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CRITICAL AREAS OF MEASUREMENT AND EVALUATION IN EDUCATION, WHERE FINAL YEAR NCE STUDENTS IN THE SOUTH-EAST NIGERIA EXPERIENCE DIFFICULTIES

Dr. Ikoro, Ibekwe Stanley and Ezeanyim, Uchechukwu Elizabeth

[1]Department of educational foundation, ebonyi state college of education, pmb 02, ikwo. Ebonyi state-nigeria.
[2]Depertment of training and research. national institute for educational planning and administration (niepa). ondo state

ABSTRACT: *This study aimed at investigating the critical areas of measurement and evaluation in education, where Final year NCE Students experience difficulties in the South East, Nigeria. Two research questions guided the study. A sample of 1250 NCE Final year students selected through stratified proportionate(10%) random sampling technique from five (5) Colleges of Education in the five (5) states of South East, Nigeria was used for the study. Questionnaire instrument developed by the researchers was used for data collection . The instrument was validated by three experts, one from Science Education and two from Educational Measurement and Evaluation. The data collected were analyzed using Mean and Improvement Required Index (IRI). The results show that the Final Year NCE Students require improvement in all the thirty (30) items of measurement and evaluation. Also the students rated that they require improvement in all the aspect of test development process. Based on these findings the following recommendations were made: Colleges of Education in the South East Nigeria , should collaborate with experts in Educational Measurement and Evaluation to organize intensive lectures, workshops, seminars and short courses for the Final Year NCE Students in those areas under study, in order to upgrade their competencies. Equally, Lecturers in measurement and evaluation should spend more time in teaching the course, giving special assignments to NCE students on those critical areas/topics in the South-East, Nigeria.*

KEYWORDS: Educational Measurement, Evaluation, Critical, Critical Areas, Nce Students.

INTRODUCTION

Educational measurement and evaluation are integral parts of teaching and learning processes, that examine the appropriateness of teaching methods, relevance of curriculum contents and the quality of learning out-comes (Ikoro and Opa, 2011). Nworgu (2003) defined Measurement and Evaluation separately. He viewed Measurement as the process of assigning numerical values to describe features or characteristics of objects, persons or events in a systematic manner. While he opined that Evaluation can generally be used in two senses thus:

In the first sense, it is used to connote the process of making value judgments or taking decisions about events or objects or their characteristics. In the second sense, Evaluation is a process of seeking, obtaining and quantifying data with a view to making value judgment about objects, events, or their characteristics (Pages, 2-4). Singh (2008), explained classroom evaluation under three specific terms, as applied in the school system thus:

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i Test: An instruments or systematic procedure for measuring a sample of behavior.

ii. Measurement: The process of obtaining a numerical description of the degree to which an individual possesses a particular characteristic, and

iii. Evaluation: The systematic process of collecting, analyzing and interpreting information to determine the extent to which pupils are achieving instructional objectives. Measurement and Evaluation in the context of this study, refers to a course or programme of study, contained in the minimum standard (curriculum) for Nigeria Certificate in Education (NCE) Teachers in the Colleges of Education in Nigeria (Federal Republic of Nigeria; FRN 2012). The course contents are in the tables under the results of this study.

Critical as explained by Della (2005) is something that is very important because what happens in the future depends on it. With reference to this study, critical areas of Measurement and Evaluation refer to those areas of Measurement and Evaluation in Education that are of great importance to final year NCE students in carrying out evaluation procedure, especially in computation and analysis of data in education.

N.CE. Students in this study means, Nigeria Certificate in Education Students.

They are students admitted into the Colleges of Education for three (3) years programme, by the joint Admission and Matriculation Board (JAMB) having passed the Unified Tertiary Matriculation Examination (UTME).

All the schools and departments in the Colleges of Education do compulsory courses in Education, and one of them is Measurement and Evaluation. Students are taught and trained in this course, to enable them effectively teach and carry out evaluation processes where they will work especially in the education systems.

Experience of many lecturers and specialists in Educational Measurement and Evaluation revealed that although many NCE Students are interested in measurement and evaluation, yet they failed the course after writing the examination at their 200 level (first sitting) and some even failed it again after writing it at (second sitting). Further discussions with the students showed that many of them stayed longer than expected in completing their NCE programme due to difficulties of some topics in Educational Measurement and Evaluation. Topics in Educational Measurement and Evaluation include:

Concepts and meaning of Measurement and Evaluation; scope; Function; Demography; Test development process; Measure of central tendency; Measure of variability or dispersion; inferential statistics among others .

Nworgu (2003) stated that some student teachers exhibit phobia when taught statistics, and those who do who lack computation knowledge exhibit the phobia more. About 60% of the topics in Educational Measurement and Evaluation involve computations and analyses. This may account for the high rate of failures in the course, since not every student is competent enough in statistical computation and analyses and this is the critical areas the final year NCE Students experience difficulties. Yet it is a compulsory course that will help the students learn how to set and administer Continuous Assessments, Assignments, Classroom exercises, Tests and Examinations in their various places of work after graduation from the College. The extent to which the NCE teachers, master all the topics including those areas they experience difficulties will determine the type of teachers and evaluators they will be.

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The Federal Republic of Nigeria (FRN, 2004) stated that minimum qualification for teaching in Nigeria schools should be the Nigeria Certificate in Education (NCE). This implies that the holders of the NCE are to teach at the Universal Basic Education (UBE) level; which is from the primary school to the Junior Secondary school. The inability of the NCE students to pass Measurement and Evaluation at the first or second sitting made the researchers to find out those critical areas of measurement and evaluation in education, where final year NCE Students experience difficulties, and will require improvement. From observations and interviews by the researchers, the search for the critical areas was restricted to the topics that involve statistics which constitute about 70% of the students' failure due to computations and analyses. This also account for most of the final year NCE students' inability to carry out research projects correctly.

Purpose of the study

The main purpose of the study was to determine the critical Areas of Measurement and Evaluation, especially those topics that involve statistical computation and analyses in education where Final year NCE students experience difficulties in South-East Nigeria.

Specifically, the study sought to find out:

1. Topics that involve statistics in Educational Measurement and Evaluation where Final year NCE students' knowledge is low and require improvement in understanding and mastery.

2. Components of Test Development process where Final year NCE students experience difficulty and will require improvement.

Research questions

1. What are the Topics that involve Statistics in Measurement and Evaluation where final year NCE students' knowledge is low and require improvement.

2. What are the Components of Test Development process where final year NCE students experience difficulty and will require improvement.

METHODOLOGY

Design of the study

The study adopted a survey research design. Ali (1996), stated that survey design is mainly concerned with describing events as they are, without any manipulation of what is being observed. While Nworgu (1991), Opined that survey design is a procedure used in obtaining data from a sample or relevant population that is familiar with the ideas relating to the objectives of a study through interview or questionnaire. The survey design is appropriate for the study.

Area of the study

The study was carried out in the five (5) Colleges of Education in the South East Nigeria. They are for Abia State: College of Education Technical Aruchukwu; For Anambra State: Nwafor Orizu College of Education; For Ebonyi State: College of Education Ikwo; For

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Enugu State: Federal College of Education, Ahamafu ; and For Imo State: Alvan Ikoku Federal College of Education Owerri. Each state has a minimum of one College of Education, either owned by the Federal or State Government. Both Federal and State Colleges of Education were used in the study.

Population of the study

The population for the study was 6250 Final year NCE students of 2015/2016 Academic session, made up of: 305 Students from Abia State- College of Education Technical Aruchukwu; 1200 students from Anambra State- Nwafor Orizu College of Education; 560 Students from Ebonyi State College of Education Ikwo; 1861Students from Federal College of Education, Ahamufu Enugu State; and 2324 Students from Alvan Ikoku Federal College of Education Owerri, Imo State.

Sample and sampling technique

The sample size for the study was 1250 final year NCE students from the South East Colleges of Education in Nigeria. The sample was composed of Abia -62; Anambra-240, Ebonyi-112; Enugu-372 and Imo-464 students. A stratified proportionate (10%) random sampling technique was employed to determine the number of respondents per state.

Instrument for data collection

The researchers developed questionnaire for data collection. The questionnaire was in two major parts. Part 1, was concerned with areas of computation in Educational Measurement and Evaluation, while part 2, was concerned with components of test development processes. The two scales of the items in part 1, are in two scales of required and performance. The required scale options are;

Highly Required, Averagely Required, Slightly Required and Not Required with a corresponding value of 4, 3, 2 and I respectively. The performance scale options were High performance, Average performance, little performance and No performance, with corresponding value of 4,3,2 and I respectively.

The response scale for part 2 are required and difficult levels.

The response options for required are, Highly Required, Averagely Required, Slightly Required and Not Required, with a corresponding value of 4,3,2 and I respectively. The response options for the difficultly levels are High difficult, Average difficult, little difficult and No difficult, with a corresponding value of 4,3,2 and I respectively.

Validity of the Instrument

The draft instruments were submitted to three (3) experts from the field of Educational Measurement and Evaluation for face and construct validity. The experts made amendments on the drafts in terms of appropriate terminology; adequacy and clarity of language. In the course of validating the instrument five (5) items were dropped leaving thirty (30) items.

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Reliability of the instrument

The final instrument made up 30items was subjected to test of reliability using cronbach Alpha method to determine the internal consistency of thequestionnaire which yielded a coefficient of 0.86.

Method of data collection and analysis

The researcher administered the questionnaire with the help of research assistants to the respondents. Five (5) research assistants were used, one from each College of Education. All the 625 copies of the questionnaire were administered and retrieved for analysis. Data collected were analyzed using mean and improvement requirement index (IRI) to answer the research questions.

The following decision rules obtain for performance gap analysis for answering research questions 1: The improvement require by final year NCE students in Colleges of Education in the critical areas of Measurement and Evaluation was determined as follows:

1. The weighted mean for required (X_R) was calculated for each item.

2. The weighted mean for performance (X_p) was calculated for each item (see table 1)

3. The performance gap (PG) was determined by finding the difference between X_R and X_p that is $X_R - X_P = PG$.

Where PG is positive (x), it means improvement is required because the rate at which the respondents could perform the item is lower than the level at which the item is required.

Where PG is negative (-), it means improvement is not required because the rate at which the respondents could perform the item is greater than what is required

Where PG is zero (O), it means improvement is not required because the rate at which the respondents could perform that item is equal to what is required (Olaitan and Ndomi, 2000).

The following decisions rules obtain for level of difficulty for answering research question 2:

1. The weighted mean for required (X_R) was calculated for each item.
2. The weighted mean for level of difficulty (X_D) was calculated for each item
3. The performance (P) was calculated by finding the difference between required and level of difficulty. That is, $X_R - X_D = P$.

Where P is positive (+) it indicates that the item is not completely difficult because respondents could perform at certain minimum level.

Where P is zero, (O), it implies that the item is difficult based on the level of requirement because the respondents cannot perform it at all.

Where P is negative (-), it means the item is very difficult because the respondents appear to be completely ignorant about the item. That is, the expressed level of difficulty by the respondents is higher than the level of requirement.

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RESULTS

Results for this study were obtained from the research questions answered through data collected and analyzed

Research question 1.

What are the topics that involve statistics in Educational Measurement and Evaluation, where Final year NCE Students' knowledge is low and require improvement?

The data for answering research question I are presented in Table I

Table I: Performance Gap analysis and mean ratings of the responses of Final year NCE students on topics that involve Statistics in Measurement and Evaluation, where they require improvement in understanding and mastery.

N =1250

SN	Items	$\overline{X}_R$	$\overline{X}_P$	PG $(\overline{X_R - X_p})$	Remarks
1	Concept of demography	2.85	1.22	1.63	1R
2	Demographic data collection and Analysis	2.94	1.53	1.41	1R
3	Frequency distribution (organization data)	3.25	2.11	1.14	1R
4	Computing mean for ungrouped data frequency	3.65	2.43	1.22	1R
5	Computing mean for grouped data and frequency	2.87	1.15	1.72	1R
6	Computing weighted mean frequency	2.10	2.01	0.09	1R
7	Finding median for ungrouped data	3.61	2.51	1.10	1R
8	Finding median for grouped data	2.94	1.28	1.66	1R
9	Finding mode for ungrouped data	3.92	2.71	1.21	1R
10	Finding mode for grouped data	3.74	1.62	2.12	1R
11	Range	3.41	3.12	0.29	1R
12	Inter quartile range	2.87	1.82	1.05	1R
13	Semi inter quartile range	2.65	2.41	0.24	1R
14	A Table of frequency of one	3.14	3.25	-0.11	I N R
15	Varying frequencies (more than one)	3.42	2.31	1.11	1R
16	Calculating SD for grouped data	2.94	1.28	1.66	1R
17	Calculating SD using Raw-Score formula	3.78	2.19	1.59	1R
18	Calculating the variance measure .	3.86	2.41	1.45	1R
19	Pearson product moment correlation	2.98	1.06	1.92	1R
20	Spearman Rho (row) rank order correlate	3.54	2.13	1.41	1R
21	Simple ranking	3.47	3.84	- 0.37	IN R.
22	Percentile ranking	2.94	2.62	0.32	1R
23	Z – Score	3.16	1.88	1.28	1R
24	T – Score	2.83	1.12	1.71	1R
25	Stanine scores				
26	Test development using test blue print	2.80	1.50	1.30	1R
27	Validity of developed test items.	3.10	3.21	- 0.11	IN R.
28	Split half method of reliability	3.58	1.73	1.85	1R
29	Rulon's method of reliability	3.84	1.42	2.42	1R
30	Kudder Richardson.	2.87	1.54	1.33	1R

Note:-1R, means Improvement required;& INR, means Improvement not required.

Data in table one revealed that the performance gap value of three items 14, 21 and 27, ranged from – 0.11 to – 0.37 and were nagative. This indicated that the respondents do not require improvement for the three items. While the remaining 27 items out of 30 require improvement in understanding and mastery.

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Research question 2.

What are the components of test development process where Final year NCE Students experience difficulty and will require improvement.

The data for answering research question 2 are presented in table 2.

Table 2: performance gap analysis and mean ratings of the responses of final year NCE students on components of test development process, where they experience difficulty and will require improvement.

SN	Items	$\bar{X}_R$	$\bar{X}_D$	PG ($\bar{X}_R$-$\bar{X}_D$)	REMARK
1	Content analysis	2.78	2.76	0.02	Not very difficult I R
2	Review of instructional objectives	3.12	3.74	- 0.62	Very difficult IR
3	Construction of test blue print covering six objectives cognitive domain	3.10	3.60	- 0.50	Very difficult IR
4	Item writing	2.70	3.01	- 0.31	Very difficult IR
5	Face validation	3.83	3.94	- 0.11	Very difficult IR
6	Item review	3.47	3.56	- 0.09	Very difficult IR
7	Trial testing of items. Item analysis for norm referenced test:-	3.62	3.75	- 0.13	Very difficult IR
8	Item analysis for norm referenced test; Item facility /difficulty	3.24	3.27	- 0.03	Very difficult IR
9	Computing Discrimination index.	3.12	3.41	- 0.29	Very difficult IR
10	Computing Distractor index. Item analysis for criterion referenced Item analysis for criterion ref. test:-	2.94	3.00	- 0.06	Very difficult IR
11	Applying its formula: $S = \frac{RA-RB}{N}$	2.88	3.22	- 0.34	Very difficult IR
12	Item selection	3.47	3.31	0.16	Not Very Diff icult. IR
13	Test item assembly	3.10	3.61	- 0.51	Very difficult IR
14	Final testing	3.20	3.22	- 0.02	Very difficult IR
15	Writing test manual	2.80	2.80	0. 00	Very difficult IR
16	Final production	3.54	3.56	- 0.02	Very difficult IR

Table 2: Revealed that two out of sixteen components of test development processes appear to be less difficult for the respondents with positive performance values of 0.02 and 0.16 for items numbers 1 and 12 respectively. The other 14 items had their performance ranged from 0.00 to – 0.02 to -0.62, indicating that the items are very difficult for the respondents in understanding and mastering them. From the general performance all the 16 items were difficult for the respondents in understanding and mastering and therefore, they require improvement in all of them.

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DISCUSSION OF RESULTS

Result of the study in table, revealed that the respondents require improvement in all the thirty (30) items. However, items 14,21 and 27 were not very difficulty, yet they require improvement .Result of the study in table 2, indicated that 14 out of 16 of the test development process components were very difficult for the respondents to understand and master very well, while two items. Numbers 1 and 12 were not very difficult. Therefore, they required improvement in all the items for clearer understanding and mastery. These findings are in agreement with the finding of Nworgu (2003) that student teachers exhibit phobia in statistics, and find it difficult to understand and master.

The findings of the study are also in conformity with the preliminary investigation and interview of the researcher as contained in the literature review that topics on statistics constitute about 60% of the student teachers failure in Educational Measurement and Evaluation. The findings of the authors above give credence to the findings of this study. Impliedly, final year NCE students experience difficulty in the areas of Measurement and Evaluation that involve statistics and in Test Development Process. They require improvement in these areas.

Implications of the study.

The implications of this study is that, it offers the Nigeria Educational Measurement and Evaluators in Colleges of Education the opportunity to improve on their pedagogical skills in teaching those topics that involve statistics in measurement and evaluation ,for the optimal performance of the final year NCE students. Equally, the study provides a platform and insight for measurement and evaluation teachers to allot more time for the teaching those topics with high difficulty indexes.

CONCLUSION AND RECOMMENDATIONS

In the South –East Nigeria, it was observed by the researchers that the final year NCE students of Colleges of Education experience difficulties in understanding and mastery of Educational Measurement and Evaluation, especially those areas that involve Statistics and Test development process. These identified critical areas therefore require improvement. Based on these results, it was therefore recommended that the College of Education management in collaboration with the experts or specialists in Educational Measurement and Evaluation should organize intensive lectures, workshops, seminars and short courses for the final year NCE students in thoses areas under study, in order to upgrade their competencies in Educational Measurement and Evaluation. Equally, Lecturers in measurement and evaluation should give more time in teaching the course , giving special assignments to NCE Students on those critical areas/ topics in the South East Nigeria.

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