

## DIFFERENTIAL ITEM FUNCTIONING ON STUDENTS PERFORMANCE IN SOCIOLOGY OF EDUCATION SCHOOL EXAMINATION ITEMS

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### Abstract

*The study investigated Differential Item Functioning on Students Performance in Sociology of Education Test Items in tertiary Institutions in Lagos State. Two hypotheses were formulated to guide in this study. Descriptive research Design was used for this study. A sample of 1,434 students was sampled for this study through purposive sampling technique. Gender and College (Location) were the two criteria in which the samples were grouped. A 60-items Teacher Made Multiple Choice Examination Items on Sociology of Education was used to generate data as content and face validity was ascertained by two experts in educational measurement and Evaluation, University of Benin. With Cronbach alpha reliability form,  $r=0.879$ , meaning internal reliability was met. The data was analysed using excel and SPSS Version 24 packages tested at 0.05 level of significance. The study revealed that items in Sociology of Education Multiple Choice test items do not significantly function differently by gender and college (location) respectively. Among others the study recommended that test experts should employ the use of Item Response Theory when developing a valid, reliable and usable test.*

**Keywords:** Sociology of Education, IRT, DIF, Performance, Skills, Values

### Introduction

Sociology of education makes contributions to the understanding of an important institution present in every society. Sociologists have also identified educational differences, inequality, poor performances, involvement in vices and corruption as possible activities that are found in societies and families where competition is prevalent. It should be noted that professional hierarchies and models of social mobility are surprisingly similar in all industrial societies". As education and participation in society expand, the effect of social background weakens slightly, but this weakening can be different for students in different fields of study in higher institution thereby bringing about a differential in schooling activities and possible involvement in sensitive fraudulent acts in the school system (Oyeyemi, 2019).

With the emergence and springing up of different public-private tertiary institutions in the country to meet the yearnings of the teeming youths with respect to addressing admission capacities into tertiary institutions, there is the need to also educate these youths on how to live and interact effectively when finally admitted to study. One of the ways to educating these students is exposing them to sociology of education. The course remains one of the compulsory an important course taught at the undergraduate level in all tertiary institution in Nigeria. The National University Commission, NUC, designed this course to be taught to new students especially in their first year due to their envisaged interaction with other students in a larger group. Sociology of education seeks to address and manage how humans interact in a group and living a conflict free life irrespective of one's different background. Hypothetically, Sociology of education is the study of how public institutions and individuals experiences affect education and its outcome. It is mostly concerned with the public schooling systems of modern industrial societies including the expansion of higher, further adult and continuing education (Spade, 2014).

In education students' success is established through test or examination. A good test consists of items or set of items presented to an individual or set of individuals to whom they are expected to respond under specific

conditions with the intent to determine the extent to which such trait is present or absent in the respondents (Somwung, Samphan and Tan (2018). A test is supposed to measure examinees ability or other traits irrespective of certain factors like gender, geographical locality, social status and others. A test with differential functioning items distorts the meaning of test results and the decision that is based on it for some groups.

Systems of educational assessment and accountability have been in existence for centuries. However, the intent of such assessment has changed considerably in the past 30 to 40 years. Early accountability systems held students or applicants for admission accountable for their learning through the use of graded examinations. In the early years of the 20th century, the testing of students served another function as a diagnostic tool to inform teachers of student deficiencies that were in need of remediation or enhanced instruction. While these earlier roles for accountability persist, new purposes emerged during the last few decades of the 20th century; these coincide with significant changes in economic and political relations among nations. Testing in its current usage frequently serves as an indicator of the quality of the educational system and its professional practitioners. Test score outcomes are used to judge whether to close schools and replace personnel at the school level, and to judge the adequacy of a national workforce.

In the context of test, Differential Item Functioning occurs when people from different groups with same ability have systematically different responses to specific test items. DIF is concerned with ability of test takers. Madu (2012) see DIF as a collection of statistical methods that gives indication of items that are functioning differently for different groups of students. In a classroom test where Sociology of Education items were administered and boys display a higher likelihood of answering correctly items than their female counterpart with the same ability level because the content in the questions are biased against females, one can conclude that the items exhibit DIF and should be considered for either modification or removal from the data set. One of the qualities of a good test is that it should not be biased to testees in any way or form. DIF occurs when individuals at the same level on the traits or constructs have being assessed but from different sub-population that have unequal probabilities of attaining a given score on the item.

In determining DIF of a test, gender, location, nature of school, socio economic status among other classified groups are often investigated by test experts. Ogbemor and Onuka (2013) investigated that items are biased using DIF approach in relation to location. The findings showed that out of 60 items in NECO examinations, 10 items were biased in relation to school type and 8 items in relation to school location. In a similar study conducted by Adedoyin (2010), he observed that there exists a significant difference in the performance of students from rural and urban schools with respect to their academic achievement. It went further to conclude that students from urban schools were more superior when compared to their rural counterparts. An investigation into DIF of Tests conducted by WAEC and NECO examination bodies in Nigeria was carried out by Obinne & Umobong (2013). Surprisingly, their findings revealed that there was no difference in the DIF of items from the two examination bodies, meaning both examination items are close substitutes.

The existence of bias is an issue to be addressed because tests are used as a gatekeeper for educational opportunities and it is very important that test items are fair for every examinee of the same ability level. Researchers in gender bias have been carried out across different countries. Siamisangand (2012) carried out an analysis of gender biased DIF in 2007 TIMSS examination among students from Botswana, Singapore and USA. Through the analysis it was discovered that there were very few mathematics and science items which functioned significantly different for male and female students from these three countries. In Madu (2012) analysis of Gender-Related DIF in Mathematics Multiple Choice Test Items, it was revealed that male and female students functioned differently in 39 items and no DIF in 11 items. Adeosun (2013) carried out a study on DIF in 2012 Unified Tertiary Matriculation Examination (UTME) Mathematics with respect to gender and location. The outcome showed that items in Mathematics test administered by JAMB functioned differentially between male and female examinee in favour of male students.

No doubt from the above summation one can allude that many empirical studies have been executed on Standardised tests and this is so because of the large population involved in taking such a test and validation

process needs to be determined before such a test can be administered to the heterogenous population, meanwhile little or nothing have been done on teacher made test with respect to DIF (Udofia, et al. 2020). In tertiary institutions where Sociology of Education, a compulsory course taken at the faculty level have been conditioned to be presented in Multiple choice format, there is also the need to determine the DIF level of the items. Constructing a good Sociology of Education test (Teacher Made Test) requires expertise and skills owing that Sociology of Education comprises of Sociological concepts and principles in line with educational paradigms. *Values, globalization, acculturation, ICT, behaviourism (Deviant) and Psycho- sioness, communal living, religion and other sociological constructs are veritable areas where issues of education can be addressed* (Oyeyemi, Adeyemo and Udofia, 2019). Sociologists are always out to address challenges that are designed to Thwart academic achievement in classroom that is why it very important to determine DIF of the items constructed for examination in our tertiary institutions.

### Statement of Problem

During classroom interaction and teaching, Sociology of Education course always seems innovative, interactive and comes with lots of revelation due to the contextual nature of the course, however, during examination exercise students performance in same course keep dwindling and the institution keeps recording annual increase in the failure rate which is often characterised with why these students always indulge in examination malpractices in our tertiary institutions. If this malady is not swiftly nipped in the bud, there is every tendency that poor academic performance will persist for so long in our ivory towers. Scholars have identified that several sociologists have done series of tasks on standardised items but little or no study have been conducted on Teacher Made Test, hence the importance to note how good the test items constructed, preciseness, difficulty index, specific or objective enough, relevant, discriminatory among others. Hence the study was out to investigate determination of DIF on students' performance in Multiple Choice Sociology of Education test items in Lagos State Tertiary Institutions.

### Objectives

- To investigate if Sociology of Education Multiple Choice Test items Function Differently with respect to gender.
- To identify how Sociology of Education Multiple Choice Test items Function Differently with respect to College (location)

### Hypotheses

- Items in Sociology of Education Multiple Choice Test do not significantly function differentially between male and female students.
- Items in Sociology of Education Multiple Choice Test do not significantly function differentially by College (location)

### Methodology

Descriptive research design was used in this study. The population comprised of 3,250 Undergraduate students in tertiary institutions of Lagos State. A target population of 100 level undergraduate students offering education courses in the institution was captured for this work. A sample of 1,434 respondents was selected for this work. Male students were classified into focal group and female reference group; Students from College of Specialised and Counselling Psychology were classified into focal group and those in College of was used to selected respondents suited for this research. The instrument used for data collection is a 60-item Objective Multiple Choice Sociology of Education Test. This instrument was developed and designed by a team of three academics teaching the course across the two colleges. With the aid of test blueprint, the items were well developed. The instrument was validated by the Head of Department and other Sociologists. After removal and modification of unwanted items, a clean copy was obtained and both content and face validity was ensured. A reliability index of 0.879 was obtained through the use of Cronbach Alpha, a reliability type. The formula for calculating the area index of 2PL model by Raju (1988) was used in

conjunction with Microsoft excel and SPSS version 24 packages to estimate the item difficulty and discrimination for each item. With this it was used to determine items that flagged DIF using Chi-square statistics at 0.05 level of significance.

### Testing of Hypothesis

#### Hypothesis One: Item in Sociology of Education Multiple Choice Test do not significantly function differentially by gender

Table 1: Chi-square Summary of DIF functioning by gender

Gender	Items favoured due to DIF	Df	Chi-square	Sig.
Male	19(21)	1	0.482	0.769
Female	23(21)			
Total	40			

Table 1 shows a chi-square value of 0.482 and p-value of 0.769, testing at an alpha level of 0.05. Since the p-value is greater than the alpha level of 0.05, the null hypothesis is therefore retained and the conclusion is that items in Sociology of Education Multiple Choice test items do not significantly function differently by gender.

#### Hypothesis Two: Item in Sociology of Education Multiple Choice Test do not significantly function differentially by college (location)

Table 1: Chi-square Summary of DIF functioning by gender

Gender	Items favoured due to DIF	Df	Chi-square	Sig.
COSPED	15(18.5)	1	1.512	0.743
COHED	22(18.5)			
Total	37			

- ❖ COSPED.....College of Specialized and Primary Education.
- ❖ COHED.....College of Humanities Education

Table 2 shows a chi-square value of 1.512 and p-value of 0.743, testing at an alpha level of 0.05. Since the p-value is greater than the alpha level of 0.05, the null hypothesis is therefore retained and the conclusion is that items in Sociology of Education Multiple Choice test do not significantly function differently between students in COSPED and COHED..

### Discussion of Findings

Hypothesis one revealed that items in Multiple Choice Sociology of Education test items do not significantly function differentially by gender. The outcome of this work is in consonance with that of Siamisang and Nenty (2012) who disclosed that only four mathematics items and four science items flagged DIF between male and female. Although the DIF detected did not significantly function differently among boys and girls respectively. Here it was disclosed that gender was never a contributory condition to performance rather emotional state of the individual, maturity and motivation were identified as drivers that had the possibility of indicating differential Item Functioning.

Hypothesis two shows that items in Sociology of Education Multiple Choice test do not significantly function differently between students in COSPED and COHED. This study reaffirmed the findings of Obinne, Nworgu and Umobong (2013) who disclosed that there is no significant difference in the DIF of items from WAEC and NECO examination bodies in terms of location of the examinees. It goes to affirm

that students in different colleges sited in different locations has nothing to do with their ability level. The ability to perform well in the test may be attributed to readiness to study, teaching methodology of the teacher and even examination phobia which often arises during exposure to examination condition.

### ‘Conclusion

The dynamic that surrounds standardized test differ from that of teacher made test. As a principle of necessity, teacher made test can also have some attributes of standardized test when the structured items are further pilot tested and validated in order to determine the psychometric properties of such a test. From the study it can be concluded that:

- Teacher made Multiple Choice Sociology of Education Test items do not functionally differ by gender.
- Teacher made Multiple Choice Sociology of Education Test items do not functionally differ by college (location).

### Recommendations

Before DIF can be determined on a test, item analysis should have been undertaken. The study among others recommended that:

- Only students who are emotional stable, matured and intrinsically motivated should be encouraged to advance to tertiary institutions.
- Test experts should employ the use of Item Response Theory when developing a valid, reliable and usable test.
- Further studies should be undertaken to condition other test practitioners to determine DIF on other teacher made tests in tertiary institutions.

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