



Students' Attitude towards Mathematics and Academic Achievements

Feagiai Lefotu^{1} and Xan Hue²*

¹National University of Samoa, Samoa

²Northwest Normal University, China

ABSTRACT

Mathematics plays a crucial role in our daily lives and is the most important core subject in the school curriculum. The performance statistics of students in Samoa secondary school level, mathematics remains one of the subject's students fail in most categories and contexts. The findings from this study indicated statistically, significant positive students' attitudes towards mathematics ($M=3.50$, $SD=0.34$) and $t(119)=16.24$, $p<0.001$ and also revealed significantly positive students' perceptions of mathematics teaching methods ($M=3.29$, $SD=.39$) and $t(119)=8.20$, $p<0.001$ in a one-sample t-test conducted. In addition, the findings also revealed varied students' attitudes among the gender of students. It was illustrated that the female students generally scored higher on positive attitudes than their male counterparts. The findings from this research raise some noteworthy issues relating to the teaching and learning of mathematics in Samoa.

Keywords: student attitudes, performance, learning, Samoa

1. Introduction

Mathematics plays a crucial role in almost every field of our modern association. Everyday people around the world come across an intricate array of mathematics, from the mathematics of business and employment to a situation involving exposure to the danger of household coincidence. According to Nardi & Steward (2003), a huge number of students found mathematics the most complicated and boring subject in schools. Students' negative attitudes and beliefs can be associated with many of the difficulties they are confronted with in learning mathematics. These negative thoughts reduce students' liking and have a major influence on their way of learning mathematics (Amirali, 2010). Students can do things to be successful in mathematics, but unfortunately, believe they are unable to succeed due to difficulties in understanding concepts and applying technical skills in mathematics (Beghetto & Baxter, 2012; Tambychik & Meerah, 2010). Furthermore, few scholars indicated that students find difficulties in learning mathematics because of the difficulties in understanding language and problem-solving skills (Chinn, 2012; Lazim, Abu-Osman, & Wan-Salih, 2004) and lack of basic mathematical skills in conceptualizing number-pattern (Tambychik & Meerah, 2010).

Samoa is a group of volcanic islands in the South Pacific, and it lies between Hawaii and New Zealand. It consists primarily of two large islands, Upolu and Savaii, which together cover an area of about 2,680 square kilometers (115 sq. miles). Samoa is a lower middle-income country with a capital GDP of 843.8 million USD in 2021, a population annual growth rate of 1.8%, and a Human Development Index of 0.707. This identified Samoa at 184th position of the 196 countries, in the lower medium human development group. Church schools were established in the villages when missionaries arrived in Samoa in the 1830s, later, secondary education in Samoa was based on New Zealand's education system. The government of the country strives to promote equal education for all citizens. In this light, education has undergone diversified important changes in the early days of the 1900s and it has significantly improved throughout the years in terms of curricula, syllabus, and also in the recruitment of teaching professionals, National Review (2015). The ministry improves the quality of life of Samoans by improving educational achievement standards and increasing productive engagement (Education Sector Plan (2016-2024)). Leifiifi College was established in 1987 and it was one of the government schools in Vaimauga District. The number of students enrolled each year was approximately 1000 students from level 9 to level 13, and the number of teachers was 55-60 teachers every year. Leifiifi was one of the colleges that have different levels of a student's abilities, but teachers in its efforts to promote a learning environment that optimizes the ability of children of Leifiifi College to grow and learn and to give equal opportunities to educate students well for their betterment in future endeavors. The main objective of the study was to investigate students' attitudes toward mathematics and academic achievements among fourth-year students at Leifiifi College. This study is beneficial because as illustrated by mathematics teaching literature, students' attitudes and perceptions of teaching methods towards mathematics play relevant roles in the process of learning irrespective of the subject content.

2. Methodology

The researcher adopted a survey research design through a quantitative method approach to investigate the relationship between student-related factors and mathematics performances at Leifiifi College. Thus, the student's attitudes towards mathematics and academic achievement were explored at the

Lefiifi College in Samoa. By a survey research design, the researcher collected data at one point in time to answer the research questions. Survey research can be used in both quantitative and qualitative approaches; questionnaires and interviews (Creswell, 2012; Creswell, 2003). However, the researcher employed questionnaires as the data collection instrument for the study.

The population of the study included all students of the Lefiifi College in Samoa. The total number of students enrolled each year is about 900 from year 9 to year 13. But the current study focused on level 12 who were 180 students. In the 12th level, there are four classes categorized into 12Art, 12Commerce, 12 Science, and 12 Vocational. The researcher used level 12 students for the study because, in Samoa, the academic calendar depicts that exams are only written in July and November every year with level 12 exams revered as the major exam every year. As such, all the level 12 students who will be taking part in the mid-year level 12 exams in July were recruited for study at Lefiifi College.

The researcher used a simple random sampling technique to select 120 students from the 180 students in level 12 to participate in the study at Lefiifi College. The participants were selected to engage in the study on the condition that they were in level 12; had taken the mid-year exams at the time of the study and were willing to participate in the study. The participants for the study were 120 fourth year (year 12) students of the Lefiifi College, Vaimauga District in Samoa. A mean age of 17 was reported for both males and females. The students were aged between 15 and 19 years old. Sixty-eight of the students were female corresponding to 56.7% and 52 were males (43.3%).

The Test of Mathematics-Related Attitudes (TOMRA) was used to collect data on students' attitudes toward mathematics. The original version of the TOMRA was developed as a Test of Science-Related Attitudes (TOSRA) (Fraser, 1981). However, the akin relationship between mathematics and science constitutes one of the reasons why researchers have modified the scale as TOMRA.

Although the original version of TOSRA has 10 questions, the modified and extended version of TOSRA, now the TOMRA has seven subscales. TOMRA was used to measure the attitudes of students aged 15 to 19 years which comprises 3 component subscales- Attitudes towards Mathematics Inquiry, Adoption of Mathematics Attitudes, and Enjoyment of Mathematics Lessons were chosen for my study. Each of these subscales has 10 items half were stated positively and the others were stated negatively statements (See Appendix B). The modified version has identical questions to the original TOSRA; however, where the term "science" was replaced with "mathematics" (Adolphe, Fraser, & Aldridge, 2003; Aldridge, Fraser, & Huang, 1999; Waldrip & Fisher, 2001). The questionnaire is rated on a five-point Likert scale ranging from (1. Strongly disagree to 5. Strongly agree). The questions are composed of both positively and negatively phrased sentences which demand researchers to reverse during the scoring before the data analysis

Both descriptive statistics and inferential statistics were employed to analyze the data obtained in this study. The Statistical Package for the Social Science (SPSS) version 21 was used to analyze the data. The data collected therefore was analyzed statistically using statistical and analytical approaches; means and percentages, one sample t-test, Pearson correlation, and multiple linear regression.

The researcher employed means and percentages to analyze the students' attitudes toward mathematics and their mathematics performances were computed. The mean scores were calculated for the total number of questions and each of the sub-scales. Furthermore, one sample t-test analysis was employed to measure students' attitudes toward mathematics, because the researcher was interested in investigating whether students had positive or negative toward mathematics. A reliability test was conducted as the instrument was used in a different cultural context from where it was developed. The instrument yielded, a similarly, fair honest reliability coefficient of 0.657 in the Samoan context. The instrument was reliable since the alpha value obtained was above 0.60 (Nunnally, 1997; Baharin, et al., 2015) which is the minimum requirement.

3. Results and Discussion

This study investigated the relationship between students' attitudes toward mathematics and students' mathematics performances at Lefiifi College. The means and percentages of students' attitudes towards mathematics and perception of mathematics teaching methods results, as shown in Table 1 below, indicate that the average score of students' attitudes SATM (Male)=3.52, SD= 0.301 is slightly akin to the average score of SATM (Female)= 3.50, SD= 0.362 but each is above or equal to the specified value of 3.0. This is strongly suggested as a logical consequence of students having positive attitudes towards the fact of being useful in mastering mathematics.

Table 1 – Mean and Percentages

Gender of respondents	N	Mean	Std. Deviation
Male	52	3.5218	0.30083
Female	68	3.4799	0.36182

The findings indicated statistically significant positive students' attitudes towards mathematics ($M=3.50$, $SD= 0.34$) and $t(119)=16.24$, $p<0.001$ and also revealed significantly positive students' perceptions of mathematics teaching methods ($M=3.29$, $SD= .39$) and $t(119)=8.20$, $p< 0.001$ in a one-sample t-test conducted as shown in Table 2.

Table 2 – One-sample T-Test and Descriptive Statistics (Test value = 3) (95% CI for Mean)

M	SD	N	Difference	T	df	Sig (2-tailed)
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3.50	0.34	120	0.437, 0.559	16.24	119	0.001*
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*P < 0.01

The overall percentages and average mean of students' attitudes revealed that 72 (60%) of respondents strongly agreed and agreed with the statements given and 48 (40%) of respondents indicated strongly disagreed and disagreed with the items given in the questionnaire. This indicates the students' mean scores are $M=3.50$ greater than 3.0 showing their positive attitudes toward learning mathematics. The study showed students exhibited positive attitudes toward mathematics. This explained that the low performances in mathematics were influenced by their attitudes towards mathematics. These findings were consistent with Tamukong (2017) and Rawnsley (1997). It is undeniable that students' positive attitudes may delineate high performances in mathematics. It is interesting to note that irrespective of the positive attitudes towards mathematics, students reportedly scored low marks in their examinations as revealed in their performances. This means, there may be other factors that contributed to students' low performances in mathematics subjects other than their attitudes towards mathematics. It could be their perceptions of the subject, the teaching environment, and teaching methods among others.

In addition, the findings also revealed varied students' attitudes among the gender of students. It was illustrated that female students generally scored high on positive attitudes as compared to their male counterparts. Thus, in the context of the mathematics subject in Samoa especially at the Lefiifi College, females generally demonstrate positive attitudes towards mathematics more than their male counterparts. Logically, if students' positive attitudes correlated with high performances in mathematics, the female students at Lefiifi College would perform better than their male counterparts. Significantly, among the student population at Lefiifi College, females can be said to perceive mathematics more positively than male students. The variations observed among students' gender could be also attributed to their personalities, environmental, and educational backgrounds.

It is most probable that students based on the environments they were raised influenced their mathematics attitudes. For instance, if students were raised in environments where mathematical values or prints were common, it is probable for students to develop positive attitudes towards the subject. On the other hand, if students do not have any early contact with mathematical values and prints in their early years, they are most likely to have problems in mathematics in later years. Such gender variations in mathematics attitudes may be attributed to how students began to learn about mathematics.

In the process of learning mathematics, if students develop the perception that mathematics is difficult, they may develop negative attitudes toward mathematics and vice versa. In sum, in the present study, students demonstrated positive attitudes toward mathematics.

4. Conclusion

The study showed that students demonstrated positive attitudes toward mathematics. In addition, the study also revealed a negative correlation between student-related factors and their mathematics performances. Finally, gender variations were revealed among students in terms of student's attitudes and perceptions. Female students demonstrated higher attitudes toward mathematics than their male counterparts.

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