the student's knowledge of the subject matter for which items are supposed to be measuring, but if a student is test wised, it enhances his chances of getting high score in the examination or test and vice versa. Test- wiseness (TW) emanates from test takers regular taking of examinations and can confer a significant advantage to the experienced students over less experienced ones (Odeh, 2018). Similarly, test-wiseness is the ability of a test taker to answer correctly a particular test item without having adequate knowledge of the subject matter being tested. Test-wiseness has been seen as one among the various sources of test variance on students' scores. Test wise-ness is related to this study for the fact that if students are wise, it will make them to obtain high grades.

Yusuf (2024) conducted a research titled "Relationship between Level of Test-wise-ness and

Performance in Mathematics". The main objective of the study was to find out whether or not there existed a relationship between the variables- levels of test-wise-ness and performance in Mathematics among secondary school students in Bauchi metropolis. The study which used survey and correlational research designs was guided by three research questions and three hypotheses. The sample size of the study was 245 students and the instruments for data collection were the results of the State- administered mock SSCE Mathematics examination and a Students' Test-wise-ness Questionnaire. Simple percentages, Pearson Product-Moment Correlation, Chi-square test and the t-test for independent samples were used for the data analysis. Findings revealed that more than half of the number of students had low and moderate level of test-wise-ness; and also, a positive relationship existed between level of test-wise-ness and students' performance while no relationship was found between gender and level of test- wise-ness. The reviewed study and the current study are related as both focused on test-wise-ness as it relates to the academic achievement of students. However, both studies differ in terms of location and scope. The reviewed study was conducted in Bauchi metropolis using secondary school students while this study was carried out using colleges of education in north central Nigeria. Also, present study differs from the reviewed study because it employed different methodological approach and statistical tool used to establish the relationship between test-wiseness and academic achievement of NCE two students in Economics/Mathematics using correlational survey design. The reviewed study is relevant to the present study because it focused on test-wise-ness, self-efficacy and academic performance in Mathematics which was also a part of the focus of this present study.

Aborisade and Adeniji (2022) carried out a study on "Effects of Test-wise-ness Strategy on the Academic Performance of Senior Secondary School Students in Economics in Oyo State, Nigeria". This study determined the effects of test-wiseness strategy on the academic performance of senior secondary school students in Economics in Oyo State, Nigeria. It employed a pretest, posttest and control group quasi-experimental design. The population of the study comprised of all the public senior secondary school II (SSS2) students offering Economics in Oyo State, Nigeria. A sample of 240 SSS II students was used for the study using a multistage sampling procedure. The instruments used for the study were Economics Achievement Test (EAT) and Test-wise-ness Questionnaire (TQ). Data collected were analysed using descriptive and inferential statistics. The research questions postulated were answered using mean, standard deviation and bar chart while the hypotheses formulated were tested using Student's t-test and Analysis of Covariance (ANCOVA) at a 0.05 level of significance. Results of the study show that there was no significant difference in the

performance of students exposed to test-wiseness strategy and those in the control group. Also, the results show that there was no significant effect of the test-wiseness strategy on the performance of the students based on gender and school location. It was therefore, concluded that students exposed to the test-wiseness strategy performed more than those not exposed to the test-wise-ness strategy and that gender and school location have no significant effect on the student's achievement in Economics when exposed to the test-wise-ness strategy. The reviewed study is related to the present study as both focus on academic performance of students in Economics as one among the variables of the present study. However, both studies differ in their approach as the reviewed study was conducted using quasi-experimental design while the present study was based on correlational survey design. The present study is wider in scope and has many variables than the reviewed study.

Statement of the Problem

The importance of Economics/Mathematics in promoting economic literacy and scientific thinking cannot be overemphasized. For the fact of their impact on national development, students' academic achievement in these subjects that are offered as a combined programme in Colleges of Education in Nigeria has continued to attract concern from educators, policymakers, and other stakeholders, specially, in North Central Nigeria. The expectation is that student teachers will acquire adequate knowledge and skills that will enable them to teach these subjects effectively in the future. Despite the relevance of Economics/Mathematics on the national development and efforts made by government, educational administrators, and lecturers to improve the quality of teaching and learning in these institutions, observations suggest that the academic achievement of students appears to be unsatisfactory and raising concerns among educators and stakeholders in the education sector (Iorsugh, Christopher, Godfrey & Peter, 2021).

Previous studies have attributed students' poor academic achievement to several factors, including ineffective teaching methods, teachers' behaviour, gender differences, peer influence, unfavourable school climate, and negative attitudes toward academic work (Olufemi, 2022; Mahrukh, 2022; Lukman, 2023). While these factors are important, most of the existing studies have largely focused on external or instructional variables, with limited attention given to certain psychological and cognitive factors that may influence students' academic outcomes. However, the extent to which this student-related factor (test-wiseness) influences academic achievement among Economics/Mathematics students in Colleges of Education, particularly in North Central Nigeria, remains unclear.

Therefore, this study investigated the relationship between test-wiseness and academic achievement of Economics/Mathematics students in Colleges of Education in North Central Nigeria.

Objectives of the Study

This study investigated the relationship between test-wiseness and academic achievement in Economics/Mathematics students in Colleges of Education in North Central Nigeria. Specifically, the study focused on the relationship between students:

1. Test-wiseness and academic achievement in Economics/Mathematics in Colleges of Education in North Central Nigeria.
2. Test-wiseness and academic achievement in Economics/Mathematics based on gender in Colleges of Education in North Central Nigeria.

Research Questions

The following research questions guided the study. What is the:

1. Relationship between students' test-wiseness and their academic achievement in Economics/Mathematics in Colleges of Education in North Central Nigeria?
2. Test-wiseness and academic achievement in Economics/Mathematics segregated based on gender in Colleges of Education in North Central Nigeria?

Hypotheses

To further facilitate the investigation, the following null hypotheses were formulated and tested at 0.05 level of significance.

1. There is no significant relationship between students' test-wiseness and their academic achievement in Economics/Mathematics in Colleges of Education in North Central Nigeria.
2. There is no significant relationship among students' test-wiseness, and academic achievement in Economics/Mathematics based on gender in Colleges of Education in North Central Nigeria.

METHODOLOGY

The study adopted correlational survey research design and carried out the investigation using NCE 2 students of Economics/Mathematics in Colleges of Education in the North Nigeria.

The population of the study was 26,344 students (NCCE, 2024 Research and Statistics). The sample size for the study was 379 NCE 2

students of Economics/Mathematics in Colleges of Education in the North Central Zone of Nigeria. The sample size comprised of 238 male students and 141 female students from six selected colleges of education in North Central Zone, Nigeria. The sample size was obtained using Krejcie and Morgan table for sample size determination. The study adopted a multi-stage sampling procedure. Test-Wise-ness Questionnaire which comprised of 15 items (TWQ) of; Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with values of 4, 3, 2 and 1 for positively worded items and a "Profoma was designed on four-point rating scale for collection of academic achievement scores were used for data collection. The instruments were validated by five (5) experts for logical and content validities. The instruments were trial-tested on fifty (50) students, results collected, analysed using the Cronbach Alpha method and obtained a reliability coefficient of 0.75. Data collected for the research were analysed using Pearson Product Moment Correlation to obtain the correlation coefficients. The correlation coefficients of r of; 0.00 signified No Relationship (NR), 0.01 to 0.39 signified Low Relationship (LR), 0.40 to 0.69 represented Moderate Relationship (MR) and 0.70 to 1.00 implied High Relationship (HR). Also, the correlation coefficients -0.01 to -0.39 signified Low Negative relationship (LNR), - 0.40 to-0.69 represented Moderate Negative Relationship (MNR) and -0.70 to -1.00 implied High-Negative Relationship (HNR) (Anikweze et al, 2016).

Research Question 1**:** What is the relationship between students' test-wiseness and their academic achievement in Economics/Mathematics in North Central Nigeria?

Table 1: Pearson Product Moment Correlation Coefficient on Students Test-wiseness and Academic Achievement.

Variables	N	r	R^2	Relationship
Test Wiseness Academic Achievement	379	.581	.338	Direct Moderate Relationship (Positive)

N= Number of Students, r = Pearson's Product Moment Correlation Coefficient, R^2*= Coefficient of Determination.*

Table 1 result indicates that r = .581, R^2= .338(33.8%) of the change that occurred at 0.05 level of significance. This result shows moderate positive relationship between students' test wise-ness and their academic achievement in Economics/Mathematics in the Colleges of Education.in North Central Nigeria.

Research Question 2: What is the relationship between students' test-wiseness and academic

achievement in Economics/Mathematics segregated based on gender in Colleges of Education in North Central Nigeria?

Table 2: Pearson Product Moment Correlation Coefficient on Students' Test-wiseness and Academic Achievement based on Gender.

Variables	Gender	N	R	R^2	Relationship
Academic Achievement & Test-wiseness	Male	238	.543	.295	Moderate positive Relationship
	Female	141	.343	.136	Low positive Relationship

N= Number of Students, r = Pearson's Product Moment Correlation Coefficient, R^2= Coefficient of Determination.

The result from Table 2 reveals that r = .543, R^2= .295(29.5%) for male and r = .343, R^2=.136 (13.6%) for female of the change that occurred at 0.05 level of significance. This shows moderate positive relationship between test- wiseness and the academic achievement of both male and female students in Economics/Mathematics in the Colleges of Education in North Central Nigeria. However, the test-wiseness of male students is higher than that of female students as depicts by r = .543, R^2= .295(29.5%) for male and r = .343, R^2=.136 (13.6%) for female respectively.

Research Hypothesis1: There is no significant relationship between students' test wise-ness and their academic achievement in Economics/Mathematics in North Central Nigeria.

Table 3: Pearson's Product Moment Correlation Analysis for Relationship between Students' Test Wise-ness and their Academic Achievement.

Variables	N	DF	Probability Value (*Sig)*	Decision
Test Wiseness & Academic Achievement	379	377	.000	Significant

N= Number of Students, p<0.05, DF=377.

The result in table 3 shows the Pearson's Product Moment Correlation Analysis for significant relationship between students' test wise-ness and their academic achievement with a probability value (sig) of .000 in Colleges of Education in North Central Nigeria. This result indicates that there exists a significant relationship between Colleges of Education

students' test wise-ness and their academic achievement. This is due to the fact that the sig value of .000 is less than the 0.05 level of significance. Thus, the null hypothesis which states that there is no significant relationship between students' test wise-ness and their academic achievement in Economics/Mathematics in Colleges of Education in North Central Nigeria stands rejected and the alternative hypothesis of significant relationship of students' test wise-ness and academic achievement is sustained.

Research Hypothesis 2: There is no significant relationship among students' test-wiseness, and academic achievement in Economics/Mathematics based on gender in Colleges of Education in North Central Nigeria.

Table 4: Pearson's Product Moment Correlation Analysis for Relationship between test-wiseness and their Academic Achievement based on Gender.

Variables	**Gender**	**N**	**DF**	**Probability Value** Sig	**Decision**
Academic Achievement & Test-wiseness	Male	238	236	.000	Significant
	Female	141	139	.000	Significant

N= Number of Students, p<0.05, DF=Degree of freedom.

The result in table 4 shows the Pearson's Product Moment Correlation Analysis for significant relationship between students' test wise-ness and their academic achievement with a probability value (sig) of .000 in Colleges of Education in North Central Nigeria based on gender (male or female). This result shows that there exists a significant relationship between Colleges of Education students' test wise-ness and their academic achievement based on their gender. This is due to the fact that the sig value of .000 is less than the 0.05 level of significance. Thus, the null hypothesis which states that there is no significant relationship between students' test wise-ness and academic achievement in Economics/Mathematics in Colleges of Education in North Central Nigeria based on gender is rejected and the alternative hypothesis of significant relationship of students' test wise-ness and academic achievement based on gender is sustained.

DISCUSSION OF FINDINGS

First finding revealed that there exists moderate positive relationship between test-wiseness and academic achievement of Economics/Mathematics students in Colleges of Education in North Central Nigeria. The result indicates that r = .581, R^2= .338(33.8%) of the change that

occurred at 0.05 level of significance. This implies that test wise-ness exerts positive relationship with students' academic achievement. This is also supported by the sig value of .000 is less than the 0.05 level of significance that was revealed by hypothesis one on table 3 that was tested. Thus, the null hypothesis which states that there is no significant relationship between students' test wise-ness and their academic achievement in Economics/Mathematics in Colleges of Education in North Central Nigeria stands rejected and the alternative hypothesis of significant relationship of students' test wise-ness and academic achievement is sustained. When a student possesses test-wiseness, the possibilities to perform well in the test is high due to the potential of understanding of the test situation. This finding aligns with the finding of the study by Yusuf (2024) which revealed that more than half of the number of students had low and moderate level of test-wise-ness; and also, a positive relationship existed between level of test-wise-ness and students' performance. However, test-wiseness gives students the confidence to attempt the items of test instruments. Hence, the finding by Aborisade and Adeniji (2022) found in an experimental study, that students exposed to test wise-ness performed better than the control group not exposed to test wise-ness with a significant effect also supports the present study.

Second finding revealed that there is a moderate positive relationship between test wise-ness and students' academic achievement in Economics/Mathematics in Colleges of Education in North Central Nigeria with regard to gender (male and female students). The result from Table 2 which reveals that r = .543, R^2= .295(29.5%) for male and r = .343, R^2=.136 (13.6%) for female respectively buttress this claim. This finding was further confirmed by the fact that the sig value of .000 is less than the 0.05 level of significance that tested the hypothesis two($Ho_{2)}$ and also agrees with the finding of the study carried out by Asiyanbi and Yusuf, (2021), that test-wiseness and academic achievement of students are influenced by gender positively with one another. This study also affirms that male students' test wiseness is highly related with their academic achievement than their female students' counterpart in Economics/Mathematics in Colleges of Education in North Central Nigeria.

CONCLUSION

This study concluded that test-wiseness has positive relationship with Economics/Mathematics students' academic achievement in Colleges of Education in North Central Nigeria.

RECOMMENDATIONS

1. Teachers/lecturers should apply different methods to encourage test wise-ness among students to facilitate and improve their academic achievement.
2. In the administration of tests and during students' orientations, teachers/lecturers should lay more emphasis on female genders' needs to be wise as this will enhance their academic achievement.

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