
ITEM KEYS POSITION: A DETERMINANT OF STUDENT'S ACHIEVEMENT

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Abstract

This study aimed at determining how the position of item keys can influence the student's achievement. Two research questions were generated and answered for the purpose of the study and two hypotheses were formulated and tested. The sample comprised of one thousand (1000) S.S.3 students drawn through simple random sampling from public schools in Lagos State. The instrument used for data collection was a 50 – itemed multiple choice test on English language. Kuder – Richardson technique was used in determining the internal reliability coefficient of the instrument to obtained 0.85. The data collected were analyzed using percentage, chi-square and Z – test. All hypotheses were tested at 0.05 level of significance. The result of the study showed that the proportion of students who chose the various options of A,B,C,D and E when the key was at any of the options were significantly different. Based on the findings, some recommendations were made including that test constructors should vary the placement pattern of the key in any test items.

Increased criticism of the quality of educational products, as well as the teaching – learning methods employed in schools and colleges have made it necessary more than ever before to be concerned with valid and reliable measures of educational products.

As many writers have pointed out, much of the responsibility for improving the society has been placed squarely on the shoulders of educators. Seemingly for every existing social ill, there exists someone who strongly advocates that the responsibility for the solution lies with education.

One of the important ways of generating a reliable information for such decision making is by the use of test. Inaccuracies in scoring a test paper, health, motivation, degree of fatigue of the student and guessing, tend to cause variation in test scores. Similarly, other variables like ambiguity of items, misleading languages in test item, difficulty level of the test, improper pattern of key placement may also contribute to variation in test scores. Dececco (2008) has pointed out that failure to prevent cheating with respect to key placement may have serious deleterious effects on student

test scores: (1) when cheating occurs with impunity, honest achievement goes unrecognized or unpunished and reduces student's motivation to achieve. (2) There is no way to assess validly or reliably what the student has or has not learnt. (3) Ingenuity in devising ways to cheat becomes more important than attainment of the instructional objects. Students sometimes guess when unnecessary clue has been given by the examiner in the key placement format adopted in the test. When the clue is given in the next or proceeding question or when the answer is made longer than the others, students will want to guess so as to get more scores. When students have no idea of the correct answer, they tend to distribute their choices with about equal frequency among all options. However, there have been a number of suggestions as to how the key should be written and arranged so as to avoid guessing or giving the answer cheaply to test-wise students. In order to avoid these pitfalls, Sax (2009) suggests that the placement of the correct options in a multiple – choice or true false objective test must be varied. He went further to say that students who are uncertain of the correct answers tend to select the middle options and avoid the responses in the extreme positions. Unfortunately, many test constructors also select the center options as the correct one and thus give answers away easily. Item keys refer to the correct answer or response in any items, while the incorrect answer or responses in the items are called foils or destructors (Onunkwo 2002). Consequently, the question that follows is, what effect will the item arrangement and specifically the position of the keys among the options within a test have on test scores. The problem of this study therefore is how do the positions of item keys in the multiple – choice objective test format influence students' achievement.

Purpose of the Study

The purpose of this study is to determine the influence of item key positions in a multiple – choice objective test on student's achievement. Specifically, the researcher will:

1. Determine the proportion of students who chose the various options of A, B, C, D and E.
2. Ascertain the extent at which the proportion of male and female students can be influenced by the position of the keys.

Significance of the Study

The prime importance of test and scores is to elicit and provide useful information about individuals which can be used for placement, promotion, certification, guidance and counseling of such individuals. It is therefore hoped that the findings of this study will be of immense help to professional test constructors, classroom teachers and guidance counselors to identify appropriate approach to key placement during the construction of test. Also examiners both internal and external will find the results of the study useful particularly in their efforts to identify and reduce guessing, including all forms of malpractices in the examination. The results of this study will help item writers to identify and evolve appropriate strategies in key placement, so as to improve the quality of tests, avoid giving unnecessary clue to test-wise students, since all these would affect the reliability of the test scores.

Scope of Study

The study concentrates on multiple-choice objective test items in English Language.

Research Questions

The following research questions guided the conduct of this study:

1. What proportion of the students chose the various options of ABCD and E?
2. To what extent can the proportion of male and female students be influenced by the position of the key?

Hypotheses

The following null hypotheses (H_0) testable at 0.05 level of significance were formulated in order to make decision on the issue investigated:

1. There is no significant difference in the proportions of students who chose the various options of ABCD and E when the key is in them.
2. There is no significant difference between male and female students when the key is at any of the options.

Research Design

The study adopted a survey design aimed at finding out whether item key positions in a multiple-choice objective test has any influence on the test scores of the students.

Area of Study

The area of the study was Lagos State which consists of 20 local Education Districts.

Population

The population of this study comprises all the S.S 3 students in all the public secondary schools of Lagos State.

Sample and Sampling Techniques

The sample comprises of one thousand (1000) S.S.3 students. This was drawn through simple random sampling. To get proper representation in the sample, cluster sampling method was used to select the schools. One school per local Education district was randomly chosen. This amounted to twenty (20) secondary schools that were used. Fifty (50) students from S.S 3 comprising of 25males and 25 females were randomly selected from each schools.

Instrument for Data Collection

The instrument used for data collection was a 50 – itemed multiple choose objective test on English Language. Each item contains five (5) options ABCD and E. The items for the test were taken from past WAEC Senior Secondary School Certificate Examination (SSCE) questions on English Language. The test items were arranged in

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ascending order of difficulty and each of the options contain one key at scattered positions in the test.

Method of Data Analyses

The data collected were analyzed using percentage, chi-square and z-test. All hypotheses were tested at 0.05 level of significance.

Results and Discussion

The results of the findings are presented in the tables below:
The proportion of the students that chose various option of ABCD E when the key was in them are shown in tables 1 and 2.

Table 1: Distribution of Students Who Passed or Failed the Test When the Key was in any of the Options Indicated.

Options	Pass	Fail	Total
A	7760	2240	10 000
B	6400	3600	10 000
C	70 20	29 80	10 000
D	66 40	33 60	10 000
E	59 60	40 40	10 000
Total	33 780	16 220	50 000

Table 2: Proportion of Students Who Passed or Failed the Test When the Key was in any of The Options Indicated Against It.

Options	Proportion of Pass	Proportion of Fail	Total
A	77.6%	22.4%	100%
B	64.0%	36.0%	100%
C	70.2%	29.8%	100%
D	66.4%	33.6%	100%
E	59.6%	40.4%	100%

The porportion of male and female studetns influenced by the position of the keys are reflected in tables 3 and 4.

Table 3: Distributions of Male and Female Students Who Passed the Test When the Key Was in Any of the Options.

Options	Male	Female	Total
A	3290	3840	7760
B	3220	3180	6400
C	3620	3400	7020
D	3420	3220	6640
E	3140	2820	5960

Table 4: Proportion of Male and Female Students Who Passed the Test when they Key was in any of the Options.

Options	Proportion of Male	Proportion of Female	Total
A	50.5%	49.5%	100%
B	50.3%	49.7%	100%
C	51.6%	48.4%	100%
D	51.5%	48.5%	100%
E	52.7%	47.3%	100%

Hypotheses Testing

Two hypotheses were stated and tested. The results of the findings were presented as follows.

Hypothesis One

The null hypotheses states that there is no significant difference in the proportions of students who chose the various option of A,B,C,D,and E when the key is at any of the options. The hypothesis was tested with chi-square at 0.05 level of significance and the results obtained summarized in table 5.

Table 5: Chi-Square Tests for Proportion of Students Who Chose Various Options.

Options	O	E	O-E	(O-E) ²	(O-E) ²	
A	776	675	101	10201	149.20	S
B	640	675	-35	1225	18.76	S
C	702	675	27	729	10.32	S
D	664	675	-11	121	1.99	NS
E	596	675	-79	6241	93.79	S
Total	3378	3378			276.06	

$X^2 - \text{Critical} = 9.4877$

A critical observation of x^2 when the key was in option A (149.20), B (18.76), C (10.32) and E (93.79) are respectively higher than the critical value of x^2 at 0.5 alpha level (9.4877). This implied that the proportions of students who chose each options that contained the key were significantly different. The reverse of this was obtained in option D where the x^2 calculated value 1.99 was less than the critical x^2 value (9.4877). Here, the proportion of students who chose D when the key was at option D was not significantly different.

Hypothesis Two

The second hypothesis which states that there is n significant difference between the proprtions of male and female students when key is at any of the options, was tested with z – test and the results obtained were summarised in table 6.

Table 6 – Test for Proportion of Male and Female Students Who Chose the Key When Placed At any of the Options.

Options	Freq. of male	Freq. of female	Prop of male	Prop. Of female	No of male	No of female	9 level	Std. error	2 cal.	Z critical	Decision at P.05
A	3920	3840	0.784	0.768	5000	5000	0.05	0.0083	1.928	1.96	NS
B	3220	3180	0.644	0.636	5000	5000		0.0096	0.833	1.96	NS
C	3620	3400	0.724	0.680	5000	5000		0.0091	4.835	1.96	S
D	3420	3220	0.684	0.644	5000	5000		0.0094	4.255	1.96	S
E	3140	2820	0.628	0.564	5000	5000		0.0098	6.531	1.96	S

The data of table 6 expressed that the calculated values of z in A (1.928) and B (0.833) were respectively less than the critical value of Z (1.096) at 0.05 alpha level.

The implication of this was that proportions of male and female students that chose options A and B when the key was there, were not significantly different. The data also reveal that the calculated z in option c (4.835), D (4.255) and E (6.531) were significantly higher than the critical value of Z (1.96) at 0.05 alpha level. This implied that the proportions of male students who chose each of the options C,D,E, respectively were significantly higher than that of their female counter part.

Discussion of Findings

The result of this study showed that the proportion of students who chose the various options of ABCDE when the key was at any of the options were significantly different. The first hypothesis which states that there is no significant difference in the proportion of students who chose the various options ABCDE when the key is at any of the options was rejected. This was because of some reasons.It could be because some of the students guessed. Though the items used were mainly simple expressions in English Language which can easily be understood, yet many of the students still believed that the correct answers in multiple choice objective tests are always placed on a particular option. This idea could have arised from their previous experience on how their class teachers do position the keys in their teacher made test. To some, options A and C usually carry the key while other options rarely carry the correct answer. This view is similar to the view of Marso (2010) that in 4-options multiple-choice tests, there is a tendency for the correct answers to appear more frequently in the second (options B) and third (option C) positions than in the first (option A) and last (option D). Another reason was that, the plausibility of the distractors did not allow given away the correct answers easily to those that love guessing or the test-wise students. However, Onunkwo (2000) have suggested that a student is expected to get the correct answer to a test question only because he has learned the materials.

Hypothesis Two

The second hypothesis which states that there is no significant difference between the proportions of male and female students when the key is at any of the options, was tested with z-test and the results obtained were summarized in table 6.

The findings also showed that the second hypothesis which dealt with the proportion of male and female students that chose each option has no significant difference in option A and B. This could be explained that gender difference does not always have significant influence on the performance or academic achievement of the students.

This finding is in line with the findings of Nwagbo (2010) who reported no significant gender difference on the level of the scientific literacy of science students. Another reason for no significant gender related difference in the proportion of male and female students, who chose options A and B could be because the two sexes held the opinion that the key is usually placed in the first and second positions.

This also agree with Rowley (2009) that says some teachers like to place the correct answer in the first or second position.

Conclusion

From the findings, the following conclusions were drawn:

1. Generally, there was significant differences in the proportion of students who chose the various options when the key was placed on them. This indicates that the position of the key in any of the options have significant influence in the scholastic achievement, through there may be some slight differences in number of students choosing each of the options. Any where the key is positioned, so far the student has the mastery of the content he would to able to locate the key.
2. That, there was no significant difference in the proportions of males and females in options A and B, while there were differences in options C,D and E between male and female students was just an indication that gender has no significant influence in the choice of correct answer to a question and scholastic achievement.

Implication of the Findings

The findings have implications for class teachers, professional test constructors and guidance counselors.

For class teacher, the result will enable him to adopt appropriate method of placing item keys in the multiple choice objective test, when setting his test so as to

avoid giving unnecessary clue to test-wise students or giving away the answer to them cheaply.

For the guidance counselor, the proper placement of item keys will perform diagnostic function, since it will enable him to know the actual performances of the students.

Recommendations

Based on the findings and conclusion, the following recommendations have been put forward:

1. Teachers and test constructors should vary the placement pattern of the key in any test items.
2. They should avoid giving unnecessary clue that will make the answer very cheap for the examinee.
3. Test constructors should make the distracters plausible and functioning in the test items.
4. Teachers should make sure that they teach their subject effectively and avoid ambiguity so that guessing of answers will be reduced.
5. Teachers should attend seminars on how to write test items especially objective test-multiple choice type.
6. Teachers should discourage students from guessing and cheating during examinations since this idea will not reveal their strength and weakness in their academic performance.

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