

Assessing the Knowledge of Teachers in Objective Test Construction Procedure in the Teacher Education Programs

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Abstract

Assessment of prospective teachers is seen as the most practical technique to improve and assess teacher candidates' abilities to make judgments to help their students learn when presented with diverse scenarios in the classroom. This study assesses teachers' knowledge in objective test construction procedures in the Teacher Education programs using descriptive – correlational research method with an adapted and modified questionnaire to determine the respondents' profile and their knowledge in objective test construction procedure. Results show that the ages of most of the respondents were from 20 to 29 years old and mostly female with 1 to 5 years of teaching experience and attended local pieces of training. Furthermore, it was revealed that they tend to place little value on the relevance of test items and has found no significant relationship between the respondents' gender and professional training attended and their knowledge in objective test construction procedures. However, it was revealed that there exists a significant relationship between their age and expertise in assembling the test, and between and among their number of years in teaching and knowledge in developing test specifications, selecting appropriate item types and preparing relevant items. Thus, teachers have a good understanding of the objective test construction procedure. This inspired the administrators to conduct a seminar training in the procedures of objective test construction, highlighting checking the validity and relevance of the test items. The findings of this study can be used as a basis for further research in areas related to objective test construction procedures.

Keywords: Assessment, Multiple Choice, Objective Test, Test Items

1. Introduction

In a dynamic society, educational institutions are constantly concerned with employing competent teachers and instructors who can provide quality academic output. This need is met through the portals of Teacher Education Institutions, which produce teachers capable of dealing with the challenges of changing times. As a result, Teacher Education Institutions are keeping up with changes to ensure that their programs meet the needs and concerns of educational institutions. To ensure the quality of education provided to Filipino students, the Philippine government supports various educational reforms and mechanisms implemented in both primary education and higher education institutions. Similarly, because public school teachers are considered the backbone of education, the Department of Education (DepEd) strictly monitors adherence to standards set in hiring them. Passing the Licensure Examination for Teachers (LET) is one of the

highlighted standards for teacher education graduates to qualify as professional teachers as stipulated in RA 7836, also known as the "Philippine Teachers Professionalization Act of 1994," is administered in objective tests. In this case, pre-service teachers or the students enrolled in Teacher Education programs must be provided with objective tests by teachers similar to the one administered in the LET. Thus, this study aims to assess teachers' knowledge of objective test construction procedures in Teacher Education programs.

Ability and competence in classroom instruction differ in various ways, including competence in classroom management, instructional delivery, assessment, and evaluation, to name a few, which are also critical indicators of a teacher's competence for effective teaching (Opie, et al., 2021). Given the value of test scores provided by teachers, the importance of teachers creating appropriate tests for their students is undeniable. According to studies, the competence of teachers, particularly in assessment, influences the quality of the test constructed (Inko-Taria, et al., 2019). However, teachers' competence in assessing students' learning is often overlooked (Opie et al., 2021). Teachers' qualifications, values, and attitudes toward students and the teaching profession are critical to the success of any educational program (Rabanal, 2016). The emphasis placed on assessing prospective teachers is viewed as the most practical way to develop and evaluate teacher applicants' ability to make decisions to facilitate their students' learning when confronted with various situations in the classroom (Gerundio, et al., 2014). Moreover, the first aspect of developing a quality teacher workforce is to prepare quality teachers. As part of teacher preparation, teacher quality determines the success of educational standards.

Education pursues two primary goals: to provide equal opportunities to all students and promote success for all students. Achievement of these goals comes first from the teachers' effectiveness in different classroom instructions. There is widespread agreement that improving teacher effectiveness is the key to raising student achievement, though questions about how best to accomplish this remain. This is extremely dangerous because most classroom decisions are based on assessment results. Not every assessment instrument can elicit the necessary data for assessing learned behaviors. Not every assessment instrument is a reliable instrument on which to rely, and not every graduate or teacher possesses the required skills and competence to design and implement assessment instruments to obtain the desired learned experience. The understanding and application of assessment instruments are critical components of assessment competence.

Teachers' importance in following this procedure to create valid tests cannot be overstated. Any accurate test's outcome reflects the traits or learned experiences acquired in the learning environment. It is, however, intriguing that even after a battery of tests in the school system, some students continue to perform poorly in terms of expected learning outcomes. Students who fail in classroom assessments do not always because they are dull but because of teachers' incompetence in test item development (Eni, et al., 2019). A faulty test instrument created by teachers results in a false report on the students' level of knowledge. Therefore, this study is of utmost importance in assessing the knowledge in the objective test construction procedure of teachers handling subjects in the Teacher Education programs.

2. Conceptual Background

This study is anchored on the Revised Bloom's Taxonomy (RBT), a framework for classifying educational goals and objectives. This was conceptualized first and proposed in the year 1956 by Benjamin Bloom. RBT has two aspects: a cognitive process and the other of which is a knowledge dimension (Laddha, et al., 2021). Bloom's taxonomy has been utilized by administrators, curriculum developers, researchers, and other educational actors and is regularly cited and implemented in education (Radmehr, et al., 2018). Taxonomies are commonly utilized in the systematic evaluation of curriculums and education (Zorluoğlu, 2020). Taxonomies provide a common language for practitioners to communicate by informing them about the curriculum's learning objectives/outcomes (Bloom, et al., 1956). Furthermore, taxonomy tells practitioners and evaluators about the benefits and drawbacks of curriculums (Krathwohl, 2002). Bloom created the taxonomy to help educational practitioners and assessors (Bloom, et al., 1956). RBT may categorize educational objectives (such as assessment questions) by arranging them in categories based on the intersection of the columns for classifying the verbs they are aligned to (Radmehr, et al., 2018). The RBT aids in the mapping of assessment results to certain types of objectives (Jideani, et al., 2012).

Several specialists have used Bloom's taxonomy to quantify Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS) based on the Cognitive Process component (Poluakan, et al., 2019). Educators are advocating for enhancing higher-order thinking skills based on these levels of cognitive skills (Qasrawi, et al., 2020). The Revised Bloom's taxonomy (RBT) classified the original and translated the various categories into active verbs (Anderson, et al., 2001). This enhancement is intended to encourage students to be more critical and creative, allowing them to use the content of knowledge in a way that will enable them to research information, analyze, evaluate, and be vital and creative in their responses to questions and problem solving (Rahman, et al., 2017). As a result, incorporating higher-order thinking skills (HOTS) into education has become one of the changes implemented to help students develop critical and creative thinking abilities (Qasrawi, et al., 2020).

This study is also supported by the theoretical model of the Multiple-Choice Objective Test, also known as MCOT (Opie et al., 2021), which is classified as the teacher-constructed test using Multiple-Choice Question (MCQ). Among the exam types, this is the most commonly designed, used, and sometimes abused by classroom teachers (Opie et al., 2021). This item format is beneficial and acceptable for developing tests that measure a wide range of knowledge, ability, or cognitive skills across various subjects (Downing, 2006).

Multiple-choice items are commonly used in educational testing because they are the most effective item format for assessing cognitive performance or ability, particularly higher-order thinking skills (Downing, 2006), and allow direct measurement of a wide range of knowledge, skills, and competencies across a wide range of disciplines and content areas, such as the ability to understand concepts and principles, make judgments, draw inferences, reason, complete statements, interpret data, and apply information (Gierl, et al., 2017). Although this increases the likelihood of a student answering correctly by recognizing or guessing the correct answer (Fuhrman, 1996), it can be reliable and ideal if comprehension, application, and content analysis are what one wants to test.

Moreover, there are four contexts to understand teachers' knowledge in constructing objective tests (Opie et al., 2021). This includes: (1) Developing test specifications; (2) Selecting appropriate item types; (3) Preparing relevant test items; and (4) Assembling the test.

Bloom's taxonomy of cognitive domains may be used to assure and examine the alignment of assessment techniques to learning goals (Jideani, et al., 2012). These outcomes may be used to assess the success of the learning process and, as a result, the quality of instructional systems (Krouska, et al., 2018). Academic performance is measured by what pupils can accomplish with their knowledge rather than what they can recall (Jideani, et al., 2012). RBT can accurately define course objectives, create accurate and efficient evaluations by incorporating activities from several taxonomy levels and improve students' cognitive abilities (Krouska, et al., 2018).

For test items to be relevant, they must also be considered valid. The validity of a test has been defined in various ways by various researchers over time (Baghaei, 2011). Due to the advantages of ease of administration and high-speed, reliable scoring, selected-response exams are a popular and standard assessment format for assessing students' scientific knowledge and skills (You, et al., 2020).

Similarly, the response patterns of a test should meet the unidimensionality criteria. If items are ranked from easy to difficult, a person who has correctly reacted to one thing should also correctly respond to more accessible items. Put another way. It is not anticipated for a person to accurately reply to challenging items while missing the easier ones, or vice versa (Baghaei, 2011).

3. Methods

This study utilized the descriptive - correlational method of research using adapted and modified questionnaires using 40 teacher respondents from the Teacher Education programs. Frequency count and percent, weighted mean, and chi-square statistical tools analyzed and interpreted the data. The correlation design was used to know whether there are significant relationships between and among respondents' profiles and the extent of the teachers' knowledge in objective test construction procedures in developing test specifications, selecting appropriate item types, preparing relevant test items, and assembling the test.

4. Data Analysis and Interpretation

4.1 Profile of the Respondents

Table 1: Respondents' Profile

Profile	Frequency	Percentage
Age		
20 – 29	28	70.0
30 – 39	6	15.0
40 – 49	3	7.5
50 – 59	2	5.0
60 above	1	2.5
Gender		
Male	15	37.5
Female	25	62.5

Number of Years in Teaching		
1 - 5 years	22	55.0
6 - 10 years	10	25.0
11 - 15 years	7	17.5
16 years and above	1	2.5
Professional Training Attended		
Local	22	55.0
Regional	10	25.0
National	7	17.5
International	1	2.5

Table 1 shows the respondents' profile in terms of age, gender, number of years in teaching, and professional training attended. This study showed that 70.0 percent of the respondents ranged from 20 to 29 years old, followed by 30 to 39 years old at 15.0 percent and 40 to 49 years old at 7.5 percent. Meanwhile, in terms of gender, most of them (62.5 %) were female respondents, and only 37.5 percent were male respondents. In terms of several years in teaching, most respondents fall within 1 to 5 years at 55.0 percent, followed by the respondents with 6 to 10 years at 25.0 percent and 11 to 15 years at 17.5 percent. For the professional training attended, 55.0 percent of the respondents attended local training, 25.0 percent attended regional training, 17.5 percent attended national training, and only 2.5 percent attended international training.

Another facet that may be investigated to grade teachers on what is going on in the school system is their understanding and application of test construction procedures. This part of the evaluation appears to be relatively new regarding competency assessments and how they affect instructors (Opie et al., 2021). Given the relevance of test results given by teachers, the necessity of teachers creating proper examinations for their students is unquestionable. Thus, teachers' knowledge and competence in objective test construction procedures have been stressed as it dramatically influences the quality of the test (Inko-Tariah, et al., 2019).

4.2 Respondents' Knowledge in Objective Test Construction Procedure

The extent of teachers' knowledge in objective test construction procedures was assessed in this study in terms of developing test specifications, selecting appropriate item types, preparing relevant test items, and assembling the test.

4.2.1 Developing Test Specifications

Table 2 shows the respondents' knowledge of objective test construction procedures in developing test specifications in teacher education programs. The overall mean of 4.31 interpreted as strongly agree indicates an agreement of these aspects, as found in table 3. The top 2 in rank among the items tied up are State the purpose of the test and Give item format appropriate for the test (M=4.40). The bottom 2 in position among the indicators involve: Write testing time available and the need for breaks (M=4.25), followed by Write content framework (M=4.10). This implies that teachers in the teacher education programs state the test's purpose and give an item format appropriate for the difficulty in developing test specifications for an objective test. Although they write testing time available and the need for breaks, this

item was found at the bottom, implying less priority among respondents in these areas. The lowest rank indicated that teachers still write a content framework. This shows that they would less likely prioritize writing content framework in constructing an objective test. Thus, the school should employ developmental activities to enhance the teachers' construction of the content framework in the teacher education programs.

Table 2. Respondents' Knowledge in Objective Test Construction Procedure in terms of Developing Test Specifications

Indicators	Mean	Description	Rank
State the purpose of the test	4.40	Strongly Agree	1.5
Write content framework.	4.10	Agree	5
Write testing time available and the needs for breaks	4.25	Strongly Agree	4
Outline number of items per content area.	4.38	Strongly Agree	3
Give item format appropriate for the purpose of the test.	4.40	Strongly Agree	1.5
Total	4.31	Strongly Agree	

The business of teaching and learning isn't complete without an assessment of the students to see whether the goals are being met. Each teacher in a university or college is expected to quantify how much their students have learned from a course of instruction. This is done by administering tests by teachers who may not have sufficient knowledge of test construction procedures, resulting in question papers lacking basic psychometric properties. To set good tests, each teacher should be aware of and follow test construction and development processes that contain all of the properties and characteristics of a quality test (Inko-Tariah, et al., 2019).

4.2.2 Selecting Appropriate Item Types

Another essential aspect investigated in this study involved teachers' knowledge of objective test construction procedures in choosing the correct item types in the teacher education programs. From table 3, it was found that the overall mean (M= 4.27) was interpreted as strongly agree, which indicates that respondents utilize their knowledge in selecting appropriate item types in an objective test. The top in rank among the indicators stated: Write items for the test (M= 4.45) and prepare the test manual and reproduction of the test (M= 4.33). They were followed with things that tied up, Checking the reliability of the final test (M= 4.25) and Checking the validity of the final test (M= 4.25). In comparison, the last in rank stated: Preliminary administration of the test (M= 4.08) interpreted as agree. Respondents select appropriate item types in an objective test but give less attention to the preliminary administration of the test or practice examination to test-takers before the examination (Opie et al., 2021).

Table 3: Respondents' Knowledge in Objective Test Construction Procedure in terms of Selecting Appropriate Item Types

Indicators	Mean	Description	Rank
Write items for the test	4.45	Strongly Agree	1
Preliminary administration of the test	4.08	Agree	5
Checking the reliability of the final test.	4.25	Strongly Agree	3.5
Checking the validity of the final test	4.25	Strongly Agree	3.5
Preparation of the test manual and reproduction of the test.	4.33	Strongly Agree	2
Total	4.27	Strongly Agree	

4.2.3 Preparing Relevant Test Items

Table 4 shows the respondents' knowledge of the objective test construction procedure in preparing relevant test items. The overall mean (M= 4.08) indicated an agreement among the things.

The top in rank stated: Prepare items to measure correctly the differences among test takers (M= 4.23), which was agreed upon by most of the respondents, followed by the statement, Revise items based on item indicators (M= 4.10) interpreted as agree. While the bottom rank among the indicators stated: Arrange items in order of difficulty so that test-takers begin with relatively easy items to that of increasing difficulty (M= 4.05) and Select good items with high discriminatory abilities (M= 4.05), which were tied up, and Estimate test item parameters (M= 3.95), all interpreted as agree. Although most respondents showed agreement among the statements, these were the less frequent answers being found on the bottom rank, which indicates that respondents give less priority to arranging test items enough to ensure that all cognitive domains are covered at all levels, from easy to complex, selecting good things to take into account the age of the test-takers, and preparing to mark guide in constructing the test. Therefore, the school should consider this for potential improvement, including developmental activities to make teachers arrange the level of difficulty of test items, select good items with high discriminatory abilities, and estimate test item parameters.

Table 4: Respondents' Knowledge in Objective Test Construction Procedure in terms of Preparing Relevant Test Items

Indicators	Mean	Description	Rank
Arrange items in order of difficulty, so that test takers begin with relatively easy items to that of increasing difficulty.	4.05	Agree	3.5
Prepare items to measure correctly the differences among test takers.	4.23	Strongly Agree	1
Revise items based on item indicators.	4.10	Agree	2
Estimate test item parameters.	3.95	Agree	5
Select good items with high discriminatory abilities.	4.05	Agree	3.5
Total	4.08	Agree	

4.2.4 Assembling the Test

Table 5 shows the respondents’ knowledge of the objective test construction procedure in creating the test. The overall mean (M= 4.32) indicated an agreement among the items. The top in rank stated: Assign grades/marks to items (M=4.53) which were agreed upon by most of the respondents and interpreted as strongly agree. This was followed by three items that tied up, which stated: Give criteria to assess task (M= 4.30), Give performance standards for each criterion (M= 4.30), and Reflect/ review marks allotted to items (M= 4.30) which were all interpreted as strongly agree. Meanwhile, the bottom rank among the indicators stated that Outline formats for marking criteria (M= 4.18) were interpreted as agree. Thus, respondents utilize their knowledge in assembling the test but give less priority to outlining formats for keeping standards.

Table 5: Respondents' Knowledge in Objective Test Construction Procedure in terms of Assembling the Test

Indicators	Mean	Description	Rank
Outline formats for marking criteria.	4.18	Agree	5
Give criteria to assess task.	4.30	Strongly Agree	3
Give performance standards for each criterion.	4.30	Strongly Agree	3
Assign grades/marks to items.	4.53	Strongly Agree	1
Reflect/review marks allotted to items.	4.30	Strongly Agree	3
Total	4.32	Strongly Agree	

4.3 Relationship between Respondents’ Profile and Their Knowledge in Objective Test Construction Procedure

Table 6 shows the relationship between respondents’ profile and their knowledge in objective test construction procedure. From Table 6, it was found that age was significantly correlated ($p < 0.05$) with knowledge in objective test construction procedure in terms of assembling the test ($C = 0.336$), but showed no significant relationship with developing test specifications, selecting appropriate item types, and preparing relevant test items. The strength in correlation based on eta coefficient showed low strength which indicates that the relationship among these variables was weak.

Consequently, it was found out that gender showed no significant relationship with the respondents’ knowledge in objective test construction procedure. In addition, a similar study conducted by Inko-Tariah and Okon (2019) indicated that the knowledge of test construction procedures among lecturers is unaffected by gender. The findings of this study accord with Dubem (2014), who said that the application of objective-based assessment practice by teachers is determined by their personality and training rather than their gender. Male and female test constructors did not differ significantly in their understanding of test construction methods (Okon, 2014). This is most likely since male and female instructors go through the same training as students.

The respondents' number of years in teaching was found to be significantly correlated ($p < 0.05$) with their knowledge of objective test construction procedures in terms of developing test specifications ($C = 0.374$), selecting appropriate item types ($C = 0.327$), and preparing relevant test items ($C = 0.348$). Consequently,

the number of years in teaching showed no significant correlation with assembling the test. This entails that completing the objective test is valid for all respondents regardless of their number of years in education. However, the correlation strength based on the eta coefficient showed a low power, indicating that their relationship is weak.

Accordingly, the respondents' professional training attended was no significant correlation with their knowledge of objective test construction procedures. This finding agrees with Inko-Tariah and Okon (2019), who found no vital relationship between teachers' knowledge of objective test construction procedures and professional training. According to Ovat and Ofem (2017), professional training has little effect on lecturers' use of test blueprints in student evaluation in schools. This conclusion was unexpected since one would anticipate teachers who have received test construction training to be better informed about test construction techniques (Inko-Tariah, et al., 2019).

Table 6: Relationship between Respondents' Profile and Their Knowledge in Objective Test Construction Procedure				
Variable	P-value	Decision on Ho $\alpha = 0.05$	Interpretation	Strength
Age in relation to:				
Developing Test Specifications	0.561	Failed to Reject Ho	Not Significant	
Selecting Appropriate Item Types	0.791	Failed to Reject Ho	Not Significant	
Preparing Relevant Test Items	0.825	Failed to Reject Ho	Not Significant	
Assembling The Test	0.048	Reject Ho	Significant	0.336 – weak
Gender in relation to:				
Developing Test Specifications	0.732	Failed to Reject Ho	Not Significant	
Selecting Appropriate Item Types	0.402	Failed to Reject Ho	Not Significant	
Preparing Relevant Test Items	0.751	Failed to Reject Ho	Not Significant	
Assembling The Test	0.479	Failed to Reject Ho	Not Significant	
Number of Years in Teaching in relation to:				
Developing Test Specifications	0.008	Reject Ho	Significant	0.374 – weak
Selecting Appropriate Item Types	0.011	Reject Ho	Significant	0.327 – weak
Preparing Relevant Test Items	0.03	Reject Ho	Significant	0.348 – weak

Assembling The Test	0.143	Failed to Reject Ho	Not Significant	
Professional Trainings Attended in relation to:				
Developing Test Specifications	0.107	Failed to Reject Ho	Not Significant	
Selecting Appropriate Item Types	0.425	Failed to Reject Ho	Not Significant	
Preparing Relevant Test Items	0.602	Failed to Reject Ho	Not Significant	
Assembling The Test	0.753	Failed to Reject Ho	Not Significant	

This study coincides with other research findings from the literature. Teachers use extensive expertise in test construction procedures, except for administering preliminary exams. Thus, teachers should be encouraged to give pre-tests before the main tests in schools (Opie et. al., 2021). Students or test-takers in schools who are not subjected to pre-testing regularly will be unprepared to face the actual exam due to a lack of preparation. It is, therefore, necessary to call on educational agencies/policymakers to devise a program that would impose preliminary tests so that scientific students and test-takers may face the actual exams without fear (Opie et. al., 2021). In this case, Opie et. al. (2021) recommended that teachers should be encouraged to be sponsored to attend assessment practice seminars.

This study was also confirmed by Inko-Tariah and Okon (2019) that although most tests designed by university lecturers lack fundamental psychometric features, examination of most tests constructed by lecturers revealed that their tests lack basic psychometric properties. They are unlikely to put their expertise to use while creating tests for their courses. However, a study conducted by Quansah, Amoako, and Ankomah (2019) revealed that teachers are weak in constructing tests. Classroom instructors must understand that measuring psychological factors such as academic success is challenging. This data is required not only by instructors but also by parents, school administrators, and lawmakers. Because the acquired information is used to make decisions, it must be as accurate as possible. If a test with low validity and reliability is often utilized, incorrect judgments may be made. Therefore, experts in test creation should hold seminars so lecturers may demonstrate their claimed competence in practice (Inko-Tariah, et al., 2019).

Similarly, as revealed from the study conducted by Gichuhi (2014), because most instructors are not educated in test construction abilities, this area deserves additional attention. As a result, instructors must be educated in test creation to develop test items competent in establishing learning at all levels of Bloom's Taxonomy. The exam items used by the teachers do not adequately reflect the six cognitive level objectives. The articles primarily assess lower-level reasoning. Based on the study's findings, it can be inferred that training can increase assessment quality by enhancing the quality of teacher-created exams.

5. Conclusions

Teachers' knowledge of objective test construction procedures in the teacher education programs was generally good. While teachers have a high level of expertise in proper test construction procedures in terms of assembling the test, they tend to have less priority in preparing relevant test items.

6. Recommendations

The findings of this study have significant benefits for teaching, especially for the development of standardized objective tests in teacher education programs. The findings of the knowledge of teachers' inaccurate test construction procedures in the teacher education programs can be used as a basis and reference for teachers to trace these procedures in the construction of valid and relevant tests that would measure the low and high order thinking skills of students in achieving the goals and aims of education. By saying this, teachers must possess competence in producing relevant and valid test items that would measure the learning of the students and the achievement of the aims of the curriculum – which is to prepare learners in the field of employment.

The findings of this study also have significant benefits for future researchers as a source of reference in assessing similar topics. To reinforce the results of this study, researchers can further study research on the same issue but use different types of respondents. In addition, to complement the extent of teachers' knowledge in objective test construction procedures, the next researcher can research topics about the attitude of teachers in the construction of valid and relevant objective tests. Finally, the school must develop and conduct seminar training in the procedures of objective test construction especially highlighting checking the validity and relevance of the test items included in the exam because it helps produce valid and relevant objective tests. Hence, it would be helpful for students whose ability and performance are quite a concern already; nevertheless, the accurate and appropriate assessment tools could also help have more possible options and interactive ways of understanding and comprehending multiple-choice questions.

7. Acknowledgement

The researcher would like to acknowledge and extend his profound gratitude to Cebu Roosevelt Memorial Colleges Inc., its administrators, and faculty and staff for the continuous support and sponsorship of his professional and academic endeavors.

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