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A SURVEY OF SECONDARY SCHOOL TEACHERS' MULTIPLE CHOICE TEST CONSTRUCTION SKILLS

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Abstract

The purpose of the study was to evaluate the competence of Ekiti State secondary school teachers in creating multiple-choice tests. A descriptive research design was employed in this study. The research covered thirty public secondary schools in the Ekiti North Senatorial District, and its population consisted of four hundred and forty-five secondary school teachers. A simple random selection technique was used to select 150 subject-head teachers at random for the purpose of evaluating their competency as teachers. These subject-head experts are in charge of leading classes in language, science, and the arts and they were chosen through a purposive sample because they share many responsibilities with supervising teachers, who work closely with principals and administration on administrative and management duties. The researchers revised and adjusted a twenty-item questionnaire originally created by Kissi (2020) to evaluate the competence and quality of questions used to produce multiple-choice tests among teachers. The instrument was determined to be reliable with an r-value of 0.69 from the test-retest reliability coefficient. The study question and hypothesis were examined and tested using mean and an independent t-test for two sample means at 0.05 level of significance respectively. A higher degree of multiple-choice test construction competency was found among female teachers compared to male teachers, according to the study's results. The result further showed a low level of competence was observed among public secondary school teachers. The study's authors recommended that secondary school teachers should be trained in more realistic methods of designing multiple-choice questions, especially when it comes to handling alternatives. Workshop, seminars and trainings in test construction can be helpful.

Keywords: Multiple-choice tests, test construction competency, assessment, secondary school teachers, subject-head teachers, public secondary school.

Introduction

The purpose of assessment is, in part, to improve students' knowledge acquisition (Ajogbeje, 2023, 2024). Teachers evaluate their students' progress in a range of subjects and skills through the use of various tools and strategies (Opateye, 2016; Ajogbeje, Boris & Omoya, 2023). Using empirical data on student learning is an essential part of assessment in order to improve programs and learning outcomes (Ajogbeje, 2023a, 2024). The goal is to collect and analyze data from a wide range of sources in order to gain a complete picture of students' knowledge, understanding, and abilities as a result of their educational experience (Ibrahim, Ibrahim, & Amina, 2022). This shows that there are multiple ways to understand students' academic performance in the evaluation process. In order to collect important data on students' learning as they progress through the course of instruction, teachers often design and administer tests (Opie, Oko-Ngaji, Eduwem, & Nsor, 2021; Ajogbeje, 2023a, 2023b, 2024). Not only does testing show how much students and teachers have learned, but it also provides a chance for more learning to take place. Instructors must ensure that their evaluations are of higher quality in order to effectively monitor their students' progress (Opateye, 2016; Ajogbeje, 2023b, 2024). The tests that teachers design for use in the classroom impact students' lives because of the weight that assessment judgments carry (Ajogbeje, 2023b). Due regard should also be shown to assessments because of the role they play in preparing students for standardized examinations of accomplishment.

Opie et al. (2021) and Ajogbeje (2023a) state that assessments reveal whether or not students actually learned in class, help teachers improve their methods, identify problems with their teaching, and show where students excel and where they need improvement. Testing, they stressed, provides useful information for choosing students, teachers, and programs as a whole. Given this, it's reasonable to think of evaluations as a means of checking if learning objectives have been satisfied. A person's prior knowledge might be evaluated through achievement examinations. Its purpose is to evaluate an individual's level of proficiency, achievement, or comprehension within a specific domain. An aptitude test that measures what a person has learned through training is called an accomplishment exam (Quansah, Amoako, & Ankomah, 2019). Achievement tests can be either standardized tests or examinations that are created by teachers. The scoring, administration, and methodology of the Standardized Achievement Test (SAT) have all been clearly stated to ensure consistency between administrations and locales. Teachers often refer to the assessments they design for their students as "teacher-made tests" (TMTs). Non-standardized and mass-produced TMTs can be either oral or written (Quansah et al., 2019). A well-structured oral or written evaluation of students' performance is also acceptable. Exam components commonly utilized by educators include multiple-choice, matching, true/false, fill-in-the-blank, and essay questions.

There is a difference between the two types of achievement evaluations in terms of their particular features, usability, validity, and relevance. Given the importance of TMTs in secondary school placement, continuous evaluation, and final exams in Nigerian education, it is imperative that their validity and reliability be enhanced (Kissi, 2020; Ajogbeje, 2023b). How well students understand the content is heavily influenced by the test's design. The National Centre for Assessment in Higher Education (2015) states that when creating a test, it is important to follow practical and scientific criteria for each item. One aspect of test construction expertise that may be acquired through study or experience is the capacity to create trustworthy and valid test items. By creating qualitative test items, educators may ensure that students' performance on assessments truly reflects their level of comprehension of core concepts. Developing high-quality test items is a time-consuming and skilled process. Teachers who are well-versed in test creation can use the Table of Specifications (TOS) as a tool to develop assessments that are highly

content-valid (Ajogbeje, 2023b). The topics that will be studied or have been covered in a curriculum are listed in the TOS, which is a table. Important objectives are also detailed there (Kissi, 2020). It is a useful tool for examination preparation since it details the expected number of questions, their format and content, and other aspects for each unit of instruction and subject (Ajogbeje, 2023b). The focus of this study is on the knowledge and experience of secondary school teachers in the study area when it comes to the construction of tests.

How effectively a teacher designs a test is strongly correlated to the type of information it may provide on students' performance (McCoubrie, 2004). A well-crafted test allows the teacher to reliably gauge the extent to which the students have internalized the course material. Teachers can get a sense of how well they're doing in the classroom based on the scores on these tests (Karimi, 2014). However, incorrect evaluations of learning and misleading data regarding student learning outcomes and training efficacy can arise from poorly crafted test questions (Van der Merwe, 2015). Features that divert the test taker's focus from the central idea or subject reduce an item's usefulness (Salihu, 2019). Incorrect or correct answers to questions based on irrelevant criteria will provide the examinee and the examiner with misleading results (McCoubrie, 2004). Examinations given in a classroom setting would be of higher quality if the variables listed by CapanMelser, Steiner-Hofbauer, Lilaj, Agis, Knaus, & Holzinger (2020) were properly controlled which includes

(i) There is lack of details regarding the test's intended users, the abilities or skills it was meant to measure, the time allocated to each question, and the points awarded for correct answers.
(ii) The separate parts are ill-defined.
(iii) Questions on the test were inadequately worded and hence had more than one correct answer.
(iv) Not recording the amount of time given for each task on the papers. All that was given was the total amount of time that could be used to finish everything.
(v) Students' grade levels were not considered in the design of the examination.
(vi) Intricate instructions.
(vii) Homework that students are required to complete in addition to what they are taught in class sometimes causes friction between the two.
(viii) The questions do not adequately represent the course material that the teacher intends to evaluate.
(ix) Assembling sample items for testing.

Previous Research Studies on Secondary School Teachers' Multiple Choice Test Construction Skills

Opateye (2016) looked into the challenges faced by professors in an Open and Distance Learning (ODL) university context while developing exam questions for various types of exams, broken down by gender and delivery method. Faculty members from one ODL school in south-west Nigeria that used a single mode and one school that used a dual mode made up the study population. Employing a descriptive cross-sectional survey methodology ensured that educational objectives are met, or at least aligned with, the specified standards. Stratified, simple random sampling approaches were used to select 240 professors as the sample. According to the results, ODL instructors had a little trouble coming up with test items. Compared to their male counterparts, female ODL teachers found it more challenging to develop case studies, multiple choice, matching, essay, and completion activities. There was a notable difference in the challenges faced by male and female ODL educators while developing test items. Opateye

(2016) looked into the possibility of gender bias in economics multiple-choice questions using Differential Item Functioning (DIF) in senior school certificate exams. The study employed an ex-post factor or causal comparative design as the research strategy. The study included 2,985 SS3 Economics students from Enugu State's Nsukka school zone. The study included data collected from 339 SS3 Economics students. The study's instrument was the 2018 West African Examination Council Supplementary Science Certificate Examination (SSCE) Economics Multiple-Choice Test (WAEC), which consisted of 50 questions. Using the Kudder-Richardson formula, we determined the dependability coefficient to be 0.87. The data from the study were analyzed using the logistic regression method. In 2018, fourteen out of fifty WAEC Economics questions (or 28 percent of the total) showed statistically significant gender DIF at the 0.05 level. There was a significant gender difference in the functioning of just one item (2% of the total 14 items), favoring male students, whereas thirteen things (26% of the total) showed a differential functioning in favor of female students. Noviani (2016) examined how teachers constructed multiple-choice test questions, the challenges Indonesian teachers encountered, and the quality of the test items produced. Included in this descriptive research were 6 English teachers, 275 multiple-choice examination questions, and 211 student response sheets. The outcomes proved that the current method by which teachers construct multiple-choice test questions is inadequate. Testers found multiple areas where the test products' quality lacked, indicating the need for further modification and improvement.

Researchers Quansah, Amoako, and Ankomah (2019) looked at the test-building skills of teachers at Cape Coast Metropolis (SHS) senior high schools. End-of-Term Samples of Integrated Science, Core Mathematics, and Social Studies Using a lottery technique, they drew examination papers from three randomly selected Cape Coast Metropolis SHS. Based on the results, it was clear that the teachers had limited skills in creating final tests. Upon discovering issues with the test's content representativeness, relevance, validity, and fairness of the scored tasks, it became evident that this was not the case. Salihu (2019) investigated the quality of teachers' economics lessons and the methods they used to teach them at secondary schools in Nasarawa State, Nigeria. The research methods employed in the study included content analysis and a co-relational approach. Randomly selected ninety-five economics teachers from public and private high schools in Nasarawa North. The results demonstrated that secondary school teachers have struggled to develop economically content-valid assessments. Teachers' incompetence in creating effective tests is to blame for several issues, such as erroneous assessments of students' work, poorly written assessments, and inadequate grading due to a lack of oversight. Kissi (2020) looked at the correlation between the number of years a teacher has been teaching, the quality of their multiple-choice question production abilities, and the number of senior high school students in the Kwahu-South District who take their tests. Quantitative research employs a correlational design. A total of 157 distinct teachers made up the study's population. There is a high degree of competency in the development of multiple-choice tests, and the results demonstrated that there is no relationship between the quality of the questions and the test builders' abilities.

Using what they knew about the test-building technique, Opie, Oko-Ngaji, Eduwem, and Nsor (2021) looked at how secondary school science teachers in Yala Local Government Area, Cross River State, utilized it to create multiple-choice objective tests. They conducted a descriptive survey study methodology, selecting 87 chemistry instructors at random from a pool of 213 regional science teachers. The results showed that science teachers used their knowledge of test production processes to create objective tests, but they did not provide their pupils with a practice test before the real examination. There have been a number of studies looking at how well public junior secondary school teachers in Nigeria can construct multiple-choice tests. Ibrahim,

Ibrahim, and Amina (2022) used a descriptive study approach to evaluate test-building knowledge among instructors in the Ungogo Local Government Area (LGA) of Kano State, Nigeria. Among the 260 high school teachers in Ungogo who participated in the study, researchers found no significant differences in test-creation knowledge based on gender or years of experience.

The development of examinations is a crucial part of the educational system that needs serious consideration. Students in Edo State may have been given inadequate test-taking materials (TMTs), which could explain why they did poorly on the SAT (WAEC, NECO, NABTEB, BECE, etc). The purpose of taking multiple TMTs at different institutions is to ensure that students are well-prepared for the SATs. Students' aspirations to pursue further education are greatly impacted by the outcomes of SAT examinations. Basic Education Certificate Examination (BECE) assigns students to science, technical/vocational, art, or business majors depending on their assessed abilities. A child's SAT performance is affected by how well the TMTs they're given work. Consequently, a study assessing secondary school teachers' competence in developing multiple-choice tests in Ekiti State is essential. This study's overarching goal is to evaluate the proficiency with which secondary school teachers in Ekiti North Senatorial District create multiple-choice tests. The study aimed to: 1. Conduct a survey of public secondary school teachers to determine their proficiency in multiple-choice test design, and 2. Examine the level of multiple-choice test construction competency among public secondary school teachers to see if there are any disparities based on gender.

Research Questions

To direct the investigation, the researchers posed the following questions:

1. How competent are public secondary school teachers when it comes to multiple-choice test construction?
2. Do male and female secondary school teachers differ in their multiple-choice question construction competency?

Research Hypothesis

In this investigation, the researchers evaluated the hypothesis generated

1. Among public secondary school teachers, there is no discernible gender gap in terms of competency in multiple-choice tests construction.

Materials and Methods

Research Design

This inquiry made use of a descriptive research approach that relied on survey methods.

Participants

Among the 750 participants in the study are secondary school instructors from the 750 public secondary schools located within the Ekiti North Senatorial District. The researchers randomly selected 125 subject heads to serve as a representative sample for the purpose of determining the competency of teachers. Language, science, and art department heads are examples of such topic heads in the classroom. Using principals as stand-ins to assess their teachers' capacity to design

multiple-choice tests helped remove potential sources of bias and emotion from the process of collecting teachers' self-reports on proficiency.

Research Instrument

Based on Kissi (2020) research, the researchers adapt with modification the survey instrument called Teachers' Multiple-Choice Construction Competencies and Item Quality. The twenty-one items questionnaire were evaluated using a five-point Likert scale, where a score of five indicates strong agreement, one indicates agreement, and three indicates neither agreement nor disagreement. During the adaptation process, the response ratings were adjusted from a 5-point scale to a 4-point one by removing the neutral answer of 3. High Competence (4) was replaced with Highly Incompetent -1 on the scale. Two experts from the Department of Guidance and Counselling assessed the content and face validity of the instrument. The reliability of the instrument was evaluated by the test-retest method. This strategy was put into action by providing copies of the instrument to thirty high school seniors from the study area who were not part of the research sample. A few weeks later, the identical instrument was administered to the same respondents once more. To compare their performance on the first and second exams, we utilized Pearson's product-moment correlation. The instrument's reliability was demonstrated by the coefficient, which yielded an r-value of 0.72. We contacted the principals of the selected schools to get their permission to distribute the questionnaires before we began the study.

Data Analysis

The analysis of research question 1 (S.D.) made use of standard deviation (SD) and the mean (X). Using a criteria mean of 2.50, the level of multiple-choice building competence was evaluated. The outcome was reached by adding together the four (4) Likert scales: highly competent (4), competent (3), incompetent (2), and highly incompetent (1). Then, the total (10), which equals 2.50, was divided by the total of the scales (4). Therefore, a score between 2.40 and 2.49 indicates inadequate competence, while a score of 2.50 or higher indicates great competence. We used an independent t-test for two sample means with a significance level of 0.05 to verify the hypothesis generated. Statistical Package for the Social Sciences (SPSS) was used to assess and test the study's hypothesis.

Results

The following are the analysis's results:
Research Question I: How competent are public secondary school teachers when it comes to multiple-choice test construction?

Table 1: Assessing the Competence of Public Secondary School Teachers in Multiple-Choice test Construction

	Item Statements	**N = 125**		
		Mean	**S.D**	**Remark**
1.	Ensure proper spacing of the test items for enhanced readability	2.59*	0.919	HC
2.	Check for mistakes in the tests' construction.	2.55*	0.817	HC
3.	Make sure the item's settings and the item itself are always in sync keep all parts of an item (stem and its options) on the same page	2.49	0.858	LC
4.	Ensure you use the appropriate number of test items.	2.31	0.854	LC

5.	Offer detailed examination instructions	2.36	0.925	LC
6.	Give the test pages the correct numbers	2.30	1.050	LC
7.	Number the test items sequentially	2.34	0.816	LC
8.	Verify that every item addresses a critical component of the subject matter	2.45	0.954	LC
9.	Ensure that the test items align with the instructional objectives, representing the desired outcomes at the specified level of difficulty	2.52*	0.970	HC
10.	Plan the labeling process as you build the products prepare marking scheme while constructing the items	2.44	1.031	LC
11.	Allocate enough time for completing the test.	2.30	0.933	LC
12.	Ask straight, unambiguous questions	2.42	0.982	LC
13.	Question types should range from easy to very difficult	2.26	0.960	LC
14.	Have students' vocabulary levels match the objects.	2.49	0.920	LC
15.	Alternates should have about the same length	2.56*	0.946	
16.	Include any word(s) that could be repeated in each choice in the stem.	2.40	0.915	LC
17.	Whenever feasible, arrange the options in a sensible sequence (e.g., from most to least, alphabetically, chronologically) and use the formula present alternatives in some logical order (e.g., chronological, mostto least, alphabetical) when possible	2.71*	0.927	HC
18.	Encourage independence by providing options such as using make alternatives independent of each other	2.56*	0.946	HC
19.	keep away from selecting "none of the above" when an item is of the best answer type avoid the use of “none of the above” as an option when an item is ofthe best answer type	2.40	0.915	LC
20.	ensure that the options match the stem grammatically make the alternatives grammatically consistent with the stem	2.66*	0.976	HC
	Overall Mean	**2.381**		

HC means "very competent." LC-No Skill Required

The majority of the respondents had low response scores on items 1, 2, 9, 15, 17, 18, 20, 21, 22, 23, and 30, as shown in Table 1. The total mean score was 2.38, which is lower than the criterion mean of 2.50 (i.e., 2.38 < 2.50). This suggests that public junior secondary school teachers in Nigeria's Edo Central Senatorial District have a low degree of proficiency when it comes to multiple-choice building.

Research Hypothesis I: in the Nigerian public junior secondary school sector, teachers of multiple-choice tests do not differ significantly by gender. This is based on data collected from the Edo Central Senatorial District.

Table 2: Summary of T-test Results on Gender Differences in Public Secondary School Teachers' Multiple-Choice Construction Competence

Variables	Gender	N	Mean	S.D	t-cal.	p-value	Remarks
Multiple-Choice Construction Competence	Male	58	2.15	0.53	3.551	0.000	Reject null hypothesis
	Female	67	2.43	0.30			

Table 2 displays the results, which reveal that female teachers had a higher mean competency score (2.43 vs. 2.15 for male teachers). Since there was a mean score difference of 0.28 between male and female instructors on the multiple-choice construction competence test, this provided an answer to the research question. The test of hypotheses yielded a statistically significant t-value of 3.551 ($p<0.05$) to determine the significance of the observed mean score difference. That being said, we can rule out the possibility of a statistically significant gender gap in the multiple-choice construction competency of public junior secondary school teachers in Nigeria's Edo Central Senatorial District. Among Nigerian public junior secondary school instructors, there appears to be a gender gap in terms of competency with multiple-choice construction.

Discussion

The results show that public secondary school teachers in Ekiti North Senatorial District are not very good in multiple-choice tests construction. According to the results, a lot of them were not very good in using the right amount of test items, providing clear instructions, putting the test on the right pages, and making sure each item addressed a significant part of the content area. Additionally, a number of teachers showcased inadequate proficiency in the following areas: developing appropriate grading schemes for the items; allocating sufficient time for students to complete the test; asking questions that are both clear and unambiguous; including questions of varied difficulty; aligning items with students' vocabulary levels; including any word or words that could be repeated in each alternative in the stem; and avoiding the use of "none of the above" as an option when an item is of the best answer type. This could be due to a lack of preparation for the process or a lack of confidence in one's abilities, or it could be the result of an absence of information about creating multiple-choice tests. This finding is in line with what Quansah, Amoako, and Ankomah (2019) found: that teachers lacked the necessary experience when it came to designing final examinations for the term. After administering the test to educators in the Cape Coast Metropolis, issues with its validity, fairness, subject representativeness, and applicability were apparent. This finding runs counter to what Kissi (2020) found: that senior high school teachers in the Kwahu-South District were very good at making multiple-choice tests. The findings are in line with those of Noviani (2016), who found that there are still issues with the quality of the test products due to the way teachers in Indonesia generate multiple-choice test items. This suggests that there needs to be further adjustment and improvement in this area. In addition, the results are in line with those of Salihu (2019), who discovered that secondary school teachers in Nasarawa State had a hard time making assessments that were content-valid in economics. Instructors' incompetence in creating effective tests is to blame for several issues, such as erroneous assessments of students' work, poorly written assessments, and inadequate grading due to a lack of oversight. According to the results, there is a gender gap in the level of competency among public junior secondary school teachers in Edo Central Senatorial District, Nigeria, when it comes to multiple-choice construction. This is because female teachers outperformed male teachers in this area. This goes against what Ibrahim, Ibrahim, and Amina (2022) discovered in Ungogo Local Government Area (LGA), Kano State, Nigeria. They discovered that there were no significant changes in teachers' grasp of test-building based on gender or degree of experience. However, these findings are in line with those of

Opateye (2016), who found that professors' levels of difficulty in developing test items for various types of tests differ by gender in an Open and Distance Learning (ODL) higher education context.

Conclusion

Research indicates that public secondary school teachers had a low level of multiple-choice tests construction competency and that female secondary schools teachers had higher level of competency than male teachers. It is therefore necessary that education managers and stakeholders prioritize professional development opportunities for teachers to learn more practical approaches to developing multiple-choice questions, with a focus on effective management of item alternatives. To achieve this goal, the public secondary school teachers need to participate regularly in workshops and specialized seminars focused on improving their test construction abilities. And when using multiple-choice questions to evaluate student learning outcomes, school authorities and administrators should strive to guarantee and encourage secondary school teachers to generate adequate, relevant and substantial information. Ensuring that test items are appropriately constructed and addressing format and constructional errors requires effective moderation and qualitative analysis.

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Contributions of the authors

The authors are 100% responsible for the contributions

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