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Effect of Test Item arrangement on Learning Outcome in Mathematics among Junior Secondary School Students

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Abstract

The research investigated the impact of the sequence of test items on the performance of Junior Secondary School Students. A quasi-experimental research design was utilized for this study. The target population consisted of all Junior Secondary School Students across the three senatorial districts in Ekiti State, Nigeria. A sample of two hundred (200) students was selected from this population through a proportional sampling technique. The participants were categorized into an experimental group designated as A and a control group identified as B. A testing instrument referred to as the "Mathematics Multiple-Choice Test (MMCT) comprising three variants, A-C, was employed. Variant A was organized in ascending order of difficulty, whereas variant B was structured in descending order of difficulty, and variant C was arranged randomly without any specific order. The validity of the instruments was established using a table of specification (TOS), and a general reliability coefficient of 0.96 was calculated through the Kuder Richardson formula 20 (KR20). Mean, standard deviation, and t-test analyses were conducted to compare the means of each group against the control group and the test. The results indicated that arranging items in ascending order of difficulty exerted a positive and significant effect on students' performance in mathematics at a 0.05 alpha level, while the descending order arrangement demonstrated a positive yet insignificant effect on students' performance in mathematics. It was suggested that educators, test developers, and professional examination organizations should prioritize the arrangement of items from simpler to more complex to enhance students' confidence..

Keywords: Test item arrangement, ascending and descending order of difficulty.

Introduction

It is an establish fact that Mathematics is pivotal to the success of any venture in life be it medicine Engineering teaching even in the word of business its also a requirement for any student to gain admission into any higher institution Mathematics can also be regarded as master and servant of most discipline and source of enlightenment and understanding of the universe According to Fellter (1999), Mathematics is a science of structure ,order number, space and relationship through counting ,measuring and describing shapes and object

Observing the importance of mathematics in school curriculum Enukoha (1987) emphasized that mathematics play an important role in schools Fajemidagba (1996) submitted that science has been accepted as a whole for technological, social and economic development he observed that mathematics is the only basics language of science. In another study, while explain the importance of mathematics in schools Igbokwe (2003) highlighted

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the importance of mathematics with science and technology he said that without mathematics there will be no science and without science there will be no modern society As a result of Nigeria technological development ,mathematics is not only required in the Nigeria primary and secondary schools curricula but also a prerequisite for study science in colleges and universities (JAMB brochure, 1992-2000).

Despite the relevance of mathematics in the our daily activities, experience over the years have been many students do not like Mathematics and as such their performance in the subject has been relatively low. Many researchers have pointed out various reasons for this poor performance in Mathematics for example. Zalmonnc, (2019); Zalmon & Charles-Ogan, (2020); Zalmon & Njoku (2018) have identified several impediments to effective teaching and learning of Mathematics in secondary education, including inadequate application of innovative instructional methodologies, absence of constructive student-teacher interactions, deficiencies in cognitive competencies, insufficient instructional resources, misalignment of job roles, and lack of fundamental mathematical abilities. Furthermore, Ajogbeje (2013) noted that the factors contributing to students' inadequate performance in Mathematics include the ineffective absorption and application of research findings by Mathematics educators, gender stereotyping, and the negative transfer of attitudes from older students to younger peers. Sara (2012), in a study exploring the determinants of underachievement in Mathematics, in relation to instructional efficacy and student performance, conducted by Wonu and Zalmon (2019), revealed that parental influences were the most significant factors affecting students' success in Mathematics, followed by student-related factors, school-related factors, and educator-related factors.

Students' academic performance in Mathematics can be influenced by assessments. Assessments serve as instruments for evaluating an individual's cognitive abilities and non-cognitive characteristics, facilitating educational and career counseling (Aggarwal, 2007). Aggarwal posited that assessments are systematic tools designed to measure a behavior sample (i.e., "how effectively does the individual perform relative to peers or against a specific set of performance tasks"). Thus, assessments evaluate the accurate status of an individual's cognitive capabilities and non-cognitive traits that inform educational and vocational advice. They are also employed to determine whether a program has achieved its objectives and serve as systematic tools for evaluating the merits of a given initiative (Dodeen, 2002).

A test, as articulated by Opara (2014), is an instrument or methodology employed to gauge an individual's or an entity's knowledge, intellect, abilities, qualities, competencies, interests, and attitudes. It constitutes a systematic approach for observing and characterizing an individual's conduct or performance utilizing a quantitative scale or classification. As previously noted by the researcher, a significant number of students encounter challenges in successfully completing Mathematics assessments due to test anxiety. According to Hopkins and Antes, referenced in Orluwene (2012), a testing instrument represents a process that delineates a series of tasks for students to execute, with the results serving as indicators of specific traits. Kpolovie (2012) further defines a testing instrument as a procedure that outlines a sequence of tasks for students to address, with the outcomes being utilized as measures of a particular characteristic; these sequences of tasks may manifest in various formats known as item arrangement or item positioning.

There remains a lack of consensus among researchers regarding whether item arrangement or item positioning in multiple-choice assessments influences students" academic performance. Numerous scholars have raised concerns regarding the impact of item arrangement or item positioning in multiple-choice assessments on student outcomes. Backer (1998) asserted that the "arrangement of test items could significantly affect student

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performance. The arrangement of test items encompasses the diverse formats in which the presentation of assessments can manifest, reflecting a variety of organizational strategies employed by educators and examiners. The organization of test items may be systematically arranged in an ascending order of difficulty, which refers to the methodology of positioning test questions from the most straightforward and uncomplicated inquiries to those that are more intricate and challenging, thereby facilitating a progression from easy to hard questions. Notably, Fisher, in her observations, noted that when test questions are sequenced from simpler to more complex formats, this strategic arrangement can significantly contribute to maintaining and sustaining the interest and engagement of the test-taker, encouraging them to attempt and complete more questions throughout the examination process. Furthermore, Shepard (1994) posits that the positioning of items within a multiple-choice test can exert a considerable influence on a student's overall academic performance and outcomes. He contends that when test items are arranged according to an ascending order of difficulty, embodying an Easy-To-Hard structure, students are more likely to feel motivated to participate actively in answering the questions, which, in turn, has the potential to enhance their test scores significantly. In contrast, when items are presented in a descending order of difficulty, characterized by a Hard-To-Easy format, it is likely to discourage students from engaging with the questions in a sequential manner, which may adversely affect their performance and overall outcomes on the assessment.

Macnicol (1956) conducted a thorough investigation into the ramifications of an Easy-To-Hard test order on students' academic performance, discovering that items placed in a descending order of difficulty proved to be considerably more challenging than those arranged in an ascending order. This particular viewpoint was further corroborated by the findings of Cacko (1993), who aligned with Macnicol's conclusions. According to the West African Examinations Council (WAEC) in 1993, the manner in which test items are organized can have a profound impact on students' performance, yielding either positive or negative effects contingent upon the specific subject matter being assessed. Additionally, Shepard (1997) reinforced this assertion by emphasizing that modifications in item arrangement could result in substantial variations in students' academic performance on assessments. In a contrasting viewpoint, Zaman et al. (2009) argued that the difficulty level of test items is not influenced by the sequence in which they are presented during an examination. Their investigation focused on the potential effects of item sequence on the difficulty level of individual items, exploring the premise that unsatisfactory results on preceding items might adversely influence a student's performance on subsequent items. Ultimately, their study concluded that no significant effect on item difficulty was observed due to the order of presentation.

Baxter (1998), as cited in Baffoe (2021), articulated that the sequence in which test items are arranged is critically significant in shaping student performance during examinations. This observation could elucidate the reasons why certain students experience challenges when attempting to guess answers on multiple-choice items, whereas others may find this process relatively straightforward and manageable. The format and structure of test items can vary widely based on the preferences of the examiner as well as the overarching objectives of the examination itself. It is noteworthy that presenting students with simpler questions at the beginning of a test can serve to bolster their interest and enthusiasm towards tackling additional questions throughout the assessment". The absence of a consensus among researchers, as indicated in the literature review, underscores an existing problem in this field, thereby providing a compelling impetus for further investigation and study into the matter.

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Statement of the Problem

In recent years, there has been a concerning trend characterized by a multitude of unfavorable reports regarding the "academic performances of students, particularly in the context of both internal assessments and external examinations. Tei-Firstman (2011) references the work of Ali (2009), who asserts that a significant portion of the student population encounters considerable challenges when attempting to successfully pass subjects such as mathematics during their initial attempts. Furthermore, Dike (2012) lamented the fact that mathematics, as an academic discipline, tends to instill a sense of fear in many students, leading some to cultivate a negative disposition towards both the subject matter and the educators responsible for teaching it, which consequently has deleterious effects on their overall performances in both internal and external assessments.

Empirical observations suggest that grievances regarding students' subpar academic performance are frequently directed towards various parties, including the individual student, their peers, their parents, the quality of the assessment items utilized, their insufficient capabilities in test-taking, and, on occasion, the educators themselves. However, the sequencing of the test items and its potential impact on students' performance is rarely, if ever, addressed in these discussions. Conversely, educational authorities and scholars have posited that when engaging in dialogues concerning the myriad elements that influence student performance, it is of paramount importance not to overlook this intricate aspect of testing. This particular element, which has remained largely unexplored", constitutes the focal point of the current study, which aims to thoroughly investigate the implications and outcomes associated with this critical factor.

Purpose of this study

The purpose of this study was to examine the "effect of test item arrangement on Junior Secondary School Students performance in Mathematics Specifically, the study is conducted to identify:

1. The effectiveness of arranging tests item in descending order of difficulty (complex-To-simple)
2. The effectiveness of arranging tests item in ascending order of difficulty (simple to complex)

Research Questions

1. What are the effect of test item arrangement based on ascending order of difficulty (simple to complex) have on performance in mathematics among junior secondary school students
2. What are the effect of test item arrangement based on descending order of difficulty (complex to simple) have on performance in mathematics among junior secondary school students

Methodology

The methodological framework adopted for this particular study was a quasi-experimental design that allowed for a structured investigation into the research questions posed. The population from which the data was drawn encompassed a total of seven thousand individuals, specifically totaling six thousand, seven hundred and seventy-seven (6,777) potential participants. From this extensive population, a sample consisting of two hundred (200) junior secondary school students, categorized as JSSII, was meticulously selected utilizing simple random sampling and proportionate sampling techniques to ensure representativeness. To facilitate the process of data collection, a Mathematics Multiple-Choice Test (MMCT) was employed as the primary instrument. The MMCT is a

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comprehensive assessment tool that consists of three distinct types, labeled as Type A, Type B, and Type C. Type A of the MMCT comprises 40 items that are systematically arranged in ascending order of difficulty, whereas Type B contains an equal number of items but is organized in descending order of difficulty.

Conversely, Type C presents its items in a random order, without any specific arrangement. The content validity of the MMCT instrument was evaluated using a table of specification (TOS), ensuring that the test adequately covered the necessary curricular content. Additionally, the reliability of the instrument was assessed through the application of the Kuder Richardson formula 20 (KR20), yielding a remarkable reliability coefficient of 0.96, indicative of the instrument's consistency. The administration of the three distinct types of the test instrument was conducted separately on three different groups of students hailing from three separate educational institutions. Specifically, Type A was administered to 25 students in the first school, while Type B was given to a different cohort, and Type C was allocated to the control group for comparative purposes. In essence, the test instruments were distributed to two experimental groups and one control group, with the assistance of a research assistant and collaboration from the classroom teachers. The mean and standard deviation were employed as statistical tools to address the research questions, while the t-test was utilized to evaluate the corresponding null hypotheses, thereby facilitating a comprehensive analysis of the data collected.

Results

Research Question One

What effect does test item arrangement based on ascending order of difficulty (easy -To-Hard) have on performance in mathematics among junior secondary school students?

Hypothesis One: Test item arrangement based on ascending order of difficulty (simple to complex) has no significant effect on performance in mathematics among junior secondary school students .In order to answer the research question, and test the corresponding hypothesis, Scores derived from Test item arrangement based on ascending order of difficult (experimental group) and control group were subjected to mean , standard deviation statistics and t-test at 0.05 alpha level respectively. The result were presented in the table below:

Table 1 Analysis of the mean, standard deviation, and t-test of how students' performance in mathematics is affected by the arranging of items in ascending order of difficulty.

Groups	N	$\bar{X}$	S.D	df	t-cal	t-crit	Sig.	Alpha	Result
Ascending order Control group	100 100	28.72 20.76	4.67 8.02	48	4.290	1.96	0.000	0.05	Significant (Reject Ho)

The experimental group's mean and standard deviation (in ascending order) are 28.72 and 4.67, respectively, according to the analysis above, which is displayed in table 1. The control group's standard deviation was 8.01 and its mean was 20.76. It is evident from their performance and mean scores that members of the experimental group perform better than

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members of the control group. This suggests that students" performance in mathematics is improved when test items are arranged according to ascending order of difficulty.

Research Question Two: What effect does test item arrangement based on descending order of difficulty (complex-To-simple) has on "performance in mathematics among junior secondary school students

Hypothesis Two: Test item arrangement based on descending order of difficulty (complex-To-simple) has no significant effect on performance in mathematics among junior secondary school students

In order to answer the research question, and test the corresponding hypothesis, Scores derived from Test item arrangement based on descending order of difficult(experimental group)and control group were subjected to mean , standard deviation statistics and t-test at 0.05 alpha level respectively The result were presented in the table below:

Table 2: Table 1 Analysis of the mean, standard deviation, and t-test of how students' performance in mathematics is affected by the arranging of items in descending order of difficulty.

Groups	N	$\bar{X}$	S.D	d.f	t-cal	t-crit	Sig.	Alpha	Result
descending order Control group	100 100	18.48 20.76	6.66 8.017	48	0.345	1.96	0.731	0.05	Insignificant (Accept Ho)

Table 2 mean and standard deviation for the experimental group (i. e descending order group) is18 .48and6.66respectively.Thatofthecontrolgroupremains20.76and8.017 respectively. From their mean performance, it is evidenced that test item arrangement in descending order of difficulty has a positive effect on students' performance in mathematics compared to the control group. Furthermore when the data were, , subjected to t-test analysis it revealed that t-calculated value of 0.345 and a critical-value of 0.731. since the critical -value (p-0.731> 0.05) is greater than the chosen alpha level and t-cal 0.731 less than the t-crit of 1.96 at48 degrees of freedom, the null hypothesis accepted meaning that test item arrangement based on descending order of difficulty has an insignificant effect on performance in mathematics among junior secondary school students in Ekiti state.

Discussion

The empirical findings pertaining to the first research inquiry unequivocally indicate that the systematic arrangement of test items, specifically organized in an ascending sequence of difficulty levels, exerts a significant and positively correlated impact on the mathematical performance of junior secondary school pupils residing in Ekiti State. This particular outcome aligns with the conclusions drawn by Opara and Uwah (2017) as well as Aamodt & McShane (1992), and is further substantiated by the observations made by Ollemu and Etsey (2015), who articulated that students tend to exhibit markedly enhanced performance when presented with questions sequenced from easier to more challenging types, as evidenced by the statistical analysis of their mean scores. Additionally, this finding corroborates the research conducted by Barbara, Ansorge, Parker, and Lowry (2005), alongside Nwana (2007)

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and Layer (2007), all of whom documented that the arrangement of test items progressing from simple to complex significantly aids students' comprehension, thereby facilitating improved academic performance when juxtaposed with the scenario in which test items are introduced from complex to simple. The implication of these results suggests that students who are initially confronted with less challenging tasks tend to experience increased motivation and enthusiasm, which subsequently drives them to pursue higher levels of achievement in their academic endeavors. Furthermore, it can be inferred that students are likely to achieve superior academic outcomes, particularly in the domain of mathematics, if they are guided through tasks that transition from simple to more complex in nature.

Regarding the influence of test item arrangement organized in a descending order of difficulty on the mathematical performance of junior secondary school learners, the findings gleaned from this study elucidate that while students exposed to test items arranged from complex to simple do exhibit some degree of positive performance, such results tend to remain relatively inconspicuous and not immediately apparent. This observation implies that only under infrequent circumstances can such a format of item arrangement yield noticeable enhancements in student performance outcomes. Moreover, the results further indicate that the positive performance observed is, in fact, statistically insignificant. This revelation suggests that a substantial proportion of students encountered difficulties and ultimately underperformed due to the sequence of test items transitioning from more challenging to less challenging formats.

The underlying cause of this phenomenon likely stems from students' inherent aversion to tasks perceived as monotonous or tedious. This assertion finds support in the findings of Tei-Firstman (2011), who articulated that the arrangement of test items in a descending order of difficulty yields negligible effects on students' academic performance. In contrast, the present study presents findings that are at odds with the earlier research posited by Bodas and Ollendick (2005), who contended that the format of test item arrangement, regardless of its structure, does not significantly influence students' performance in mathematics. The divergences in these research outcomes may be attributable to variations in sample size or geographical context. Such discrepancies align with the psychological theories concerning job performance, which posit that individuals innately gravitate away from tasks perceived as burdensome, undertaking all possible measures to circumvent such challenges, except in unavoidable circumstances such as examination settings encountered by students. The results of this investigation indicate that students who are confronted with examination items arranged in a descending order from complex to simple might demonstrate some level of performance, albeit this performance is unlikely to be overtly discernible.

Moreover, it is imperative to emphasize once again that only in rare instances does this arrangement yield observable positive results in terms of student performance. The findings also reveal that the recorded positive performance is ultimately insignificant, implying that the majority of students encountered failure due to the arrangement of test items from challenging to simpler formats. Such outcomes arise largely because students exhibit a general disinclination towards tasks perceived as laborious or tedious. This tendency is indeed consistent with previous findings in the literature.

The psychological theory concerning job performance suggests that individuals inherently possess an aversion to tasks that are excessively laborious, striving to circumvent such tasks whenever feasible, barring unavoidable circumstances such as assessments or examinations.

The outcomes of this investigation are, nonetheless, both anticipated and somewhat astonishing to the researchers. They are anticipated in the sense that the results indicate that students' favorable performance based on this particular arrangement of items is negligible.

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This implies that students are unlikely to enhance their performance in mathematics when items are sequenced from complex to simple. Conversely, the study's results are surprising as students within this cohort still manage to surpass those in the control group. The current findings align with those documented by Tei-Firstman (2011), who observed that the arrangement of test items in descending order of difficulty exerted an insignificant influence on students' academic outcomes. In contrast, this investigation contradicts earlier findings by Bodas and Ollendick (2005), who contended that the arrangement of test items, regardless of format, does not impact students' performance in mathematics. The discrepancies in results may stem from variations in sample size or geographical context.

Conclusion

The outcomes of this investigation indicate that the arrangement of test items plays a significant role in influencing students' academic performance in mathematics. When test items are ordered in ascending complexity, from simple to complex, students tend to achieve higher scores compared to scenarios where items are arranged from difficult to easy or presented in a random sequence. Students addressing test items organized from simple to complex may be encouraged to exert greater effort, particularly after successfully answering the initial questions.

Recommendations

In light of the conclusion drawn from this study, the following recommendations are proposed:

i. To enhance students" academic performance in mathematics, examination authorities should implement the strategy of organizing test items according to difficulty (from simple to complex).

ii. Mathematics test items should be developed to encompass the entire course content or syllabus, thereby ensuring that all learners have an opportunity to excel in the subject.

iii. The practice of randomizing mathematics test items during assessments should be completely discontinued, with emphasis redirected towards structuring items from the easiest to the most challenging..

References

Aamodt, M. G., & McShane, T. (1992). A meta-analytic investigation of the effect of various test item characteristics on test scores and test completion times. *Public Personnel Management,* 21, 151–160.

Ajogbeje, O.J. (2012). Path – Analytic Model and the Effect of Some Teaching Strategies of Variables Affecting Achievement in Junior Secondary School Mathematics in Ondo State: Unpublished Ph.D. Thesis, Ekiti State University, Ado-Ekiti, Nigeria.

Babara, S. P., Ansorge, C.J., Parker, C.S. & Lowry, S.R. (2005). Effect of item arrangement, knowledge of arrangement, test anxiety and sex on students' performance. *Journal of Educational Measurement,* 19(1), 49-57.

Bodas, J. & Ollendick, T. H. (2005). *Test Anxiety: A cross-cultural perspective of clinical child and family psychology review*, 8(6), 65-88.

Fajemidagba, O. (1986). Improving Mathematics Teacher Education in Nigerian Universities, a theoretical formulation with implication for research *Journal of research in Curriculum,* 4(2), 11-18.

Fettler, E (1999). The relationship between measures of teacher experience with mathematics educational level and students' achievement in mathematics in the critical importance of well-prepared Teachers U. S Department of Education.

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"Effect of Test Item arrangement on Learning Outcome in Mathematics among Junior Secondary School Students."

Kpolovie, P.J. (2012). *Advanced Research Method.* Springfield publishers, Port Harcourt.

Layer, S. I. (2007) *Test, Measurement and Evaluation in Education and Psy*chology (4th edi) Pormount Brace College publishers

Layer, S. I. (2007). *Test, Measurement and Evaluation in Education and Psy*chology (4th edi) Pormount Brace College publishers.

Nwana, O. C. (2007). *Educational Measurement and Evaluation.* Owerri, Bomaway publishers

Okpala, P.N. & Onocha, C.O. (1988). Measurement and Evaluation in Education, Jattu-Uzairue: Sterling – Harden Publishers.

Opara, I. M. & Uwah, I. V. (2017). Effect of test item arrangement on performance in Mathematics among junior secondary school students in Obio/Akpor Local Government Area of Rivers State, Nigeria. *British Journal of Education, 5*(8), 1-9.

Shepard, L. A. (1997). The challenges of assessing young children appropriately. In Katheleen M. Cauley (12th ed.). *Educational Psychology*. Shefield: Dubuque Inc.

Tei-Firstman, R. I. (2011). *Test item arrangement on student test scores.* M.Ed Unpublished Thesis, University of Port Harcourt.

WAEC (1993). The effects of item position on performance in multiple choice tests. Research Report, Research Division, WAEC, Lagos

Sara, A. (2012). The Impact of Using Multimedia on Students' Academic Achievement in the College of Education at King Saud University: Journal of King Saud University-Language and Translation, 24, 75-82.