INFLUENCE OF TEST ITEMS ON STUDENTS' ACHIEVEMENT IN RESEARCH METHODS AND EDUCATIONAL TECHNOLOGY IN ISA KIATA COLLEGE OF EDUCATION DUTSIN-MA, KATSINA STATE

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Abstract

The study seeks to determine the influence of question type on the achievement of students in Research Methods and Educational Technology. The population size of the study was 2,325 NCE II students of Isa Kaita College of Education Dutsin-ma (2018/2019 session). The survey design was adopted for the study. Simple random sampling was used to select 157 students made up of 80 males and 77 females. Two essay and twenty objectives questions were used to collect data for the study. Three research questions were answered and five hypotheses were tested. The study reveals that students' achievement in objective test items was higher than essay test items in both Research Methods and Educational Technology. The study also showed that there were no gender differences in the use of objective and essay test items across the two courses. Thus, the researchers recommend the use of questions that are appropriately evaluated in the assessment of students.

Keywords: Objective questions, Essays, Achievement test-items.
DOI: https://doi.org/10.35386/ ser.v20i1&2.249

Introduction

The effectiveness of teaching and learning is measured and determined by way of assessment. Assessment of students' achievement is measured through definite questions properly structured to demand certain information. The response of the examinee to the questions is used to determine learners' level of achievement. Questions are a set of statements that are interrogatory in nature and therefore need answers; the answers could be in a short response, sentences, or as provided in multiple-choice options. Kathleen (n.d) defined a question as any sentence which has an interrogative form or function. Questions can also be defined as an instructional signal that seeks to demand information from learners on the content elements of a subject. Kelvin (2012) opined that a question can be defined in terms of the set of statements or assertions that answer it. According to the author, the application of the logic of inference to the set of assertions allows one to derive the logic of inquiry among questions. On the other hand, Greasser, Ozuru and Sullums (2016) identified a good question as one that is evaluated using Bloom's taxonomy that emphasizes recognition, recall, comprehension, application, analysis, synthesis and evaluation as key in question evaluation.

There are different types of questions; hence questions could be essay, objective or sub-objective. An essay test item requires responses composed by the examinee in prose. The responses could be in the nature that no single response or pattern of responses can be listed as correct, and the accuracy and quality of which can be judged subjectively only by one skilled or informed in the subject(Christian, Timothy & Richard, 2002). Allan (1992) affirmed that essay questions can be used effectively for determining how well students can analyze, synthesize, evaluate, think logically, solve problems, and hypothesize. An essay can also show how well students can organize thoughts, support a point of view, and create ideas, methods and solutions. Supporting these views Christian et al (2002), opined that essay questions provide the opportunity to assess higher-order and critical thinking, evaluate students thinking and reasoning, and provides an authentic experience. Essay questions (EQ) are also a sensitive test requiring students not only to recall facts but also to use higher-order cognitive skills. EQ though time-consuming provides a unique evaluation tool particularly suitable for advanced learners (Muryellen, 2015).

According to Kolawole (2005), objectives or multiples–choice questions require students to select the answer from several plausible alternatives. Its objectivity is both in terms of development and scoring as items cover wider curriculum contents and objectives of instruction. But, to Kwantlen (n.d.) objective or multiple-choice question test ability to recall, compare, and contrast information, just as subjective or short-answer questions also require testing recall, comparing and in addition, testing critical thinking skills. Interestingly, objectives questions are adjudged as having a good validity since it tends to cover all aspects of learning content (Lawal, 2001 & Alonge, 2003).

Most often, objectives and essay questions are used in the assessment of students in Educational Technology and Research Methods in Colleges of Education and Universities globally. Because, objective questions are appropriate for measuring knowledge, comprehension and could be designed to measure application and analysis. (Abdel-Hameed, Al-Faris & Alorainy,2005; Shima, Mina & Azedeh, 2016). Moreover, objective questions possess higher reliability, validity, and ease of scoring (Tarrant,& Ware, 2012). Yet, the use of objectives or multiple-choice test items is sometimes contested due to some perceived disadvantages. Though, the use of OQ remains popular due to its reliability, utility and cost-effectiveness (Steven, 2004).

Statement of the Problem

It was observed that the method and type of assessment most often determine the approach of students to learning. Students are inclined to espouse a surface approach when assessment emphasis is on recall of factual knowledge. They are more likely to adopt a profound approach when assessment demands higher levels of cognitive abilities (Mukhtiar, Syeda, Sobia & Nighat 2014). In fact, the approach to learning is a dynamic character and is always modified according to students' perceptions of the learning environment. It has been reported that one of the most important factors influencing students' choice of learning approach is the way assessment is carried out (Struyven, Dochy & Janssens, 2005). This is to say that question type influence learners' achievement and does influence learners' approach to learning. But it is not clear if such influence exists in the use of OQ and EQ when it comes to the assessment of students in Research Methods and Educational Technology. It is not

also clear if there is any influence of question type on students' achievement in schools. More so, there is no sufficient empirical evidence of gender influence on question type used for assessment, thus the need for this study.

Objectives of the Study

The study is aimed at several objectives, but the basic aims are to:

1. ascertain the mean achievement scores of students in objectives and essay test item in Research Methods;
2. ascertain the mean achievement scores of students in objectives and essay test item in Educational Technology;
3. determine the mean achievement scores of students in objectives and essay test items.

Research Questions

The following questions guided the study

1. What are the mean achievement scores of students in objectives and essay test items in Research Methods?
2. What are the mean achievement scores of students in objectives and essay test items in Educational Technology?
3. What are the mean achievement scores of students in objectives and essay test items?

Research Hypotheses

HO_1: There is no significant difference in the mean achievement scores of students in objectives and essay test items in Research Methods;

HO_2: There is no significant difference in the mean achievement scores of students in objectives and essay test items in Educational Technology;

HO_3: There is no significant difference in the mean achievement scores of students in objectives and essay test item

HO_4: There is no significant difference in the mean achievement scores of male and female students in objective and essay test items in Research Methods.

HO_5: There is no significant difference in the mean achievement scores of male and female students in objective and essay test items in Educational Technology.

Research Methodology

The survey design was adopted for this study. The population for the study was made up of 2,325 NCE II students (2018/2019 session) of Isa Kaita College of Education Dutsin-ma, Katsina state. 157 (80 male and 77 females) students were selected using a simple random sampling technique for the study. The entire students were taught Introduction to Research Methods (EDU 214) and Educational Technology (EDU 212)for six periods each, using the lecture method. Three essay questions were set for the students to select any two. 20 objective questions were also structured from the same coverage of the essay test item. The questions were validated by experts from the Department of Psychology and Curriculum and Instruction of Isa Kaita C.O.E.

Dutsin-ma. The two Research Methods questions and Educational Technology questions were scored 10 marks each giving a total of 20 marks for both courses. The 20 objective test items were scored 1 mark each, giving a total of 20 marks. Essay questions were first administered to the students after six weeks of lectures; it was followed with Objective questions administered to the same students after an interval of three weeks from the administration of Essay questions. Mean and standard deviation were used to determine students' achievement while t-test was used to test the hypotheses.

Reliability of the Instruments

The validated instruments were piloted on 40 students selected from the departments of Economics, Arabic, and Technical Education; these departments did not participate in the study. The instruments EQ and OQ for Research Methods and Educational Technology were administered to the students and re-administered after two weeks intervals. The data obtained from the two tests, across the two courses were analysed using Pearson's Product Moment Correlation Coefficient and a reliability coefficient of 0.74, 0.72, 0.70 and 0.81 were obtained for Research Methods EQ, Research Methods OQ, Educational Technology EQ and Educational Technology OQ respectively. These coefficients guaranteed the usage of the instrument.

Results:

Research Question 1:What are the mean achievement scores of students in objectives and essay test items in Research Methods?

Table 1: Mean Achievement Scores of Students in Objective and Essay type of Questions in Research Methods

Question Type	N	Mean	SD
Objective test	157	11.42	1.74
Essay test	157	8.99	1.80

The data presented in table 1 shows students' mean achievement scores in the objective test item as 11.42 and standard deviation of 1.74, the table also presents students' mean achievement scores Essay test item as 8.99 and standard deviation SD of1.80 in Research Methods. The mean scores indicated that objective test items have a high mean score (Mean =11.42) when compared to Essay test items (Mean = 8.99).

Research Question 2: What are the mean achievement scores of students in objective and essay test items in Educational Technology?

Table 2: Mean Achievement Scores of Students in Objective and Essay Type of Questions in Educational Technology

Question Type	N	Mean	SD
Objective test	157	9.97	1.82
Essay test	157	8.65	2.45

The data in table 2 shows students' achievement mean scores of objective test items as 9.97 and SD 1.82. Essay test item achievements mean scores were 8. 65 and SD

2.45, the scores show a slight difference between the scores of objective test items and Essay test items in favour of objective test items in Educational Technology.

Research Question 3: What are the mean achievement scores of students in objectives and essay test items?

Table 3: Mean Achievement Scores of Students in Objectives and Essay Question Types

Question Type	N	Mean	SD
Objective test	157	10.70	1.23
Essay test	157	8.82	1.58

Table 3shows the objective test mean achievement was 10.70 and SD 1.23 while the Essay test mean was 8.82 and SD of 1.58; students' achievement in the objective test is higher when compared to essay test mean scores.

Hypotheses

HO_1: There is no significant difference in the mean achievement scores of students in objectives and essay test items in Research Methods

Table 4: t-test Analysis on Mean Achievement Scores of Students in Objectives and Essay Test item in Research Methods

Question type	N	Mean	t	Df	Sig	Decision
Objective test	157	11.42	6.379	156	0.000	Significant
Essay test	157	8.99				

Table 4 shows that t-value of 6.379 was significant at 0.05 level of significance because the probability value of0.000 was less than 0.05 level of significance, hence the null hypothesis was rejected, indicating that there was a significant difference in the mean achievement scores of students in objective test item and essay in Research Methods.

HO_2: There is no significant difference in the mean achievement scores of students in objectives and essay test items in Educational Technology

Table 5: t-test Analysis on Mean Achievement Scores of Students in Objectives and Essay Test Item in Educational Technology

Question type	N	Mean	t	Df	Sig	Decision
Objective test	157	9.97	17.020	156	0.000	Significant
Essay test	157	8.65				

Table5shows that the t-value of 17.020 was significant at 0.05 level of significance because the probability value of 0.000 was less than 0.05 level of significance, thus the null hypothesis was rejected, indicating that there was a significant difference in the mean achievement scores of students in objective test item and essay test item in Educational Technology.

HO_3: There is no significant difference in the mean achievement scores of students in objective and essay test item

Table 6: t-test Analysis on Mean Achievement Scores of Students in Objective and Essay Test Item

Question type	N	Mean	t	Df	Sig	Decision
Objective test	157	10.70	15.181	156	0.000	Significant
Essay test	157	8.82				

Table 6 shows that the t-value of 15.181 was significant at 0.05 because the probability value of 0.000 was less than 0.05 level of significance, thus the null hypothesis was rejected, meaning that there is a significant difference in the mean achievement scores of students in objective and essay test item.

HO_4: There is no significant difference in the mean achievement scores of male and female students in objective and essay test items in Research Methods

Table 7: t-test Analysis on Mean Achievement Scores of Male and Female Students in Objective and Essay Question Types in Research Methods

Question Type	Gender	N	Mean	T	df	Sig	Decision
Objective test	Male	80	11.33	-0.699	155	0.486	Not significant
	Female	77	11.52				
Essay test	Male	80	8.75	-1.693	155	0.093	Not significant
	Female	77	9.23				

NS – Not Significant ($p > 0.05$)

Data in Table 7shows that the t-value of-0.699 has a probability value of0.486 for OQ and the t-value of -1.693 has a probability value of 0.093 for EQ. These probability values are higher than 0.05 level of significance, thus the null hypothesis was accepted. Hence, there is no significant difference between the mean achievement scores of male and female students' achievement in objective and essay test items in Research Methods.

HO_5: There is no significant difference in the mean achievement scores of male and female students in objective and essay test items in Educational Technology

Table 8: t-test Analysis on Mean Achievement Scores of Male and Female Students in Objective and Essay Question Type Educational Technology

Question Type	Gender	N	Mean	t	df	Sig	Decision
Objective test	Male	80	10.01	0.266	155	0.790	Not significant
	Female	77	9.94				
Essay test	Male	80	8.43	-1.174	155	0.242	Not significant
	Female	77	8.88				

The data in Table 8 shows that the t-value of0.266 has a probability value of0.790 for the objective test item and the t-value of -1.174 has a probability value of 0.242 for the essay test item. These probability values are higher than 0.05 level of significance,

thus the null hypothesis was accepted. Hence, there is no significant difference between the mean achievement scores of male and female students' achievements in objective and essay test items in Educational Technology.

Discussion

The study revealed that students achieved higher in objectives test than essay test based on the mean achievement scores of students in Research Methods (OQ Mean= 11.42 and EQ Mean =. 8.99). Students' achievement in Educational Technology was also high in favour of the objectives test (OQ Mean = 9.97 and EQ Mean = 8. 65). This study is in agreement with Igbojiwaekwu (2015) who studied the effectiveness of guided multiple choice objective questions on students achievement in senior school Mathematics by school location and affirmed that multiple-choice objectives questions in Mathematics influence the achievement of students. The higher achievement obtained from the objectives test item could be attributed to the structure of the questions, kind of options provided, subject matter and the chances of guesswork. More so, the low achievement in essay tests could also be traceable to the demand and task of giving detailed information to the essay question. Hypotheses 1,2 and 3 were tested and rejected meaning that there is a significant difference in students' achievement in objective test items and essay test items in Research Methods and Educational Technology in favour of objective test items. However, the study is in disagreement with Enja and Ikeh (2016) whose study analyzed school type and test item format on students' achievement in Financial Accounting and stated that test item does not in any way influence students' achievement in accounting.

The result of hypotheses 4 and 5 indicated that objective and essay test items are gender-friendly, Research Methods recorded a t-value of -0.699and a probability value of 0.486 for objective test and t-value 1.693 with a probability value of 0.093 for an essay test. Educational Technology recorded a t-value of 0.266 with a probability value of 0.790 objective test and t-value of -1.179 with a probability value of 0.242 for an essay test, meaning that there is no significant difference between male and female achievement in objective test item and essay test item across Research Methods and Educational Technology. The findings of this study are in support of Mbaba, Bakori & Jimoh (2018) who investigated students' perception, the impact of test types and gender on their performance in Educational Technology and found that test types does not influence gender. This proved that the type of questions set by the examiners does not influence learners achievement based on their gender.

Conclusion

The study has shown that students do better in the objective test; it also revealed that the differences in objective tests and essay tests are not driven by gender or subject matter. Thus, it could be associated with the learning approach adopted by the learners and teachers, and the provision of options that gives chance to the examinee to guess answers in objectives questions.

Recommendations

Based on the findings from this study, the following recommendations were made;
Objective questions should be properly structured and evaluated before use.

The use of objective test items should be encouraged because it ensures adequate coverage of contents in assessment. It also enables the assessment of all aspects of learning.

Objective test items should be prepared with tips that can ensure students guess of answers are made impossible.

The combination of essay and objectives questions in assessment should be much more encouraged, based on the fact that it gives room for learners to make choices or have the option of doing well from the type of questions that appease them, thereby improve learners' performance.

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