International Journal of
Modern Statistics
(IJMS)

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CARI Journals

International Journal of Modern Statistics
ISSN: 2958-8340 (Online)
Vol. 4, Issue No. 1, pp 1 - 13, 2024
www.carijournals.org

Effect of Student Perception on Teaching and Learning Mathematics in Secondary Schools in El'arish in North Sinai Governorate in Egypt

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Accepted: 14th Dec 2023 Received in Revised Form: 28th Dec 2023 Published: 11th Jan 2024

Abstract

Purpose: The aim of this paper was to investigate the effect of students 'perception on teaching and learning Mathematics students in public Schools in El'arish in North Sinai Governorate in Egypt. The hypothesis of the study was formulated and tested to guide the study.

Methodology: The survey research design type was adopted and the targeted population of one hundred and ninety-nine (119) respondents composed by 5 principals, 16 mathematic teachers and 98 students from senior secondary schools, were sampled by using stratified sampling and sample random sampling techniques. The collected data was analyzed using descriptive statistics, correlation, and regression analysis through the statistical package for social science (SPSS) version 21. The data collected were analysed using descriptive statistics and multiple regression.

Findings: The results of the findings indicated that the students' perception was more correlated with teaching and learning Mathematics (r = 0.822; p= 0.000). Multiple linear regression analysis showed that students 'perception contributed to 70.2% of variation on the performance, hence plays a vital role in teaching and learning Mathematics students in secondary schools in El Arish in North Sinai Governorate in Egypt. Additionally, the relationship between perception and students Mathematics performance in the study was very strong.

Unique Contribution to Theory, Practice and Policy: The study recommended that Mathematics teacher should be diverse in their use of methodology which can as well help their student in their own area of learning mathematics.

Keywords: *Students 'perception, teaching and learning, mathematics, and students*

1.0.INTRODUCTION

Mathematics is perceived by society as the foundation for scientific and technological knowledge that is cherished by societies worldwide. It is believed to be an instrument for political, socioeconomic, scientific and technological developments (Chang, 2002). Mathematics has importance over and above its perceived applications of basic numeracy skills. Over centuries ago, mathematics has been considered as the prime vehicle for developing student's logical thinking and higher-order cognitive skills. Additionally, Mathematics also plays a major role in a number of other scientific fields, such as Physics, Engineering and Statistics. Picker (2010), referred to mathematics as the foundation for science without which a nation can never be prosperous and economically independent. He further noted that competence in mathematics provides many of the opportunity for personnel required by industry, science, technology and education. Considering the contributions of mathematics to the contemporary world, one would have expected mounting interest on it as a discipline that is truly the language of science and technology but the reverse seems to be the case (Papanastasiou, 2002).

Due to the relevance of mathematics and its application, it is widely regarded as one of the most important school subjects and a central aspect of the school curriculum in every society, as more Mathematics lessons are likely to be taught in schools and colleges throughout the world than any other subject (Neale, 2010). In fact, the benefit that the study of Mathematics offers in the society is so profound that it is often used by Universities to filter secondary school learners for entry into the prestigious science-based degree programs (Asiedu-Addo et al, 2004). In spite of the benefits that the study of Mathematics offers, it is commonly accepted that Mathematics is difficult, obscure, and of little interest to certain people. It cannot be denied that Mathematics plays an important role in life but the reality is, majority of students find it very difficult to acquire the different mathematical skills and processes that are useful in their everyday lives.

Additionally, several studies report that most African countries attach great importance to Mathematics than any other subject (Mariam, et al, 2016). Despite the importance attached to Mathematics by Africans there has been low achievement in the subject in Egypt and in other parts of the African continent as indicated by the Third Trends in Mathematics and Science study (TIMSS) of 2004. However, the complexity of factors that can influence Mathematics performance show that high achievement in Mathematics is a function of many interrelated variables related to students, families, and schools. Among student variables, Perceptions are regarded by several researchers, as an important/key factor to be taken into account when attempting to understand and explain variability in student performance in Mathematics (Madeleine, 2013). According to Emaikwu (2011) students' perception towards Mathematics teaching and learning play an important role in Mathematics education. The learning outcomes of students are strongly related to their perceptions towards Mathematics.

Some students view Mathematics as their waterloo; as result, students perform poorly in Mathematics. Ahmad, Azizan, Rahim, Jaya, Shaipullah, and Siaw (2017) carried out a study to determine the relationship between students' perceptions of the teaching and learning towards the lecturers with their achievements in Mathematics at the Centre for Pre-University Studies. The study adopted a descriptive research design. The population of the study comprised of 841 students. The findings revealed that there is no significant correlation between the average scores of students' perceptions of teaching and learning towards the Mathematics lecturer with the average scores Mathematics achievement of the students. The findings of the study revealed that lecturer can improve their teaching skills and techniques that are appropriate to the students. Frumkin & Murphy (2007), assessed students' views on student-teacher relationship and its effect on academic grades. The instrument for data collection was a questionnaire measured on a 4-point scale. The population of the study comprised of 420 students. This study disclosed that the student-teacher relationship was good in a medical school and the views of students on this relationship were independent with their academic grades.

These perceptions toward Mathematics and Mathematics learning and their implications for Mathematics instructions have long received much attention from both Mathematics educators and mathematicians (Mato, 2010). They further mention that in fact the poor performance of students globally in Mathematics is mostly linked to perception than any other variable. Students' poor achievement in Mathematics is not just a concern for particular countries, but has become a global concern over the years. Thus, one's acquaintance with anything new in the world helps to form perception. The theory states that initial reactions to a visual presentation (exposition) give rise to exploratory motor components that play a significant role of sequentially building up activities of small groups of brain cells into a larger sequence of activity during the process of learning (Ifumayiwa, 2004). Therefore, the process of learning involves interpreting information about anything discovered. What this highlights for our attention is that the opinion one forms about another person depends on the amount of information available to him/her and the extent to which he/she is able to correctly interpret the information the person has acquired.

In particular, the relationship between perception toward Mathematics and achievement in Mathematics had traditionally been a major concern in Mathematics education research (Ng-Gan, 2017). For example, Neale (2010) describes the relationship between the two as a consequence of a reciprocal influence, that is, perceptions affect performance and performance in turn affects perception. Additionally, a survey by Mato (2010) on the relationship between students' achievement in and attitude/perception towards secondary school Mathematics submitted that despite the different perspectives from which researchers have conceived attitude/perception, the common line of agreement was that the achievement of goals and objectives can be influenced or affected by attitude/perception and that a positive attitude/perception was more likely to engender achievement of a goal or objective (performance).

In Egypt, students' ratings of teachers' methodology are widely used in secondary schools and universities. However, there are limited studies which have investigated teachers teaching methodology by examining students' perceptions of their teacher's teaching methods at secondary education level. The assessment method used in evaluating teachers' teaching methods and effectiveness of their teaching where students' views have been ignored has not provided reliable and valid information. Mathematical perceptions considered for this study include individual constructs that are generated by individual experiences (student characteristics), home and societal context of the student and those emanating from classroom experiences (Mohammed et, al., 2017). Studies generally have found boys to hold a more positive attitude towards mathematics. It is against this background that this research sought to examine the effect of student perception on teaching and learning mathematics in public secondary schools in Egypt

1.2 Statement of the problem

The importance of mathematics to the world and to a nation's technology breakthrough has been highlighted in the foregone section. This has been the reason why mathematics is given prominence in the school curriculum and timetable. However, in El'arish, the teaching and learning of mathematics have not been without problems. For some time now, there has been a growing concern over the poor teaching and learning of mathematics with the resultant poor and falling standard in secondary schools' student performance in mathematics.

In addition, students are likely to attend schools that are poorly constructed with inadequate teaching and learning facilities. The curriculum with an overcrowded syllabus. Most mathematics teachers lack teaching affective characteristic and insufficient teacher training program. On the side of students, is loss of interest in learning mathematics and the teachers not showing enough motivation to arouse student's interest in learning mathematics. The students' perception is regarded as unimportant although they are directly affected by the teacher's actions and inactions. However, in other to know how efficient and reliable the mathematics teacher teaching methodology is, student's perception is an important source of information which can be used for educational research.

Consequently, the purposes of this study were to investigate students' perceptions on teaching methodology of mathematics teacher of senior Secondary school in North Sinai governorate in Egypt

This study sought to achieve the following research hypothesis:

H_{O1}: There is no significance effect between students 'perception and teaching and learning mathematics in secondary schools in El Arish in North of Sinai governorate in Egypt

2.0. METHODOLOGY

The study adopted the cross-sectional research design where questionnaires were used to gather valuable data for the research work. In this study, questionnaire was given as hand guide to the generating data for this study Therefore, the survey design was considered suitable since the study tend to seek information from a sample that was drawn from a population using questionnaire. The population in this study was secondary school seniors attending public and private schools in North Sinai Governorate in Egypt. Sinai Governorate is one of the governorates of Egypt. It is located in the north-eastern part of the country, and encompasses the northern half of the Sinai Peninsula. The study focused on the capital which is El Arish. The study targeted 5 secondary schools in El Arish

The targeted population of this study was senior secondary schools' students, mathematics teachers and principals of those five secondary schools selected in this study. Seniors were selected in order to allow the students to consider their high school experiences over the years of life in secondary school with the maturity of a student on the verge of graduation.

Stratified sampling, purposive sampling and simple random sampling were used in this study. Stratified sampling was used to select a sample of 5 schools from other public secondary schools. The aim was to ensure that all schools in the region were represented in the study. Schools were stratified or clustered and then one school was randomly selected. The principal of the sampled schools was purposively selected to participate in the study. A simple random sampling method was also used to select mathematics teachers and senior students. Selections of the students were done using Simple Random sampling technique (SRS). The sample of the study was made up of 30 students from each five secondary schools selected, summing up to 150 students, 26 mathematics teachers, and 5 principals. Thus the total population was 181 persons

In addition, the study used the following formula proposed by Yamane (1973) to determine the sample size, as it is too large to waste scarce resources and may expose more participants than necessary to risk.

$$\boldsymbol{n = \frac{N}{1 + (N)(e^2)}}$$

Where:

n = sample size

N = the population size

e = the acceptable sampling error (5%) at 95% confidence level

Thus; n = 181/ (1+181) $(0.05)^2$

n=124.6=125 respondents

A sample of 125 respondents was targeted to participate in this study. This formula was used to estimate a representative sample.

A structured questionnaire developed by the researcher was used as the research instrument for data collection. The questionnaire which consisted of two sections (A, and B), Section A deals with the aspect of personal data consisting of background information. Likert scale option was adopted in section B of the questionnaire which was responded to by indicating the appropriate respondents' best attitude using the four point Likert's scales as Strongly Agree (SA), Agree (A), Disagree (D), or Strongly Disagree (SD), Undecided (U). The study involved oral questions based on the use of interview guides. This was a flexible way, because questions were both open and closed ended. This method helped the interviewer to collect supplementary information about the respondents as well as the researcher probed for more specific answers while at the same time helping the researcher to repeat a question when the response indicated that the respondent misunderstands the question.

Qualitative and quantitative data were obtained, descriptive analysis like frequencies, tables, and percentage were used in data presentation. SPSS version 21 was used to analyse data. After data manipulation, the researcher analysed data following objective per objective. The correlation was used to test the relationship between the association of dependent and independent variables. Data analysis were used of descriptive statistics. This was followed by use of regression analysis in assessing the effect of student perception on teaching and learning mathematics in secondary schools in North Sinai Governorate in Egypt.

3.0 FINDINGS AND DISCUSSION

3.1. Findings

In this study the research sampled senior students, Mathematics teachers, principals from 5 selected secondary schools. The following table shows the return rate of respondents.

Table 1. Response rate

Respondents	Targeted	Obtained	Response rate(%)
Principals	5	5	100
Teachers of Mathematics	18	16	88.8
Students	102	98	96.0
Total	**125**	119	95.2

Source: Primary data, 2023

As shown in Table 1, from the targeted respondents, 5 questionnaires for principals, 18 questionnaires for teachers and 102 questionnaires. So the participation rate was reduced 16 (88.8%) to mathematics teachers, and 98 (96%) to students. Regarding headteachers, the study sampled 5 school principal from 5 secondary schools and 5 of them were interviewed; therefore, the response rate was 100%. Overall, the response rate of respondents was 95.2%.

3.1.1 Descriptive Statistics

In this research the study attempted to determine the effect of students 'perception on teaching and learning mathematics subject in secondary schools in Sinai governorate in Egypt. The respondents were asked to rate the statements by indicating the extent to which they apply to their organization in 5-point Likert scale as shown on: 5. Strongly Agree (SA), 4Agree(A), 3. Undecided (N), 2. Disagree (D) and 1. Strongly Disagree (SD). Besides, the mean and deviation were used for interpretation of the findings where mean (M) is the average of group of scores and it is sensitive to extreme score when the population samples are small. Moreover, the standard deviation (SD) was also used to measure the variability in those statistics as it shows how much variation is there from the average (mean).

Table 2: Students 'perception and teaching and learning Mathematics subject

Statements	Mean	Std Dev
My mathematics teacher doesn't give room for questioning and answering	3.5	0.61
My mathematics teacher teaches and doesn't expect our contribution	3.8	0.68
My mathematics teacher doesn't mind if we understands the lesson or not	3.2	0.45
My mathematics teacher can cover topics with speed when he dominate the class	3.9	0.96
My mathematics teacher teaches with stipulated examples to demonstrate	2.6	1.05
My mathematics teacher take time to demonstrate a concept for us	3.5	1.22

Source: Field research, 2023

As shown in Table 2, the results relate to the six statements assessing the effect of Students 'perception and teaching and learning Mathematics subject. The results show that for the first

statement, the majority of respondents strongly agreed that student's mathematics teacher doesn't give room for questioning and answering, with a mean value of 3.5, and a high positive correlation standard deviation of 0.61. The second statement asked respondents whether mathematics teacher teaches and doesn't expect our contribution. The results showed that the majority of respondents strongly agreed with this statement (M=3.8, SD=0.68). For the third statement, mathematics teacher doesn't mind if students understand the lesson or not, the majority of respondents agreed with this statement, with a mean of 3.2 and a positive and low standard deviation correlation of 0.45. The fourth statement asked whether the mathematics teacher can cover topics with speed when he dominate the class. Respondents strongly agreed with this statement, with an average mean of 3.9 and a very strong positive standard correlation of 0.96. The next item was whether mathematics teacher teaches with stipulated examples to demonstrate. The majority of them agreed that statement with a mean of 2.6 and a very high positive standard deviation of 1.05. On the last

		Students 'perceptions	**Teaching and Learning Mathematics**
Students 'perceptions	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	119	
Teaching and Learning Mathematics	Pearson Correlation	.822**	1
	Sig. (2-tailed)	.000	
	N	119	119

**. Correlation is significant at the 0.01 level (2-tailed).

statement respondents were asked mathematics teacher take time to demonstrate a concept for students (M=3.5, SD=1.22). From the results, it implies that the majority of respondents strongly agreed and agreed that all of the above are key elements of students 'perception used in their five selected schools and have an effect on teaching and learning Mathematics in secondary schools in El'arish in North Sinai governorate in Egypt

3.1.2. Correlation analysis

The findings of the correlations between the independent variables and the dependent variables are summarized and presented in Table 3

Table 3: Correlation between variables

According to the findings reported in Table 3, the Pearson correlation analysis showed that students 'perceptions (r=0.822, p=0.000) is positively and significantly related to teaching and learning Mathematics subject. The correlation was deemed to be statistically significant since the p-value was less than 5%. The findings therefore showed that there is a positive and statistically significant relationship between students 'perceptions and teaching and learning Mathematics in the five sampled secondary schools in El Harish.

3.1.3. Multiple Regression

The study used multiple regression to test the following hypothesis:

H_1There is no significant effect between students 'perception and teaching and learning Mathematics in El Harish in North Sinai governorate in Egypt

Table 4. Model summary

Model	R	R Square	Adjusted Square	RStd. Error of the Estimate
1	.838[a]	.702	.691	.82701

a. Predictors: (Constant),students 'perception

The R-squared shows the variation in the dependent variable that can be explained by the independent variables being studied. The R-squared in this study was 0.702, which implies that the independent variable can explicate 70.2% of the dependent variable whereas the remaining 29.8% variation is explained by other factors which are not included in the model.

Table 5. Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	182.035	4	45.509	66.538	.000[b]
	Residual	77.287	113	.684		
	Total	259.322	117			

a. Dependent Variable: Teaching and learning Mathematics

b. Predictors: (Constant), students 'perception

In an attempt to test the significant of the model, the study used ANOVA. From Table 7 the P-value is 0000^{b} which is less than 0.05 thus the model is statistically significance in predicting how students 'perception affects Teaching and learning Mathematics. The F critical at 5% level of significance is 66.538, and this shows that the overall model was significant. There exists significant relation between the dependent variable (Teaching and learning Mathematics) and the independent variable (students 'perception).

4.0. Discussion

From the findings, the study found that most students prefer secondary school mathematics teacher using demonstration method in mathematics class. Which implies that when mathematics teacher uses demonstration for his lesson it stimulates the skills of the students to study mathematics and make them understand very fast to grasp whatever the teacher is saying. Also, it is revealed that, when students have interest in the teaching and learning of mathematics, it will further improve their competency in mathematical concepts as well as their confidence level. The more interested students are in the teaching and learning of mathematics, the more it will significantly develop their confidence in studying mathematics as well as their mathematics achievement. These findings are in Agreement with Igwe (2019) in his study when he concluded by saying that students' perception of teachers' effectiveness influences their learning outcomes in Mathematics and Economics in secondary schools of Cross River State. There is a joint significant contribution of students' perception of teachers' motivational skills, teaching methods, relationship with students, and communication level, to their learning outcomes in Mathematics.

But Salifu (2022) conducted research on Exploring the Relationship Between Students' Perception, Interest and Mathematics Achievement. The results found that the results revealed that students had negative perception towards mathematics and positive interest towards mathematics. Also, the results revealed that student's interest and perception significantly predicted students' achievement in mathematics. Again, a positive, moderate and significant relationship was recorded between students' interest and achievements in mathematics. Furthermore, there was a positive weak correlation between students' perception and achievement in mathematics which is also significant. Finally, weak positive significant correlation was recorded for the relationship between students' perception and interest towards mathematics.

This finding do agrees also with the study of (Mariam et al., 2016) which also reported students' negative perception towards mathematics. However, it contradicts the findings of Daud et al. (2020) and Hagan et al. (2020) who reported that students have positive perception towards mathematics in their studies

5.0 Conclusion and Recommendations

5.1. Conclusion

From the findings, the study concluded that students 'perception have an effect on teaching and learning mathematics subject. When mathematics teacher covers topics with speed when he dominates the class and when mathematics teacher takes time to demonstrate a concept for students. The hypothesis (H_{01}: Students' perception about mathematics significantly influences their teaching and learnings in mathematics.) that student perception influences student math scores was tested at a significance level of 0.01. The results indicated a significant direct relationship between students' perceptions of mathematics and their math achievement ($r=0.882$, $p<0.001$). Therefore, the researcher can conclude by saying that the research hypothesis was tested; verified and then it was rejected referring to the statistical (regression analysis) findings and then according to the research, the correlation of 82.2% categorized as positive and very high correlation; this leads to confirm that there is significant relationship between students 'perception and teaching and learning Mathematics in El Harish in North Sinai governorate in Egypt.

5.2. Recommendations

It was recommended that stakeholders and mathematics educators should engage students in activities that will positively improve students' perception and their interests for learning mathematics. Also, t is recommended that teachers be sensitized on how best they could approach mathematics, relate to students and change the attitude of students on mathematics. Finally, Mathematics teacher should be diverse in their use of methodology which can as well help their student in their own area of learning mathematics.

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