

Students' Attitude and Academic Achievement in Statistics: A Correlational Study

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Abstract

Students' attitude towards the course plays an important role in the learning achievement of the student. The purpose of this study is to investigate the relationship between the attitude and academic achievement of the students in statistics. The descriptive-correlational research design was employed in this study. The sample size of this study was 560 students enrolled in a business statistics course. The Survey of Attitude towards Statistics (SATS-36) instrument was used in this study with the 6 attitude components namely affective, cognitive competence, value, interest, difficulty, and effort. Pearson's correlation was used to test the significant relationships between the attitude components and the academic performance of the students in the course. Research findings revealed that the 5 attitude components such as affective ($r = 0.203$, $p = 0.001$), cognitive competence ($r = 0.231$, $p = 0.000$), value ($r = 0.182$, $p = 0.003$), interest ($r = 0.208$, $p = 0.001$) and effort ($r = 0.243$, $p = 0.000$) have a significant positive relationship on the academic achievement of the students in statistics. However, the difficulty component ($r = -0.115$, $p = 0.064$) found no significant correlation in the academic achievement of the students. Hence, educators should give much effort to the students' attitude towards the course as this would propel them to achieve higher in the learning process. Likewise, educators must have an intervention or other enhancement methods to eliminate difficulties experienced by the students in statistics.

Keywords: academic achievement, attitude, relationship, statistics.

INTRODUCTION

Students' attitude towards the course plays an important role in the learning achievement of the student. In as much as teaching and learning statistics is concerned, it is important to assess the students' attitude regarding statistics as this may provide information to the students, teachers and curriculum developers to improve instructions. Meanwhile, to ensure the competency of the students in the course, statistics educators should assess students' standing on non-cognitive factors like interest or motivation for further learning, self-concept or confidence regarding statistical skills, willingness to think statistically in everyday situations, and appreciation for the relevance of statistics in their personal and vocational lives (Gal, I. & Ginsburg, L. (1994). Hence,

students need to have a positive attitude toward statistics (Schau, C., 2003b).

Most students viewed statistics as a hard course because of its mathematical formulae and computations. In fact, according to Judi et.al (2011), statistics courses are often considered difficult because it involves many fundamental concepts and techniques. In addition, according to Sahari et al (2011), students feel that the course is not relevant to their field of study, as well as for their future career and thus resulting in a negative attitude towards the course. Students' interest and enjoyment of the course can also be factors in measuring attitudes towards the course. Other factors also mentioned by Judi, et.al (2011) like negative attitude makes them feel tired to undertake the course, incapable of appreciating the benefits of

statistics, unable to focus in the class, tend to interfere during class progress and absent.

On the other hand, a positive attitude towards the course resulted in a better performance of the students. Moore (1997) and Mills (2004) suggest that active learning methods should be employed, such as by emphasizing statistical thinking and data processing, instead of using theory and formula alone. According to Nolan et al. (2012), improving students' attitudes through educational interventions may also increase confidence in their ability to understand statistical information and problem-solve using statistics beyond the classroom. Students' attitudes towards statistics may play an important role in their statistics achievement, affecting the learning of statistics, understanding statistical concepts and methods, and developing useful statistical thinking skills needed to apply statistics knowledge (Artino A.R, La Rochelle J. S, Durning S.J, 2010). In addition, according to Gomez (2011), teaching business statistics courses to undergraduates should focus on understanding statistical results and their association with business problems. Thus, the application of statistical concepts and methods must be given priority rather than spending time in the definite details of formulae and computations. Thus, a positive attitude could be achieved for this purpose since students could be able to see and appreciate the significance of the course, especially when applied to their daily living and field of study.

Several instruments were developed and utilized to assess attitudes towards statistics: The Survey of Attitudes Toward Statistics (SATS) (Schau, C., 2003a), the Attitudes Towards Statistics scale (ATS) (Wise, S.L., 1985) and the Statistics Attitude Survey (SAS) (Roberts, D.M. & Saxe, J.E. (1982). However, the differences between these instruments that assess students' attitudes towards statistics are not the main concern of this study but it is interesting to note the relationship between their attitude and performance in statistics regardless of the instrument employed. In this study students' academic achievement was measured by using their prelim grade in statistics while their attitude towards the course was measured using the 6 attitude components of SATS instrument.

Student's performance in the course is also clearly shown to be related to their attitudes towards the course (Geddes, et al., 2010; Amrai

et al., 2011; Kazami, et al., 2013; Bakar, et al., 2010; Newton & Mwisukha, 2009; Akpinar, et al., 2009; Veresova & Mala, 2016; Pajares & Miller, 1994).

Similarly, the study reported by Liu, Maddux, & Johnson (2004) that four computer attitude variables (enjoyment, motivation, importance, and freedom of anxiety) have linear relationships with students' achievement in computer courses.

Papanastasiou (2000) and Michelli (2013) also found a positive relationship between mathematics achievement and students' attitudes towards mathematics. Concerning gender, Mitchell (2013) mentioned that males had a more positive attitude towards math compared to females, but both genders scored approximately the same on the achievement test. Finally, extroversion was the only trait to have a significant relationship with achievement, showing that more extroverted students scored higher on the test. These findings indicate that educators should be aware of students' attitudes and seek to improve them to positively influence students' academic achievement.

Moreover, the study of Bakar, et al (2010) shows a positive significant correlation between students' attitude towards learning and achievement motivation ($r = 0.53, p < .001$), and between students' attitude and academic achievement ($r = 0.16, p < .001$). However, a negative and low correlation ($r = -.038, p > .05$) was observed between students' achievement motivation and their academic achievement.

Likewise, data analysis indicated a positive and significant correlation between academic motivation and academic achievement. Furthermore, subscales of task, effort, competition, social concern within eight subscales had a significant relationship with academic achievement (Amrai, et al., 2011).

The purpose of this study is to find out the relationship between attitude and academic achievement of students in statistics. The attitude composes of 6-factor components such as affective, cognitive competence, value, difficulty, interest, and effort.

Methods

The descriptive-correlational research design was employed in this study. The design was suitable since the aim of the study is to discover the relationships between attitude components and academic achievement. Students were randomly selected and surveyed from the 5 courses namely accountancy, entrepreneurship, legal management, marketing management, and financial management students who were enrolled in the Business Statistics course for the second semester, the school year 2015-2016 with a total sample size of 560. Before the conduct of the study to the target participants, the researcher sought approval from the Office of the Dean. Then, the students were asked to fill up the survey instrument right after the prelim period of the course. The basis of their academic performance for this current study was their prelim grade in the course.

In terms of students' attitudes, a posttest instrument developed and copyrighted by Candace Schau namely, Survey of Attitudes Toward Statistics (SATS-36) was utilized in this study. SATS instrument measures both cognitive and non-cognitive components such as affective (student's feeling regarding statistics), cognitive competence (measures intellectual and knowledge and skills when applied to statistics, value (attitudes towards usefulness, relevant and worth of statistics), difficulty (attitudes towards the difficulty level of the course), interest (attitudes that assesses the interest to statistics) and effort (the amount of work of the students plan to expand to learn statistics). SATS showed a good internal consistency of all the six attitude components using Cronbach's alpha. The reliability coefficient of the SATS instrument using Cronbach's alpha is 0.87.

Descriptive analytics was used to analyze the attitude components of the students such as means and standard deviations. A high mean score in the different attitude components means positive attitudes towards statistics. The participant's attitude towards the course is being interpreted by Zamalia (2009) and interpreted as positive if the mean score is 4.50 to 7.00, neutral for 3.51 to 4.49 and negative for 0.00 to 3.50. Pearson's Correlation was used to test the significant relationships between the attitude components and academic performance of the students in the course.

The Statistical Package for the Social Sciences (SPSS) was used to expedite the process of quantitative data analysis.

Results and Discussion

Demographic profile

Out of 560 students who participated in this study, 371 or 66.25% are female while 189 or 33.75% are male. The majority of the students were enrolled in Financial Management and Marketing Management programs with a total of 334 or almost 60% out of the total participants. Most of the participant ages 18 to 20 years old with a mean age of 19.25. As to parents' occupation, farming is the most job of their father while their mother is housekeeping. Although a significant number of self-employed parents were also recorded in this study where most of them were engaged in business. The average monthly income of their parents is Php8, 990. 51 and most of them are low income earners.

In terms of their prelim grade, 40 or 7.14% of the students have a prelim grade of 80 and below, 91 or 16.25% have a grade of 81 to 85, 322 or 57.50% have a prelim grade of 86 to 90 while 107 or 19.11% have a prelim grade of more than 90. Hence, the majority of the students have a prelim grade of 86 to 90. The average prelim grade of the students in Business Statistics is 88.71.

Figure 1. *Student's Mean Score on the Attitude Components*

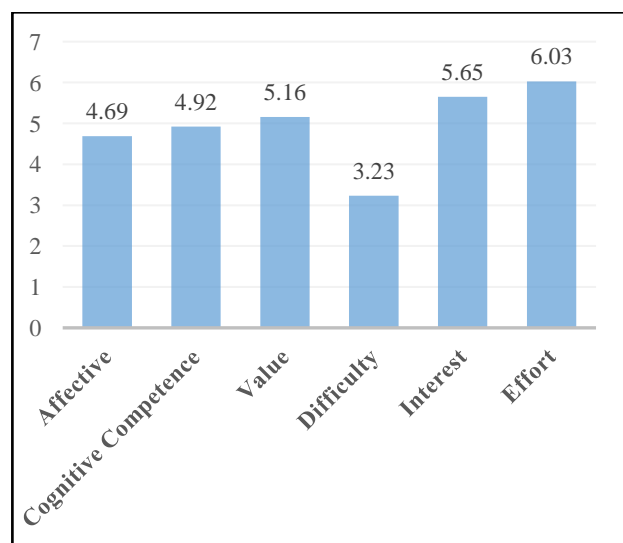


Figure 1 shows the student's mean score of all the attitude components in statistics. Based on the figure, the attitude components such as affective, cognitive competence, value, interest, and effort were labeled positive with means of 4.69, 4.92, 5.26, 5.65 and 6.03 respectively excluding difficulty with a mean of 3.23.

For the affective domain, students' feelings towards statistics are slightly positive. This means that students like statistics, they enjoy taking the course, they feel satisfaction in the course, feel confident in solving statistics problems and manage to avoid frustrations and stress in taking the course.

Likewise, cognitive, students' intellectual knowledge and skills are more likely positive shows that they are assured to learn statistics because they understand statistics; they know statistics well and find easy to understand statistics equations and concepts.

Also, value factor, students assessed a highly positive in terms of the worthiness and relevance of statistics in their personal life and future career. Since statistics is vital for them especially in their professional career as business students thus, statistics should be a part of their professional training and the statistical skills they will gain will make them more employable.

Meanwhile, a student's interest in statistics is highly positive, too. This demonstrates that

students showed interest in learning statistics, interest in understanding statistical information, they showed interest in using statistics and sharing statistical information with their fellow students.

The student provides enough effort towards the course such as they tried to complete their assignment in statistics, they worked hard toward the course, giving much effort in reading or studying hard for every statistics test and trying to attend every statistics class session.

However, students experienced difficulties in statistics. Most of the reasons for the students is that the course is highly technical since it involves massive computations and learning the course requires a great deal of discipline. Hence, to avoid a negative attitude towards statistics, educators should limit their students in doing massive computations but introduce some statistical software to enhance teaching and learning the course. A study conducted by Colado, et al. (2017) regarding the use of mathematics educational software to support the learning of first-year primary students in Mexico suggests, that based on the survey conducted, the use of mathematics educational software has a positive impact on the learning of the students. Further, the integration of technology can also contribute significantly to students' engagements and motivation as well as attitude towards Mathematics courses (Kilicman, et al. (2010).

Table 1. *Correlations between the attitude components and academic achievement*

<i>Attitude Components</i>	<i>Pearson Correlation coefficient</i>	<i>p-value</i>
Affective	0.203**	.001
Cognitive Competence	0.231**	.000
Value	0.182**	.003
Difficulty	-0.115	.064
Interest	0.208**	.001
Effort	0.243**	.000

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

Significant positive correlations were found on attitude components like affective ($r = 0.203$, $p = 0.001$), cognitive competence ($r = 0.231$, $p = 0.000$), value ($r = 0.182$, $p = 0.003$), interest ($r = 0.208$, $p = 0.001$) and effort ($r = 0.243$, $p = 0.000$) in relation to their academic achievement in statistics (see table 1) except for difficulty component ($r = -0.115$, $p = 0.064$). This shows that these attitude components have a significant

positive relationship on the academic achievement of the students in the course. These findings are consistent and supported by other researches who found a direct relationship of attitude and academic performance of students (Geddes, et al., 2010; Amrai et al., 2011; Kazami, et al., 2013; Bakar, et al., 2010; Newton & Mwisukha, 2009; Akpınar, et al., 2009;

Veresova & Mala, 2016; Pajares & Miller, 1994).

Also, the study of Amrai (2011) showed that the subscale effort had a significant relationship with academic achievement. This means that the more effort employed by the students in the course the higher their grade, thus, resulted to a better academic achievement toward the course. On the other hand, the results of the current study is contrary to the findings of Ahmad (n.d) and Kinniard (2010), that there is no significant relationship on the attitude of the student to their academic achievement. Also, Li (2010) found out that effort failed to predict academic achievement. Nevertheless, it is suggested that all educators should give much effort on the students' attitude towards the course as this would propel them to achieve higher in the learning process.

Conclusion and Recommendation

The purpose of this study is to investigate the relationships between attitude and academic achievement of students in the business statistics course. Based on the result of the study, academic achievement was found related to students' attitude towards the course. The results of the current study is consistent with the findings of the other studies as mentioned above. Thus, it is suggested that administrators and educational planners should give much effort on the students' attitude towards the course as this would propel them to achieve higher in the learning process. Also, educators must have an intervention or other enhancement methods to eliminate difficulties experienced by the students in statistics. Creating interactive graphs and tables through statistical software must also be introduced and demonstrated to the students for them to develop their statistical analysis towards the course and in order to eliminate negative attitudes towards the course. Hence, the administrators should allot funds for the purchase of math software as one of the priority projects in improving instructions.

However, further research must be done to explore relationships and other possible causes or factors that could affect the academic achievement of students in statistics.

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