KNOWLEDGE OF TEST CONSTRUCTION PROCEDURES AMONG LECTURERS IN IGNATIUS AJURU UNIVERSITY OF EDUCATION, PORT HARCOURT, NIGERIA

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ABSTRACT

The study was conducted to assess the knowledge of lecturers on test construction procedures. The study adopted an analytical descriptive survey design. One research question and four hypotheses guided the study. It involved a sample of 200 lecturers drawn from 440 teaching members of staff of the university. A self-structured instrument was used for data collection. The research question was answered using mean scores while independent t-test and ANOVA were used to analyze the hypotheses at 0.05 level of significance. Results revealed high knowledge of test construction procedures by the lecturers. It was also found that lecturers' knowledge of test construction procedures did not differ significantly based on gender, years of experience, professional training and educational qualification.

Keywords: Test construction Procedures, Item Analysis, Test Blue Print, Knowledge

INTRODUCTION

The business of teaching and learning cannot be complete without a periodic examination of the learners to determine if set objectives are being achieved. In the university each lecturer is expected to quantify how much the students have achieved from a course of instruction, this is done through the administration of tests by the lecturers who may not have adequate knowledge of test construction procedures, hence most often one encounters question papers that lack the basic psychometric properties (i.e validity, reliability, and usability). The most common tests used by lecturers are teacher–made achievement tests as against standardized tests which have the psychometric properties established. For achievement test, the most important validities to establish are face and content validities. Face validity is concerned with level of English used, if the items are ambiguous, if it is multiple choice you check if they are properly keyed, if the keys come in a pattern, and if there are overlapping items. It is also very important to establish content validity of an achievement test as it is crucial that the test covers the content area the learners have been exposed to; reliability and usability of the tests are also established as achievement is a latent trait. All these are incorporated in test construction procedures which each lecturer should be aware of and follow to be able to set good tests.

As the power to assess the students rest on the lecturers. One would expect adequate measures to help lecturers acquire the skills in test construction but this is not the case. To confirm this, Izard (2005) observed that most teacher-made tests assess mainly the lower level processes as Bloom's taxonomy of educational objectives specified for the cognitive domain. It becomes pertinent to guide lecturers on test construction procedures, which involves three major steps, (a). Test planning, where you plan the type of test you want to construct, this encompasses things like test format, the number of items to construct, determining the objectives to be assessed and drawing the test blueprint. (b) Item writing: Items are written out bearing in mind ways of improving essay or objective test items, after

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which the test is given out to other content specialists to establish face and or content validity. The test is then given to an equivalent group to the people the test is intended for trial testing, thereafter item analysis is by calculating the difficulty and discrimination indices of the items. Items are then selected based on the appropriate levels of these indices for norm and criterion-referenced tests.

The importance of teachers setting appropriate tests for their students is inarguable considering the value of test scores given by teachers. Researchers have stressed that teacher's competence greatly impacts on the quality of tests constructed (Chan, 2009, Darling-Hammond, 2012). Marso and Figge (1989) investigated the extent to which supervisors, principals, and teachers agree in assessing their proficiency in testing. The study demonstrated proficiency in assessment skills of the participants. Results showed teachers rating themselves higher than principals while principals rated themselves higher than supervisors. Generally, it was found that they all needed more training in test construction skill.

Similarly in a study on the profile of teacher made test construction of the professors of the University of Perpetual Help Laguna, Magno (2003) determined the level of the professors' appropriateness in test construction. A sample of 33 professors participated in the study which determined their tendency to employ the general principles, guidelines, and procedures in test construction. Findings indicated that only about 54.54% had an average level of appropriateness in test construction and no significant difference was found based on years of experience. Ololube (2008) investigated the competencies in test construction of professional teachers in Nigeria and found that professionally trained teachers have the likelihood to use different evaluation tools correctly which may not be true of the non-professional teacher.

It should be emphasized that most of the lecturers in universities do not have education background and have never taken courses in test construction.. Adodo (2014) carried out an evaluative study of secondary school teachers competence in evaluating students cognitive and psychomotor achievement in basic science and technology. The results revealed teachers years of experience and qualifications did not significantly influence their competence in assessing their students while gender made a significant influence. The result is not surprising as only a teacher proficient in test construction procedures can construct tests that have the right psychometric properties. However, Dubem (2014) positioned that lecturers competence in test construction is dependent on the personality and training rather than gender of the teacher as the skills in constructing good tests are acquired through training. Okon (2014) studied gender and knowledge of test construction and found no significant difference based on gender. Hamafyleto et al, (2015) allso assessed the relationship between commerce teachers proficiency in test construction and test quality, the study had a sample of 75 commerce teachers in senior secondary classes and revealed a significant relationship between teacher's competence and content validity of their tests

Quansah, et al (2019) also investigated teachers test construction skills in some high schools in Cape Coast metropolis of Ghana. The study investigated test construction skills of the teachers using qualitative document analysis sample of the end of term examination papers in Integrated Science, Core Mathematics and Social Studies. Experts in measurement and evaluation critically examined samples of the presented tools. Results showed that most of the teachers have limited skills in the construction of tests. These results summarily have implications for educational evaluation as proper evaluation of learning outcomes is very important considering that test scores are used in decision making.

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RESEARCH QUESTION

The following research question is asked to guide the study:-

To what extent are lecturers knowledgeable in test construction procedures?

RESEARCH HYPOTHESES

Four research hypotheses were developed to guide the study

Ho_1: Lecturers' knowledge of test construction procedures does not differ significantly based on gender.

Ho_2: Lecturers' knowledge of test construction procedures does not differ significantly based on years of experience

Ho_3: Lecturers' knowledge of test construction procedures does not differ significantly based on professional training

Ho_4: Lecturers' knowledge of test construction procedures does not differ significantly based on educational qualification

METHODOLOGY

The study adopted a descriptive survey research design. The population of the study comprised 440 teaching members of staff of the Ignatius Ajuru University of Education. A sample of 200 lecturers was drawn using the stratified random sampling technique. The study made use of primary data derived from a self-structured questionnaire titled Test Construction Scale (TCS). The instrument had two sections A and B. Section A on bio-data and section B had 20 items that measured lecturers knowledge of test construction procedures. The questionnaire adopted the Likert format. The research question was answered with mean scores while independent t-test was used to test hypotheses 1, 2 and 3. Analysis of Variance was used to test hypothesis 4. All tests were carried out at 0.05 level of significance.

RESULTS

Data Presentation

Table 1. Mean and Standard Deviation Analysis of Lecturers' Gender and Knowledge of Test Construction Procedures

Gender	N	Percentage	Mean	Standard Deviation
Male	136	68	3.01	0.82
Female	64	32	2.98	0.89

Table 1 shows mean of 3.01 with a standard deviation of 0.82 for male while mean of 2.98 with a standard deviation of 0.89 for female indicates that male have the highest mean score and lowest standard deviation against female respectively.

Table 2. Mean and Standard Deviation Analysis on Years of Working Experience and Knowledge of Test Construction Procedures

Year of Working Experience	N	Percentage	Mean	Standard Deviation
0-10 year	80	40	2.991	0.825
11 and above	120	60	2.995	0.86

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Table 2 above shows mean of 2.991 and standard deviation 0.825 for 0-10years while mean of 2.995 with a standard deviation of 0.86 for 11 years and above indicates that the mean for 0-10year is lower than that of 11year and above while the standard deviation of 0-10year is higher than that of 11year and above.

Table 3. Mean and Standard Deviation Analysis of Professional Training and Knowledge of Test Construction

Professional training in test construction	N	Percentage	Mean	Standard Deviation
Trained	144	72	3.09	0.83
Untrained	56	28	2.77	0.87

Table 3 shows mean of 3.09 with a standard deviation of 0.83 for trained while mean of 2.77 with a standard deviation of 0.87 for untrained indicates the mean score for trained is higher than that of untrained while the standard deviation of trained is lower than that of untrained.

Table 4. Mean and Standard Deviation Analysis of Educational Qualification of Lecturers' and Knowledge of Test Construction Procedures

Educational qualification	N	Percentage	Mean	Standard Deviation
B.Ed/B.Sc	12	6	3.128	0.685
M.Ed/M.Sc	54	27	2.906	0.88
PhD	134	67	3.032	0.83

Table 4 shows mean 3.128, 2.906 and 3.032 with a standard deviation of 0.685, 0.88 and 0.83 respectively indicates that B.Ed/B.Sc has the highest mean and standard deviation and Ph.D. has mean of 3.032 higher than mean of M.Ed/M.Sc, 2.906 while the standard deviation of Ph.D. is lower than that of M.Ed/M.Sc.

Research Question One: To what extent are lecturers knowledgeable in test construction procedures?

Table 5(Part-I). Mean and Standard Deviation Analysis of Lecturers' Knowledge of Test Construction Procedures

S/N	Items	VK 4	K 3	SK 2	NK 1	N	GT	(X)	SD	Remark
1	Prepare a test blueprint as a guide in test construction	82	88	16	14	200	638	3.1	0.8	Accepted
2	Organized test items in a logical manner	86	90	18	6	200	656	3.2	0.7	Accepted
3	Give clear instructions to guide the test taker	104	80	10	6	200	682	3.4	0.7	Accepted
4	Consult previous tests and adapt questions from them	64	100	28	8	200	620	3.1	0.7	Accepted
5	Submit items for vetting to the course coordinator	70	72	30	28	200	584	2.9	1.0	Accepted
6	Set items that elicit creative and imaginative answers	88	80	18	14	200	642	3.2	0.8	Accepted
7	Prepare a marking guide while constructing the test	132	44	16	8	200	700	3.5	0.8	Accepted

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Table 5(Part-II). Mean and Standard Deviation Analysis of Lecturers' Knowledge of Test Construction Procedures

S/N	Items	VK 4	K 3	SK 2	NK 1	N	GT	(X)	SD	Remark
8	Avoid items that measure opinion	48	76	46	30	200	542	2.7	0.9	Accepted
9	Avoid too long questions or phrases in item writing	102	68	18	12	200	660	3.3	0.8	Accepted
10	Ensure items cover all the topics taught for the period	106	66	12	16	200	662	3.3	0.9	Accepted
11	Make sure options in objective items are plausible	70	98	18	14	200	624	3.1	0.8	Accepted
12	Establish test reliability	58	86	38	18	200	584	2.9	0.9	Accepted
13	Calculate difficulty indices of items	40	68	64	28	200	520	2.6	0.9	Accepted
14	Calculate discrimination indices of items	28	56	68	48	200	464	2.3	0.9	Rejected
15	Use only objective test items	30	66	64	40	200	486	2.4	0.9	Rejected
16	Seek the opinion of lecturers on same course area	34	88	62	16	200	540	2.7	0.8	Accepted
17	Use only essay test items	62	62	60	16	200	570	2.8	0.9	Accepted
18	Use both objective and essay test items	64	70	38	28	200	570	2.8	1.0	Accepted
19	Avoid ambiguous items	114	60	12	14	200	674	3.3	0.8	Accepted
20	Make sure that information in one question does not provide a clue to answer to another question	78	80	22	20	200	616	3.0	0.9	Accepted

Table 5 above shows of the 20 items, 18 items are accepted that lecturers have knowledge in these test construction procedures while 2 items 14 and 15 were rejected, Item 7 was accepted as the item with the highest magnitude mean of 3.5 with a standard deviation of 0.8 while item 14 was the least among the rejected items with a mean of 2.3 and standard deviation of 0.9. Therefore, items above the criterion mean of 2.5 were accepted as test construction procedures that lecturers are knowledgeable in while those below 2.5 were rejected on research rules that items should be rejected.

Hypothesis 1: Lecturers' knowledge of test construction procedures does not differ significantly based on gender.

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Table 6. Independent T-Test Analysis of Lecturers' Gender and Knowledge of Test Construction Procedures

Gender	N	X	SD	DF	Calculated t-value	Critical t-value	Level of significance	Remark
Male	136	3.01	0.82	198	0.3	1.66	0.05	Not Significant
Female	64	2.98	0.89					

Table 6: since the calculated t-value 0.3 is less than the critical t-value 1.66 the null hypothesis is not rejected, this implies that lecturers' knowledge of test construction procedures does not differ significantly based on gender.

Hypothesis 2: Lecturers' knowledge of test construction procedures does not differ significantly based on years of experience

Table 7. Independent T-Test Analysis of Lecturers' Years of Working Experience and Knowledge of Test Construction Procedures

Year of working experience	N	X	SD	DF	Calculated T- value	Critical t- value	Level of significant	Remark
0-10 year	80	2.991	0.825	198	-1.04	1.66	0.05	Not significant
11 and above	120	2.995	0.86					

Table 7: since the calculated t-value -1.04 is less than the critical t-value 1.66 the null hypothesis is therefore not rejected this implies Lecturers' knowledge of test construction procedures does not differ significantly based on years of experience

Hypothesis 3: Lecturers' knowledge of test construction procedures does not differ significantly based on Professional training

Table 8. Independent T-Test Analysis of Lecturers' Professional Training in Test Construction and Knowledge of Test Construction Procedures

Professional training in test construction	N	Mean	SD	DF	Calculate T-value	Critical t-valve	Level of Significant	Remark
Trained	144	3.09	0.83	198	0.1	1.66	0.05	Not Significant
Untrained	56	2.77	0.87					

Table 8: since the calculated t-value 0.1 is less than the critical t-value the null hypothesis is therefore not rejected this implies that Lecturers' knowledge of test construction procedures does not differ significantly based on Professional training

Hypothesis 4: Lecturers' knowledge of test construction procedures does not differ significantly based on Educational qualification

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Table 9. ANOVA Analysis of Educational Qualification on Lecturers' Knowledge of Test Construction Procedures

Source of variance	Sum of squares	Degree of freedom	Mean square	Calculated F- value	Critical F-value
Between	3548.44	2	1774.22	0.27	3.15
Within	371005.54	57	6508.86		
Total	**374553.98**	**59**			

Table 9: since the calculated F-value 0.27 is less than the critical F-value the null hypothesis is therefore not rejected this implies that lecturers' knowledge of test construction procedures does not differ significantly based on educational qualification.

DISCUSSION

The items on table 5 show that most of them were accepted as they have higher mean scores than the grand mean of 2.5. This indicates lecturers have knowledge of test construction procedures to a reasonable extent. The result, however, disagrees with the findings of Magno (2003) and Quansah et al (2019) who found most teachers they studied not to be knowledgeable in test construction procedures. This result, however, does not agree with the observation made on tests constructed by most of the lecturers which showed lecturers, low competence in test construction. They probably did not apply the knowledge they claim to have while constructing tests items.

Findings from hypothesis one showed that lecturers' knowledge of test construction procedures does not differ significantly based on gender. The finding from this analysis is in agreement with Dubem (2014) who noted that lecturers' use of objective-based assessment practice is dependent on the personality and training of the lecturer rather than their gender. Okon (2014) found no significant difference in the knowledge of test construction procedures between male and female test constructors. This is probably because both male and female lecturers undergo the same training as students.

Findings from hypothesis two showed that lecturers' knowledge of test construction procedures does not differ significantly based on years of experience. This finding is in agreement with Adodo (2014) who found years of experience not to make any significant difference on teachers knowledge of test construction procedures.

Finding from hypothesis three shows that lecturers' knowledge of test construction procedures does not differ significantly based on professional training. The result disagrees with Ololube (2008) who found that professionally trained teachers are more likely to use various evaluation tools correctly. However, Ovat and Ofem (2017) found no significant influence of professional training on lecturers' utilization of test blueprint in learners' assessment in schools. This result was surprising a one would expect teachers with training in test construction to be more knowledgeable in test construction skills.

Findings from hypothesis four indicated educational qualification made no significant difference in teachers' knowledge of test construction procedures. This finding agrees with Adodo (2014) who also found no significant differences made by educational qualification on teacher's competence in test construction skills. However the mode of training a teacher receives will impact more on his/her competencies in test construction rather than educational qualification. A highly educated person who has never taken training in test construction may not be competent enough to construct test items with proper qualities.

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CONCLUSION

The study investigated knowledge of test construction procedures of lecturers in Ignatius Ajuru University of Education Port Harcourt. The study involved 200 lecturers drawn from a population of 440 teaching members of staff of the university. A self-structured instrument was used to elicit the lecturers' knowledge of test construction procedures. The result indicated that the lecturers are very knowledgeable on the test construction procedures but observation of most tests constructed by lecturers in the university showed that their tests lack basic psychometric properties. They probably do not apply the knowledge during the test construction for their respective courses.

RECOMMENDATION

From the results, lecturers posited a high level of knowledge which does not reflect in the observation made on tests constructed by most of the lecturers. It is therefore recommended that

a. Experts in test construction from the University should organize workshops where lecturers will practically demonstrate the knowledge they claim they have.

b. Seminars on test construction procedures should also be encouraged in the University to enhance the incorporation of new innovation in test construction.

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