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Reliability Analysis on Teachers' Quarterly Classroom Assessment in Basic Education

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ABSTRACT

The study was conducted to enhance basic education teachers on the basic concepts of teaching and learning assessment, particularly in the given quarterly examinations. Specifically, it aimed to identify the different assessment techniques in measuring authentic learning, determine the reliability indices of quarterly assessments in the different subject areas and analyze the test items of the specified learning domains in the Table of Specification (TOS). Participants were the basic education teachers identified in the college extension program teaching in elementary, integrated and high school levels. Based on the results, assessment tools used in the classroom for the quarterly examinations were mostly identified as Multiple Choice Questions (MCQ) type in all subject areas. The reliability coefficient, Cronbach Alpha, were computed of which most of the test obtained higher than the minimum standard reliability of 0.70. Much more in Mathematics subject, retained items of the test were just average based on learning domains in the TOS with 58% and 33% characterized as lower-order thinking skills(LOTS) and higher-order thinking skills(HOTS), respectively.

Keywords: classroom assessment, reliability, item analysis, Cronbach Alpha, basic education teachers

INTRODUCTION

Assessment is a systematic and logical means of gathering information about what students learned and can do. Such information may be sourced through observation of students during their learning activities, examining the results of their learning activities, testing their knowledge and skills (Navarro &Santos, 2013). Classroom assessment has continuously become one of the concerns in educational institutions. As time passes by, new assessment practices in schools have been adapted to suit the need of the ever-changing curriculum (Lasaten, 2016). classroom assessment includes a wide array of tasks from constructing tests and performance measures to grading, interpreting test scores, communicating test results, and using assessment results in making decisions.

Classroom Assessment is an integral part of curriculum implementation. It allows the teachers to track and measure learners' progress and to adjust instruction accordingly. Classroom assessment informs the learners, also the parents and guardians, with regards to their academic progress in school (DO #8 s. 2015). As such, teachers were the frontliners in managing the learning of the students. As the new curriculum was implemented, the k-12, it is imperative to support and assess the teaching-learning process based on the specific curriculum guides in each year level, particularly in the basic education sector. It is in this aspect that this study is based on determining and examining the different assessment tools manifested by the basic education teachers in the classroom. In fact, this is also of great help to teachers as well as the administrators in evaluating the performance of students in the given National Achievement Test.

FRAMEWORK

Assessment is one of the most critical dimensions of the education process; it focuses not only on identifying how many of the predefined education aims and goals have been achieved but also serves feedback mechanism that educators should use to enhance their teaching practices. Assessment is located among the main factors contributing to quality teaching and learning environment (Kallia, 2017). Lamprianou and Athanasou (2009) point out that assessment is connected with the educational goals of "diagnosis, prediction, placement, evaluation, selection, grading, guidance or administration." The priority of Assessment for Learning in its design and practice is to promote students learning. It thus differs

from assessment designed primarily to serve the purposes of accountability, or of ranking, or of certifying competence. Most of the assessment activity promotes learning if it provides information to be used as feedback by teachers, and by their students, in assessing themselves and each other, to modify the teaching and learning activities in which they are engaged. Such assessment becomes formative assessment when the evidence is actually used to adapt the teaching work to meet learning needs (Black et al., 2003; Derrick, J. & K. Ecclestone, 2008).

Generally, assessment is the process of gathering data. More specifically, assessment is used by instructors to gather data about their teaching and their students' learning (Hanna & Dettmer, 2004). The data provide a picture of various activities using different assessment tools, such as pre-tests, observations, and examinations. Once these data are gathered, we can then evaluate the student's performance. Wiggins and McTighe (2000) posted that perhaps the first step of the whole assessment in a learning process is establishing student learning goals, what is worthy and requiring understanding (DeMeester & Jones, 2009). Students' understanding of goals had critical motivational and cognitive impacts, as stressed by Brookhart, Andolina, Zuza, & Furman (2004).

Plata (2018) reported that Philippine education is undergoing a major reinvention with changes in basic education, classroom assessment, and teacher preparation in the past five years. These reforms necessitate an urgent review of the teacher education curriculum of CHED (Commission on Higher Education) to check its alignment with these new initiatives. Her study focused on a multi-phase study which aimed to analyze the alignment of Domain 5 (Assessment and Reporting) of the Philippine Professional Standards for Teachers (PPST) descriptors for Beginning Teachers, DepEd assessment reforms based on CMO 75 s2017. This study is also anchored on the cognitive level of Bloom's taxonomy (Bloom, 1956 and Anderson & Krathwohl, 2001), that learning is a sequential and hierarchical process that started from lower-order thinking skills (LOTS) such as remembering, understanding, and applying to higher-order thinking skills (HOTS) such as analyzing, evaluating, and creating,

OBJECTIVES OF STUDY

The study aimed to enhance basic education teachers on the teaching and learning assessment concepts. Specifically, it sought to answer the following: 1) identify the different assessment techniques in measuring authentic learning; 2) determine the reliability indices of quarterly classroom assessments in the different subject areas, and 3) analyze the test items of the specified learning domains in the Table of Specification (TOS).

METHODS

This study is of descriptive research design. The participants of this study were the randomly identified teachers of Valencia City Division, Department of Education, as recipients of the teacher-training extension program under the Teaching and Learning Assessment Project of the College of Education, Central Mindanao University. The participants were grouped according to their major field of specialization and to the type of subjects handled. Secondary data gathered for analysis were the Table of Specifications (TOS) and results of the quarterly assessment or periodical examination in one grading. The quarterly assessment per subject area and by year level was departmentalized throughout the division.

The data were summarized, translated, and analyzed using descriptive Statistics such as the frequency counts and percentages. Reliability indices and Item analysis of the test were measured and computed using the Cronbach Alpha coefficient thru statistical software. Only the test items in the TOS the of Mathematics subject area were presented for analysis.

RESULTS AND DISCUSSION

After the needs assessment as part of the College Extension Program, the teachers-participants under the Teaching and Learning assessment project were grouped by level or by their subject areas. A series of lecture-workshop was done during Saturdays or weekends. The participants were reviewed and refreshed onthe different assessment tools in assessing student performance. The topics include introductory concepts on assessment; The making of Table of Specifications (TOS); The review on tye of tests and its construction; The concept of Validity and Reliability; The Item Analysis process, and the Concept of grading based on the criteria in the Department of Education.

Table 1

Types of classroom assessment during the First Quarter

Subject	TOS	TYPE OF ASSESSMENT / EXAM	
		FILL THE BLANK / IDENTIFICATION	MULTIPLE CHOICE
ARALING PANLIPUNAN (SOC STUDIES)	1	1	1
ENGLISH	1	-	1
FILIPINO	1	-	1
MATH	1	-	1
SCIENCE	1	-	1
TLE	1	-	1
TOTAL	**6**	**1**	**6**

During the preparation of the test for the first quarter, the teachers submitted their examination type thru email for easy checking and mobility. As shown in Table 1 were the different types of assessment distributed across subject areas. Based on the subjects represented by the participants, all teachers employed multiple-choice as one of the assessment tools during the quarter examinations. This was also the type of quarterly assessment given by teachers to their students as practiced in the City Division. Accordingly, the use of multiple-choice questions(MCQ) in assessment has been reported extensively in all fields of education and the wider educational context (O'Dwyer, 2010). Generally, the MCQ type of test has been used by these teachers since the achievement tests like the NAT utilized this kind.

Table 2

Chronbach alpha values in the reliability of the test

Subject	# of students	# of items	Cronbach α * Value	Interpretation
AP (SOC STUDIES)	42	50	0.741	Reliable
ENGLISH	45	50	0.736	Reliable
FILIPINO	78	50	0.729	Reliable
MATHEMATICS	55	45	0.776	Reliable
SCIENCE	70	50	0.701	Reliable

* - Cronbach α value of 0.70 is reliable (Hopkins and Antes, 1990)

Table 2 shows the reliability indices, Cronbach Alpha coefficient of the subjects after the First quarter. Generally, all of the tests were reliable based on the standard criterion set for Educational measurements, i.e., tests with alpha equal to or greater than 0.70. The test is said to be reliable for a classroom test. (Hopkins & Antes, 1990; Navarro, Santos, & Corpuz, 2019). The MATH subject has the highest Cronbach Alpha of 0.776, followed by AP with alpha = 0.741, while the least alpha of the subjects being presented was on Science, equal to 0.701.

Table 3

Mathematics test item classification after performing item analysis.

TOPIC	COGNITIVE BEHAVIOR										
	Remembering		Understanding		Applying		Analyzing		Evaluating / Creating		
	# Items	# *Retained*	# Items	# *Retained*	# Items	# *Retained*	# Items	# *Retained*	# Items	# *Retained*	Total Items
A	4	*2*	4	*2*	3	*2*	1	*1*	1	*1*	**13**
B	3	*2*	3	*2*	2	*1*	3	*1*	1	*0*	**12**
C	3	*2*	2	*1*	3	*2*	3	*1*	1	*0*	**12**
D	2	*1*	2	*1*	2	*1*	2	*0*	0	*0*	**8**
Total Items	**12**		**11**		**10**		9		**3**		**45**
Total Retained		*7*		*6*		*6*		*3*		*1*	**23**
% Retained	**Lower Order Thinking Skills (LOTS) 19/33 ≈ 58%**						**Higher Order Thinking Skills – (HOTS) 4/12 ≈33%**				**23/45 = 51%**

Table 3 presents the submitted summary of Item analysis for the Mathematics subject based on the cognitive behavior displayed in the TOS. As shown, the total items for was 45, of which after running the item analysis, only 23 items were retained based on the discrimination index. Using the revised Bloom's Taxonomy of Anderson, Lower order thinking skills (LOTS) items retained were about 58% compared to the Higher order thinking skills (HOTS) of 33%. The overall retained items combined is 51%, which means out of 45 items, 23 items were retained or good items. According to Hopkins and Antes (1990), tests with 40-60% retained being indicable of a good and reliable test.

CONCLUSIONS

The teacher - participants were reviewed, updated, and enhanced their knowledge and skill in the teaching and learning assessment. Series of Lecture-Workshops were employed during the extension activities with actual hand-on using the raw data gathered after the first quarter exam for the item analysis. Several educational assessment topics were presented, such as the TOS, the type of classroom assessment tools, Test construction, Validity and reliability concepts, and the process of item analysis employing the statistical software. Based on the results, the type of assessment tools used in the classroom for the first quarter exams as identified, of which the MCQ type dominated in all subjects as one cognitive assessment tool. Also, TOS per subject area was made and submitted. The reliability coefficient, Cronbach Alpha, were computed of which most of the test obtained higher than the minimum standard reliability of 0.70. In the Mathematics subject area, item analysis was conducted. The ratio of the computed retained items in the test to the total items based on the cognitive behavior in the TOS was indicative of a reliable test.

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