

RESEARCH ARTICLE
Relationship between Student Perception on Self-achievements and Attitudes toward Statistics: A Spearman's Correlation Analysis

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ABSTRACT

Students' perception on statistics is an important element in making sure that they love or do not love the subject. When students interested in learning statistics, their performance in that subject will be good and vice versa. In this study, the relationship between students' perception on their self-achievement in mathematics and their attitude toward elementary statistics course was investigated. The respondents were selected from different courses, ethnic and religious background, gender, and age group. Sample respondents of 274 were chosen from 18 different classes for elementary statistics course in 2015–2016 academic years. Every class size ranged from 41 to 57 students. A Spearman's correlation analysis was adopted to examine the relationship. A preliminary study on the data shows that there are seven factors contributing to students' attitude toward elementary statistics course. Students' perception on their self-achievement in mathematics and their attitude toward statistics course are related to each other. This study found that students with a good mathematics achievement tend to have a more positive attitude toward statistics.

Key words: Students' perception, attitude towards statistics, spearman's correlation analysis

INTRODUCTION

Mathematics is one of the important subjects.^[1] Mathematics has been taught since primary school, secondary school, and up to the tertiary level of education. We use mathematics in our daily life.^[2] We learn mathematics since our young age. There are many assessments that have been done to check the understanding of students towards mathematics subject.^[3] This is to make sure that all of us can use mathematics at least to the simplest problems/situations.

There is a broad area of mathematics. In the area of mathematics, there is one important branch, which we called statistics. Statistic is a technique being use in collecting data, organizing data, analysis, making conclusion and finally come out with decision.^[4-6] There is a wide range of

statistical usage in our life. Many important decisions must be based on statistics. Statistics may help us to make an accurate decision based on the information that we have.

Even though the importance of statistics has been highlighted recently,^[6,7] there are still many students who are afraid of learning statistics. They have the mindset that the subject that involved calculation is a difficult subject.^[8,9]

It is very important for us to study the student perception on their self-achievement and attitude toward statistics. The findings of the study will help the students to realize their perception on statistics. This hopefully will help them to improve themselves in the future.

METHODOLOGY
Sample of data

In this study, the population was the non-science quantitative undergraduate students of who

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enrolled in elementary statistics course during the first semester of 2015–2016 academic years. The total population comprised of 976 students. Students were selected from different courses, ethnic and religious background, gender, and age group. With the total population of 976 students, the minimum number of 274 respondents was an appropriate sample size to represent the population in this study.^[10] For that reason, the sample size in this study was set to 274 respondents. Stratified sampling method was used to select sample students. Since there were a total of 18 classes for elementary statistics course during 2015/2016 academic years with different class size ranged at 41–57 students, therefore, 18 classes considered as strata. Finally, students were randomly selected from each of the strata to make a sample size of a total of 274.

Data collection

Data collection method included questionnaires developed based on previous literature. Semantic scale was used, with items' scale ranging from 1 (strongly disagree) to 7 (strongly agree). Demographic profiles such as gender, age, and race to name a few were collected. Questionnaires were distributed to the respondents of the survey in order to collect the information regarding students' attitudes toward statistics. This study used an instrument developed by Schau^[11] called Survey of Attitudes toward Statistics (SATS-36) that contains 36 items, which were designed to measure undergraduate students' attitudes toward statistics.

Spearman's rank correlation coefficient

Spearman's rank correlation coefficient measures the strength and direction of the association between two ranked variables. This correlation was named after Charles Edward Spearman, an English Psychologist. A perfect Spearman's correlation of +1 or -1 shows that each of the variables has monotone function of each other. A zero correlation value indicates that there was no relationship existing between variables. A positive correlation value indicates positive relationship between the two variables. As the value of one variable increases, it will also increase the value of other variable. While for negative correlation, as the value of one variable increases, it will

decrease the value of other variable. Spearman's correlation coefficient can take values from +1 to -1. The closer the value to zero, the weaker association between the ranks. The closer the value to +1 or -1, the stronger the association between the ranks.

ANALYSIS AND DISCUSSION

This study investigated the relationship between students' perception on their self-achievement in mathematics and their attitude toward elementary statistics course. A preliminary study on the data shows that there are seven factors contributing to students' attitude toward elementary statistics course. The factors are self-determination, cognitive competence, effort, value of the statistics in professional life, difficulty, statistical solving, and value of statistics in everyday life, while the perception on self-achievement in mathematics was assessed by the following questions: (i) "How well did they do in mathematics subject in the past" and (ii) "How good is their mathematics skills."

Spearman's rank correlation coefficient

Students were asked "how well did they do in mathematics subject in the past" and "how good is their mathematics skills." Therefore, a correlation analysis using Spearman's rank correlation coefficient was conducted to explore the relationship between the seven factors regarding the students' attitude toward statistics with respect to their mathematics achievement.

The result in Table 1 shows that the question on "how well did student do in mathematics course that they have taken in the past" had a statistically significant relationship with self-determination, cognitive competence, effort, and value of statistics in professional life where the $P < 0.05$. There was moderate and positive relationship correlation ($r = 0.560$, $P < 0.05$) between "how well did student do in mathematics course that they have taken in the past" with self-determination factor. If the students did well in mathematics course that they have taken in the past, the more positive their attitude toward statistics. The same results arrived for cognitive competence factor and "how well did student do in mathematics course that they have taken in the past" have moderate and positive relationship ($r = 0.417$, $P < 0.05$). If the students

Table 1: Correlation between mathematics achievement and how good mathematics at and students' attitude toward statistics

Factors		F1 Self-determination	F2 Cognitive competence	F3 Effort	F4 Value of statistics in professional life	F5 Difficulty	F6 Statistical solving	F7 Value of statistics in everyday life
How well did you do in mathematics course you have taken in the past	Correlation Coefficient	0.560**	0.417**	0.268**	0.169**	-0.083	0.047	0.050
	Significant (two-tailed)	0.000	0.000	0.000	0.005	0.172	0.437	0.408
	N	274	274	274	274	274	274	274
How good is your mathematics skills	Correlation Coefficient	0.580**	0.429**	0.274**	0.190**	-0.099	0.059	0.036
	Significant (two-tailed)	0.000	0.000	0.000	**0.002	0.103	0.329	0.548
	N	274	274	274	274	274	274	274

**Correlation is significant at the 0.05 level (2-tailed)

did well in mathematics course that they have taken in the past, the more positive perceptions of their intellectual knowledge and skills when they apply it toward statistics. Furthermore, effort ($r = 0.268, P < 0.05$) and values of statistics in professional life ($r = 0.169, P < 0.05$) have small and positive relationship with "how well did student do in mathematics course that they have taken in the past." Hence, if the students did well in mathematics course that they have taken in the past, the higher the effort of students in statistics and they have more positive attitude about the usefulness, relevance, and worth of statistics in professional life. However, there was no statistically significant relationship between "how well did student do in mathematics course that they have taken in the past" with the factor difficulty, anxiety, and self-concept.

On the other hand, it also shows that "how good is your mathematics skills" had a statistically significant relationship with self-determination, cognitive competence, effort, and value of statistics in professional life factors. All the P values were smaller than 0.05. There was moderate and positive relationship correlation ($r = 0.580, P < 0.05$) between the how good is your mathematics skills' with self-determination factor. The good the students in mathematics, the more positive their attitude toward statistics. The same results also arrived at cognitive competence factor and "how good is your mathematics skills." They have moderate and positive relationship ($r = 0.429, P < 0.05$). When the students are good in mathematics, the positive the perceptions of their intellectual knowledge and skills when

applies to statistics. Furthermore, effort ($r = 0.274, P < 0.05$) and values of statistics in professional life ($r = 0.190, P < 0.05$) have a small and positive relationship with "how well did student do in mathematics course that they have taken in the past." Hence, when the students doing well in mathematics course that they have taken in the past, the higher the effort of students in statistics and the more positive their attitude about the usefulness, relevance, and worth of statistics in professional life. However, there was no statistical significant relationship between "how well did student do in mathematics course that they have taken in the past" with the factor difficulty, anxiety, and self-concept.

CONCLUSION

Students' perception on their self-achievement in mathematics and their attitude toward elementary statistics course are correlated to each other. This study found that students with a good mathematics achievement have a significant relationship with their attitude toward statistics. Students with a good mathematics achievement tend to have more positive attitude toward statistics. They have more positive perceptions of their intellectual knowledge and skills when apply to statistics and make more effort to learn statistics. Besides, they also tend to have a positive attitude about the usefulness, relevance, and worth of statistics in professional life.

Statistics should be demonstrated in a more practical way which enables students spontaneously and willingly associates statistics knowledge with

their everyday life and in environment. This was important due to the engagement and exposure of students with statistics which gives a better perspective of statistics and statistics learning. Furthermore, developing a more positive attitude toward statistics can further promote the learning process and students' ability to apply the concepts in environment and future.

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