TOPIC PREFERENCE OF SENIOR SECONDARY SCHOOL MATHEMATICS STUDENTS: THE ROLE OF GENDER

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ABSTRACT

This study investigated the topic preference of Senior Secondary School Students in mathematics and the role gender plays on their preferences. Six hundred and forty Senior Secondary School II students selected through multi stage sampling were used. They provided data on their preferred topics in mathematics by giving positions to the nine major mathematics topics in the Senior Secondary School Syllabus. They equally indicated their gender. The data collected was analyzed using descriptive statistics (frequency, cross tabulation) Chi – square test was also used to test the impact of gender on student topic preference at the 0.05 level of significance.Number and Numeration, Algebraic process and Statistics were found to be most preferred Mathematics topics while Bearing, Probability and Mensuration are most disliked mathematics topic among Senior Secondary Students. Male and female studenst are found to be different in their preference for mathematics topics. It was also found that many male preferred Number and Numeration, Algebraic process, Mensuration and construction than their female counterparts whereas many female students preferred Plane geometry, Trigonometry, Bearing, Statistics and Probability than male students. Based on the finding of this study, it was recommended that mathematics teachers should organize various result oriented classroom activities, initiate strategies and innovations especially on the topics identified as disliked mathematics topics that will boost interest of their students. School counselors also should make use of these findings especially the gender impact on the students' preferences for mathematics topics to assist students overcome the dislike they have for some mathematics topics.

Background of the study

Mathematics is a useful tool in the society, more so in the present technology age. No Wonder Mathematics is a compulsory subject at primary and secondary school levels, though, not all the students are expected to become Mathematicians, but because of its application in everyday life (Oladele, 2004). For a person to be able to function very well within his immediate environment, the knowledge of rudimentary mathematics is very necessary. Babalola (1991) corroborated this view by saying that mathematics is a basic tool in the development of science based knowledge such as technology, industry and even for sound analytical reasoning in daily living in a modern society such as ours.

All over the world, science has been accepted as a vehicle of technology, social and economic development (Ogunbanjo, 1988). Mathematics is not only basic to these but is the language of science. Because of its importance, mathematics is a subject that students in secondary schools have to be taught at least four times a week. This is to ensure that students have adequate mastery of the subject. Despite the importance attached to mathematics, students tend to perform poorly in the subject at all levels of educational system. There is need therefore, to find out which topics in Mathematics that Students like and those they dislike if they are to be helped.

The West Africa Examination Council Chief examiners' reports 1997,1999 & 2000 revealed candidates' areas of weakness and strength in Mathematics. According to these reports, candidates showed likeness for numerical statistics, algebra and algebraic processes, the four arithmetic rules, logarithms and its applications. Adeleke (2007) also reported that Bearing is one of the difficult mathematics topic among senior secondary school students. Candidates' likeness for these topics could be attributed to their understanding of the topics among other factors. Hence , candidates performed better in those topics than Geometry, Trigonometry and Probability (WAEC Chief examiners' reports 1997,1999 & 2000). Areas of candidates' weakness and strength are not unconnected with the preference students have for some topics in mathematics at the expense of other ones. If truly, students prefer some topics in mathematics to other ones, are their preferences gender biased?

Girls show less confidence in their ability to learn all subjects than boys do (Matsui & Ohnishi, 1990) and are less willing to approach new mathematics material. Girls are less confident about future mathematics performance: when predicting future grades in mathematics, girls are less optimistic than boys of equal ability (Tapasak, 1990). Even when they are successful in school, girls' confidence often remains low (Meyer &

Koehler, 1990). This may equally affect them on the preference they have for topics in Mathematics by considering efforts some of these topics may demand. This lack of confidence may be part of the reasons girls take fewer mathematics oriented subjects than boys, a pattern that begins in high school and continues throughout college (Wilson & Boldizar, 1990).

Over the past decades, the topics of gender equity and gender differences have been raising issues in education (Sprinthall, Sprinthall, & Oja, 1994). Boys and girls are known to learn differently even though they sit in the same classroom, read the same textbook, and listen to the same teacher (Sadker & Sadker, 1994a,). This indicate that gender affects the educational experiences of many students in today's educational world. Honey, Moeller, Brunner, Bennett, Clements, and Hawkins (1991) found that females and males perceive Mathematics related topics in distinct manners. They concluded that girls view Mathematics oriented fields as embedded in human interaction whereas boys view them as extensions of their power. These views seem to be related to the preference students have for some topics in Mathematics while in Secondary School. Based on this background, this study sought to assess the impact of gender on students' preference for Senior Secondary Mathematics topics. Findings from this study will provide empirical data needed by educational planners, programme evaluators and school counselors to assist students in some mathematics topics they dislike, in order for both boys and girls improve on their performances in mathematics.

Statement of Problem.

This study sought to find out like or dislike topics in Mathematics among Senior Secondary School Students. It also aimed at finding out empirically how significant is the impact of gender on the topic preference of students in mathematics.

Research Questions

1. What is the pattern of students' preferences for topics in the Senior Secondary School mathematics?
2. Does gender have significant impact on students' preferences for mathematics topics?

Methodology

This study is a survey type. The sample for the study was obtained using a multi-staged sampling technique. From the five Local Government Areas in Ibadan metropolis, three

LGAs were randomly selected. Two schools were randomly selected from each of the three LGAs. Finally two intact SSII classes were randomly selected from each of the selected schools. Six hundred and forty six (646) SSII students were therefore selected for the study.

Instrument

Mathematics Topics Preference Scale (MTPS): This instrument was designed to obtain information on the students' preference for mathematics topics. It consists of two sections, section A which sought information on students characteristics; while section B presents a list of nine major mathematics topics to which students indicated their preferences.

Procedure

The selected schools were visited by the researcher and assistance of all the SSII mathematics teachers in the concerned schools were sought in administering the instrument to the selected students.

Data Analysis

Descriptive Statistics: Frequency, Cross tabulation and Chi – Square test were used to analyse the data collected for this exploratory study.

Findings

Research Question One

What is the pattern of students' preferences for topics in the Senior Secondary School Mathematics?

Table 1: Pattern of Topic Preference

S/N	Topic	Like Topic		Dislike Topic	
		Frequency	Percentage	Frequency	Percentage
1.	Number and Numeration	286	43.5	47	7.0
2.	Algebra Process	65	9.9	36	5.5
3.	Mensuration	23	3.5	72	10.9
4.	Plane Geometry	28	4.3	47	7.0

5.	Trigonometry	45	6.8	54	8.2
6.	Bearing	46	7.0	176	26.7
7.	Statistics	53	8.1	49	7.4
8.	Construction	49	7.4	63	9.6
9.	Probability	51	7.8	102	15.5
Total		646	100	646	100

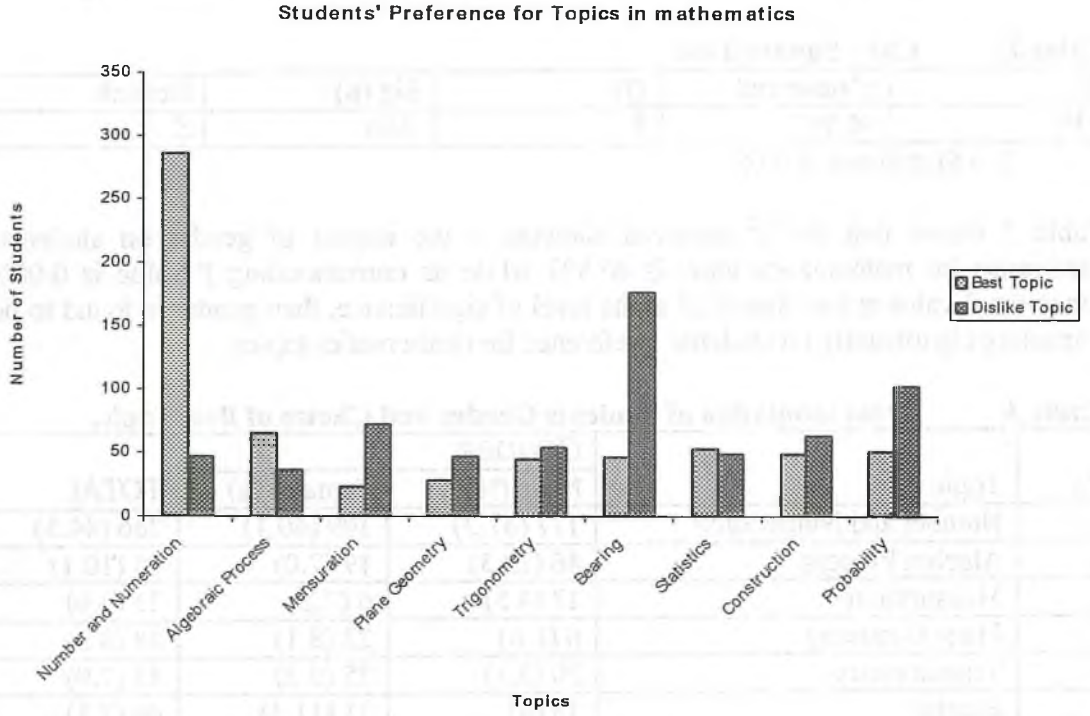

Fig. 1: Topic Preference in Mathematics

Table 1 and Fig. 1 show that among nine major subjects in the Senior Secondary School Syllabus, majority 286(43.5%) of the sampled students indicated that Number and Numeration is their best topic in Mathematics. Algebra process was the next preferred topic as indicated by 65(9.9%), followed by Statistics 53(8.1%); Probability 51(7.8%) and Construction 49(7.4%). Few students 25(3.5%) indicated that mensuration is their best topic in mathematics.

On topics disliked by the students, greater number 176(26.7%) of the sampled students indicated bearing as the topic they disliked. Also, sizeable number, 102(15.5%) indicated

probability as their disliked topic while 72(10.9%) chose mensuration, 63(9.6%) indicated Construction as their disliked topic. Very few students 47(7.0%) and 47(7.0%) indicated Number and Numeration and Plane Geometry as their disliked topics respectively (Table 1).

Research Question Two.

Does gender have Significant impact on students' preferences for mathematics topic ?

Table 2: Chi – Square Test.

N	χ^2 observed	Df	Sig (p)	Remark
646	46.597	8	.000	S

S = Significant at 0.05

Table 2 shows that the χ^2 observed showing – the impact of gender on students' preference for mathematics topic is 46.597 while its corresponding P value is 0.000. Since the P value is less than 0.05 alpha level of significance, then gender is found to be impacting significantly on students' preference for mathematics topics.

Table 3: Cross tabulation of Students Gender and Choice of Best Topic.

S/N	Topic	GENDER		TOTAL
		Male (%)	Female (%)	
1.	Number and Numeration	177 (47.2)	109 (40.1)	286 (44.3)
2.	Algebra Process	46 (12.3)	19 (7.0)	65 (10.1)
3.	Mensuration	17 (4.5)	6 (2.2)	23 (3.6)
4.	Plane Geometry	6 (1.6)	22 (8.1)	28 (4.3)
5.	Trigonometry	20 (5.3)	25 (9.2)	45 (7.0)
6.	Bearing	15 (4)	31 (11.4)	46 (7.1)
7.	Statistics	25 (6.7)	28 (10.3)	53 (8.2)
8.	Construction	36 (9.6)	13 (4.8)	49 (7.6)
9.	Probability	29 (7.7)	22 (8.1)	51 (7.9)
Total		371 (100)	275 (100)	646 (100)

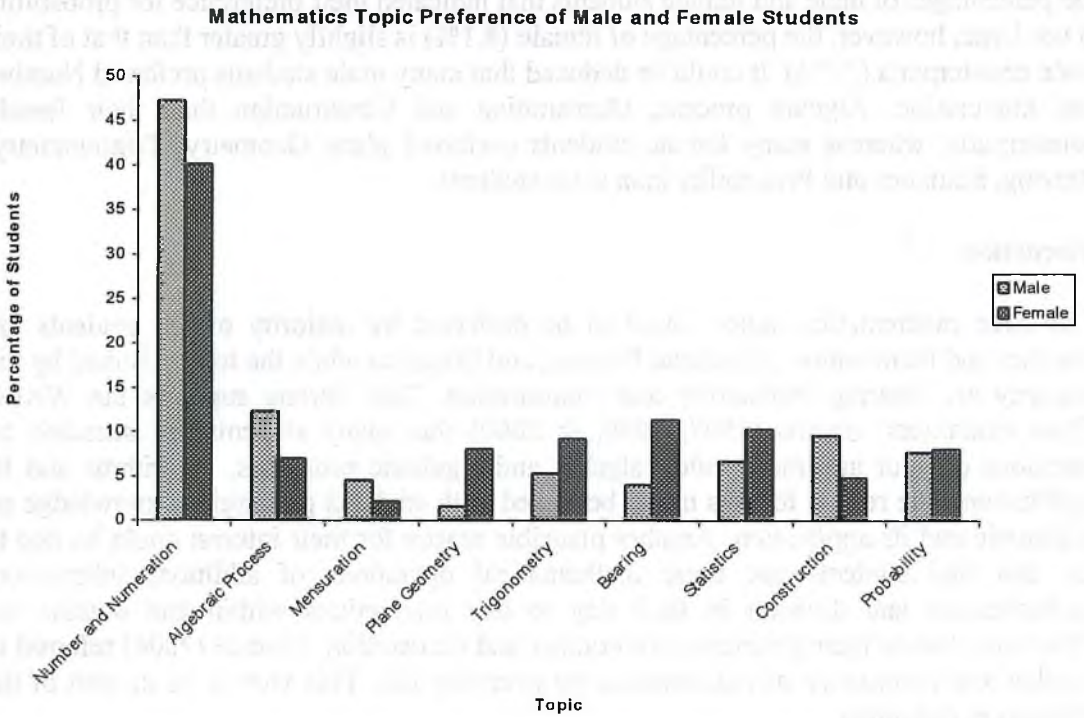

Fig 2: Mathematics Preference of Male and Female Students

Table 3 and Fig 2 reveal the direction of selection of best mathematics topic between male and female students. The percentage of male (47.2%) that prefer Number and Numeration to other mathematics topic is greater than the percentage of their female counterpart (40.1%). Similarly, the percentage of male (12.3%) that prefer Algebraic process to other topics is also greater than that of female students (7.0%). The percentages of male and female students that indicted Mensuration as their preferred topic in mathematics are 4.5% and 2.2% respectively. Also, the percentage of male (9.6%) that preferred construction to other topic is greater than that of female (4.8%).

The trend of preference changed with respect to Plane Geometry and trigonometry in which 8.1% and 9.2% of females as against 1.6% and 5.3% of males respectively showed better preferences for these two topics. Similarly, it was observed that the percentage of female students (11.4%) that indicated their preference for bearing is greater than that of male (4%). Statistics is another mathematics topic preferred by a percentage of female students (10.3%) that is greater than that of male (6.7%). Though the difference between

the percentages of male and female students that indicated their preference for probability is not large, however, the percentage of female (8.1%) is slightly greater than that of their male counterparts (7.7%). It could be deduced that many male students preferred Number and numeration, Algebra process, Mensuration and Construction than their female counterparts, whereas many female students preferred plane Geometry, Trigonometry, Bearing, Statistics and Probability than male students.

Discussion

The three mathematics topics found to be preferred by majority of the students are Number and Numeration, Algebraic Process; and Statistics while the topic disliked by the majority are Bearing Probability and Mensuration. This finding supports the WAEC Chief examiners' reports (1997, 1999, & 2000) that many students are attracted by questions on four arithmetic rules, algebra and algebraic processes, logarithms and its application. The reason for this might be linked with students prerequisite knowledge on arithmetic and its application. Another plausible reason for their interest could be due to the fact that students use these mathematical operations of addition, subtraction, multiplication and division in their day to day interactions within and outside the classroom. Hence their preference for number and numeration. Oladele (2004) referred to number and numeration as mathematics for everyday life. This view is in support of the findings in this study.

The findings on mathematics topics mostly disliked by the majority also corroborate the WAEC Chief Examiners' (1997, 1999 & 2000) reports. The report showed that majority of the candidates avoided questions on Geometry, Bearing, and Trigonometry. The finding also corroborates Adeleke's (2007) report that bearing is one of the difficult Mathematics topics for senior secondary school students. Students' dislike could be as a result of the abstract nature of the topic. For instance many students might find it difficult to understand the concept of Longitude and Latitude since they are imaginary lines that are not visible in the real sense. Also, to effectively learn some of these disliked topics effectively, students need to possess mathematical tools which many students do not have. Preference for learning activities that are less tasking could serve to explain why students dislike some topics in mathematics such as Geometry, Bearing, and Trigonometry.

Gender is found to be impacting on students' preference for mathematics topics. This finding corroborates the view of Sadker & Sadker (1994) that sitting in the same classroom, reading the same textbook, listening to the same teacher, boys and girls

perceive things in different ways. The findings also support the position of Honey, Moeller, Brunner, Bennett, Clements & Hawkins (1991) that females and males perceived mathematics related topic in distinct manners. Many male students are found to prefer Number and Numeration, Algebra process, Mensuration and Construction while many female students preferred Plane geometry, Trigonometry, Bearing, Statistics and Probability. The reason for their preference can be traced to activities male and female students usually engage in at home. Most male students most often engaged in games that demand the use of four basic mathematical rules. Female students on the other hand make use of various objects at home and this may have influenced their preference for plane geometry and other related topics.

Educational Implication.

The findings of this study have implication on the educational system.

i. Through these findings, mathematics teachers should be able to identify topics in mathematics that call for immediate attention if students are to show interest in them. Bearing as a topic needs to be taught in such a way that students will understand. Instead of using foreign names in the questions, teachers should try as much as possible to make use of the names of local objects while framing their questions.

ii. The findings also have revealed that the preference of male and female students for mathematics topics differ significantly. This form one of the strong bases for giving counseling services to secondary school students as more Female Students are found to be preferring bearing (though identified as difficult topic) as their best topic than their male counterpart. This is a good starting point if students are to be helped to develop interest in this important topic.

Recommendations

1. Teachers should rise up to their responsibilities through self initiatives and improvisation of instructional materials that enhance the understanding of the Mathematics topics identified to be difficult to many secondary school students. This will go a long way to enhance their preference for questions on these topics during examination.
2. The school counselors should also expose their students to the relevance of these so called 'difficult subject' to their future careers and the need to master them by organizing career talks for them

3. The three tiers of government should support Mathematics teachers by providing necessary instructional materials for teaching those identified 'difficult topics'.
4. Examining Bodies also should make use of names of local objects and persons of their testees while developing items especially on these identified 'Difficult topics'.

Conclusion

This study made use of students from Ibadan metropolis only; attempt should be made by other researchers to replicate this study by involving students from rural areas and geo political zones of Nigeria. Also reasons for their preference were not explored; this could be looked into by other researchers. However if the rate of failure in mathematics among Nigerian Students is to be reduced, students should be helped by teachers and counselors to have positive interest in all the topics they are being taught.

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