

Full Length Research Paper

Attitude towards Mathematics among Undergraduate Biology Education Students of Ignatius Ajuru University of Education

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ABSTRACT: The study investigated attitude of undergraduate Biology Education Students of Ignatius Ajuru University of Education towards Mathematics. Two research questions and two null hypotheses guided the study. The study adopted analytic descriptive survey design. Stratified random sampling and simple random sampling techniques, were used in selecting 186 students from levels 2, 3, and 4 for the study. The instrument used for data collection was Biology Education Students Attitude to Mathematics Questionnaire (BESAMQ). The instrument had a reliability coefficient of 0.79. The study revealed that majority of the students have positive attitude towards Mathematics, there is a significant difference between the

percentage of students with a positive attitude and negative attitude respectively towards Mathematics, no significant difference between male and female students in their attitude towards Mathematics. Based on the findings it was recommended among others that lecturers teaching Mathematics to Biology Education Students present content in such a way those students will see the relevance of Biology to their everyday life so as to arouse them.

Keywords: Biology Education, Undergraduate Student, Attitude, Mathematics

INTRODUCTION

Mathematics is described by Iji (2008) as a model of thinking which helps the learner to observe report and reason logically about a problem and in communicating ideas which makes it a vital tool in science. Similarly Awofala cited in Chimweoke (2016) and Dan'inna (2017), stated that Mathematics is the precursor of scientific discoveries and invention.

In recognition of this fact the Federal Republic of Nigeria (FRN, 1981) through the National Policy on Education made Mathematics a compulsory subject at the secondary school level and also an entry requirement into tertiary institutions for science and science related

courses. In addition the FRN according to Meremikwu and Enukoha (2015) gives material rewards and other academic opportunities to make teaching and learning of Mathematics effective.

However, Mathematics outside being a core mandatory subject is very unpopular among secondary school students. (Awofala, cited in Awofala and Nneji, 2012; Berg, cited in Abulude, 2016; Dan'inna, 2017; Eiks, Marks and Feierabend, cited in Hofstein et al., 2011; Mazana et al., 2019; Meremikwu and Enukoha, 2015; Siregor et al., 2019). The unpopularity of the subject is as a result of fear for it (Okereke cited in Okigbo and Okeke

2011; Yazor, 2016). This fear is also exhibited by students who opt to study Biology and Biology related courses in tertiary institutions. This category of students only make concerted efforts to make a credit pass in Mathematics, knowing that Mathematics is an entry requirement but with the hope that when they enter the university, they will not be required to take Mathematics courses. These students fail to realize that some knowledge of Mathematics is required for proper understanding of certain concepts in Biology. For example Soper (2005) pointed out that many mathematical model control theory have been used by plant and animal physiologist to explain the functioning of Biological control systems. Soper went on to explain that before studying some of the self regulatory mechanism of living organism it is useful to have some understanding of the principles underlying control system. Also Odili (2006) asserted that mathematical statistics is extensively employed in experimental Biology and that method of calculus is used to explain the growth of micro-organisms.

When these students enter the university and are required to take Mathematics courses the same fear which is a transference from secondary school resurfaces and this could make them put up negative attitude. Anderson (2007); Awofala and Nneji (2017); Dan'inna (2017) posited that fear attached to Mathematics makes secondary school students avoid Mathematics related courses and careers and that the fear they had at secondary school is usually transferred to the tertiary institutions and makes them parade all sorts of attitude towards the subject.

Attitude according to Sarmah and Puri cited in Mazana et al. (2019) is a learned tendency whereby a person responds positively or negatively towards an object, concept or another person. The fear and negative attitude put up by these pre-service teachers may not augur well for them as they may end up teaching Biology in secondary schools.

Regarding gender and attitude towards Mathematics, Mata et al. (2012) pointed out that it has been an issue on the research agenda. However literature reveals mix findings. Whereas some find significant difference between male and female in their attitude to Mathematics (Bhowmik and Banerjee, 2016; David et al cited in Sakariyau et al., 2016; Dan'inna, 2017; Elci, 2017). Others, for example Adebule and Borishade, cited in Sakariyau, Taiwo and Ajaaben, 2016; Ali, 2016; Karjanto, 2017; Kasimu and Imoro, 2017; Mata et al, 2012; Mahto and Prasal, 2019; Siregor et al., 2019; Yazor, 2016) found no gender effect. It is against this background that this research, work was carried out to determine attitude of undergraduate Biology Education Students of Ignatius Ajuru University of Education towards Mathematics and also to ascertain if gender has an influence on their attitude towards Mathematics.

Research Questions

The study was guided by the following research questions:

- (a) What percentages of Biology Education students have positive attitude and negative attitude respectively towards Mathematics?
- (b) What is the influence of gender on Biology Education students' attitude towards Mathematics?

Hypotheses

Ho₁: The percentage of Biology Education students with positive and negative attitude respectively towards gender does not differ significantly.

Ho₂: The attitude of male and female Biology Education students towards Mathematics does not differ significantly.

METHODOLOGY

The study adopted analytic descriptive survey design. A descriptive study aims at describing the characteristics or features of a given population as it is at the time of the study without testing hypothesis. A descriptive study can sometimes go ahead to compare groups by testing hypothesis and when this is so the design is described as analytic descriptive survey. The population of the study comprised level 2 (140), level 3 (250) and level 4(246) undergraduate Biology Education students of Ignatius Ajuru University of Education, totaling 636 students. The researcher sampled 62 students, each from levels 2, 3 and 4 which gave a total of 186. The techniques used were stratified random sampling and simple random sampling. The instrument used was named Biology Education Students Attitude to Mathematics Questionnaire (BESAMQ). The questionnaire has two sections, A and B. Section A, elicited biodata while section B has 21 items on attitude towards Mathematics. The validity of the instrument was determined by two experts, one in Educational Measurement and Evaluation and one Biology instructor. The reliability coefficient of the instrument was $r = 0.79$ obtained through coefficient alpha by Cronbach as a measure of its internal consistency. Data were analyzed using frequency counts, percentage, mean and standard deviation for the research questions while chi-square and t-test statistics were used for the hypotheses.

RESULTS

Research Question1: What percentages of Biology Education students have positive attitude and negative

Table 1: Attitude of Biology Education student toward Mathematics.

Attitude	Number (n)	Percentage (%)
Positive	140	75.3
Negative	46	24.7
Total	186	100

Table 2: Mean and standard deviation of male and female Biology Education Students attitude toward Mathematics.

Gender	n	\bar{x}	Sd
Male	79	42.54	3.802
Female	107	42.38	3.781

Table 3: Chi-square analysis of percentage difference between students with positive and negative attitude respectively toward Mathematics.

Attitude	Observed n	Sample	Expected E	O – E	χ^2	df	Sig	Decision
Positive	140	75.3	93.0	47.0	*47.505	1	0.000	Sig
Negative	46	24.7	93.0	- 47.0				
Total	186	100	186	0				

*Significant, $P(.000) < 0.05$ level of significance.

Table 4: t- test analysis of male and female Biology Education Students attitude towards Mathematics.

Gender	N	\bar{x}	Sd	df	t_{cal}	Sig	Decision
Male	79	42.54	3.802	184	.297	.775	NS
Female	107	32.38	3.781				

NS = Not significant, $P (.775) > 0.05$ level of significance.

attitude respectively towards Mathematics? Table 1 shows that 75.3 percent of the students have positive attitude toward Mathematics while 24.7 percent have negative attitude. The result is that a greater number of the students have positive attitude towards Mathematics.

Research Question 2: What is the attitude of male and female Biology Education Students towards Mathematics?

Table 2 indicated that male Biology Education Students have mean 42.54 while female students have mean value of 42.38. The result is that moderately higher number of male students have positive attitude compared to the female students.

Ho₁: The percentage of Biology Education Students with positive and negative attitude towards Mathematics does not differ significantly. Table 3 indicates that 75.3% of the

students have positive attitude towards Mathematics while 24.7% have negative attitude. When these

observations were subjected to chi-square (χ^2) analysis,

the calculated χ^2 (47.505) at df 1 has a significant value of 0.000 which is less than the chosen level of significance being 0.05 and thus significant. This implies that the null hypothesis stated is hereby not accepted (rejected). The result is that there is a significant difference between the percentage of students with positive and negative attitude towards Mathematics.

Ho₂: The attitude of male and female Biology Education Students towards Mathematics does not differ significantly. Table 4 shows that male Biology Education students have mean 42.54 while female students have

mean value of 42.38. When the observed mean values were subjected to t-test analysis, the calculated t-value (.287) at df 184 has a significant value of .775 which is greater than the chosen level of significance (0.05). The null hypothesis is therefore accepted (not rejected). The result is that there is no significant difference between male and female Biology Education student in their attitude towards Mathematics.

DISCUSSION

The study revealed that there is a significant difference between the percentage of students with positive attitude and negative attitude respectively towards Mathematics with more of the students showing positive attitude. The implication is that majority of the students do not perceive Mathematics as a difficult subject and do not have fear for the subject. The present finding agrees with that of Mata et al (2012) and Mazana et al. (2019) that generally students showed positive attitude but a small portion had negative attitude. The differences in attitude may have stemmed from the different teachers they had and the different methods they were taught with while in secondary schools. The present finding however is inconsistent with that of Adesoji, cited in Abulude, (2016) and Dan'inna (2017), that student exhibited negative attitude. The differences between the present finding and the past studies may be attributed to such reasons as; the respondents in the past studies had feelings of inadequacy and also poor perception of Mathematics compared to the majority of the respondents in the present study who do not perceive Mathematics as a difficult subject.

The result also indicates no significant difference between male and female Biology education students in their attitude towards Mathematics. This implies that male or female they can equally do well in Mathematics. This finding is in line with Karjanto (2017) and Mahto and Prasal (2019) that there was no significant gender difference in their findings.

The finding is discordant with Dan'inna, (2017) and Ecli, (2017) that gender had a significant influence on students' attitude towards Mathematics. The disparity in the findings may have resulted from reasons such as: the present respondents irrespective of gender have self adequacy while in the past studies some had feelings of inadequacy while others perceived Mathematics as an interesting subject with the result tilting favourably to the male or female depending on the gender of the model teacher and his or her mode of presentation.

Conclusion

It is concluded based on the findings that majority of the students have positive attitude towards Mathematics and

gender is not a significant determinant of the students' attitude towards Mathematics.

Recommendations

Based on the findings of the study the following recommendations are made:

- (a) Secondary school teachers adopt teaching strategies which would make the subject appealing to students.
- (b) Lecturers teaching Mathematics to Biology education students present content to the students in such a way that they see the relevance of Mathematics to Biology and to their everyday life so as to arouse them.
- (c) The Mathematics lecturers should use lots of instructional resources to facilitate understanding so as to make the subject interesting to help those with negative attitude to change their perceptions.

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