

FACTORS AFFECTING PERFORMANCE IN STATISTICS OF BENGUET STATE UNIVERSITY COLLEGE STUDENTS

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This study aimed to determine the factors affecting performance in basic statistics course. Respondents were randomly selected from the Statistics 11 students of the first semester of school year 2016-2017. Results revealed that students have a positive attitude towards statistics. Sex and year level of students have direct effects on attitude towards the difficulty of the subject, which in turn have indirect effects on the students' performance in statistics. Also, degree of students, performance in math, schedule of classes, attitude towards the value of the subject, and attitude towards the difficulty of the subject have direct effects on the students' performance in statistics. Instructors should align and personalized the examples and applications along the degree of students to develop the value of statistics among students.

INTRODUCTION

Statistics is a required subjects in almost all undergraduate programs in large number of college institutions in the Philippines. Majority of students find the subjects difficult due to variety of reasons. In fact, some scholars (Blalock, 1987; Garfield & Ben-Zvi, 2007) have suggested that instructors focus on the value of statistics in order to foster more positive attitudes toward statistics and attempt to reduce the fear of statistics as an initial step of instruction. Student attitudes towards statistics are important as these may establish connection to the learning process. In fact, studies have reported that attitudes toward statistics were related to the development of statistical thinking skills, the degree to which statistics will be used outside of the classroom, the likelihood of enrolling in future statistics related courses, persistence, and achievement (Gal, et. al, 1997; Hilton, et. al, 2004). In support, Waters, et. al (1988) accounted that negative attitudes towards statistics are related to worse performance in class.

Low and even failing grades in Basic Statistics specifically Statistics 11 are observed among students of Benguet State University. Some undoubtedly enrolled the subject simply for compliance, opposite those who endeavor to complete the course requirements. A percentage of the non-mathematics/ statistics majoring students on the other hand do not take the subject seriously as premised by the subject's presumed less relevance to their course. It is largely anchored on the above that the researcher came up to this research to see if the attitude of the undergraduate students towards the subject affects their performance coupled other independent variables.

Results of this study may benefit the undergraduate students through increased awareness on the effects of their attitude towards statistics on their learning process and performance in the said subject. Knowing the effects, they may be able to adjust while employing various alternatives to pass the course. Notably, attitude information can specifically be used to identify students who are potentially at risk for failing the statistics subject. Such identification may be the primary step in assisting them to perform better.

METHOD

The study was conducted using two hundred eighty-eight (288) Benguet State University college students enrolled in Basic Statistics on the first semester of school year 2016-2017. A survey questionnaire was administered to the respondents. It is a statistics attitude survey adopted from Survey on Attitude towards Statistics by Schau et. al (1995), Schau (2003), SATS-28 by Schau (2000), and ATS by Wise (1985). It also gathered the personal and academic profile of the students.

Descriptive statistics were used in identifying the attitudes with highest and lowest level of agreement. Using the 35 item survey questions, principal component analysis was employed to extract the unique latent factors on the attitudes towards statistics. The eigenvalue above 1 and the scree plot are the criteria used in identifying the important components. Lastly, path analysis

employed to measure the effects of the extracted component of the attitudes of the students towards statistics, academic performance and selected profile variables.

RESULTS

Among the 35 item statistics attitude survey adopted, the items with highest means are the following: “Statistics helps people to make better decisions”, followed by the statements “Statistics is useful in my profession”, and “I can use statistics in my chosen career”. While the items with lowest means are “I find that statistics problems are easy”, “Statistics formulas are easy to understand”, and “Statistics is not a complicated subject”.

Table 1 presents there are five components extracted from the attitude survey. The first component (affective) attributed 31.65 % of the total variance as shown in Appendix B. The second component (interest) explained 19.48%, the third component (value) accounted 15%, and the fourth component (difficulty) and fifth component (social) explained 8.32% and 4.80 % of the total variance, respectively.

Table 1. The extracted components of the attitudes towards statistics

Component	Attitudes	Loadings
PC1 (Affective)	Statistics is good not only for people in scientific areas.	0.984
	I am not scared of statistics.	0.983
	Statistics is very useful.	0.977
	I am passionate about statistics because it helps me to view problems objectively.	0.976
	I am interested on being able to communicate statistical information to others.	0.973
	I don't get frustrated when I hear the word statistics.	0.966
	I am not frustrated going over statistics tests in class.	0.962
	Studying statistics is not a waste of time.	0.952
	I don't feel bored when I study statistics.	0.951
	Statistics is not worthless.	0.935
	I don't feel in secured when I have to solve statistics problems.	0.906
	Statistics is very useful in everyday life.	0.892
	PC2 (Interest)	I will work hard in my statistics subject.
I enjoyed discussing statistics with others.		0.893
Statistics helps me to understand today's world.		0.890
I will study hard for every statistics test.		0.858
I am happy after finishing my seatwork in statistics alone.		0.840
I am interested in learning statistics.		0.816
I use statistics in my everyday life.		0.784
PC3 (Value)	I am interested in using statistics.	0.650
	Statistics has an important role for decision-making.	0.927
	Statistics is relevant in my life.	0.922
	I can use statistics in my chosen career.	0.900
	Statistics is useful in my profession.	0.882
PC4 (Difficulty)	Statistics helps people to make better decisions.	0.860
	Statistics skills will make me more employable.	0.828
	Statistics is not a complicated subject.	0.823
	I don't have trouble understanding statistics.	0.707
	I find that statistics problems are easy.	0.695
	It is easy for me to understand what's going on in this statistics subject.	0.659
PC5 (Social)	Statistics formulas are easy to understand.	0.620
	I enjoy solving statistics problems.	0.521
	I want to spend my time with my classmates discussing statistics.	0.771
	I enjoy discussing about Statistics.	0.737

The attitudes which highly load in the first component are the following: “I am passionate about statistics because it helps me to view problems objectively” (0.976), “I am interested on being able to communicate statistical information to others” (0.973), “I don’t get frustrated when I hear the word statistics” (0.966), “I am not frustrated going over Statistics tests in class” (0.962), “Studying statistics is not a waste of time” (0.952), “I don’t feel bored when I study Statistics” (0.951), “Statistics is not worthless.” (0.935), “I don’t feel in secured when I have to solve Statistics problems” (0.906), and “Statistics is very useful in everyday life” (0.892).

On the other hand, the variables that loaded heavily on the second component (PC2) include: “I will work hard in my statistics subject” (0.900), “I enjoyed discussing statistics with others” (0.893), “Statistics helps me understand today’s world” (0.890), “I will study hard for every statistics test” (0.858), “I am happy after finishing my seatwork in statistics alone” (0.840), and “I am interested in learning statistics.” (0.816).

As to the third component (PC3), the following variables that loaded heavily: “Statistics has an important role for decision-making” (0.927), “Statistics is relevant in my life” (0.922), “I can use statistics in my chosen career” (0.900), “Statistics is useful in my profession” (0.882), “Statistics helps people to make better decisions” (0.860), and “Statistics skills will make me more employable” (0.828).

Appealing to the fourth component (PC4), the variables that loaded heavily cover: “Statistics is not a complicated subject” (0.823), “I don’t have trouble understanding statistics” (0.707), “I find that statistics problems are easy” (0.695), and “It is easy for me to understand what’s going on in this statistics subject” (0.659). This result involves the effect of perceived difficulty of statistics on the college students’ attitude towards the subject.

Moreover, the variables that loaded heavily on the fifth component (PC5) are: “I want to spend my time with my classmates discussing statistics” (0.771) and “I enjoy discussing about Statistics” (0.737). This component was labeled “social”; relating to interest for group discussion about Statistics. Group work involvement affects the college students’ attitude as implied by this result.

To further determine which among these extracted components affects statistics performance of the students together with the selected profile variables, path analysis was employed.

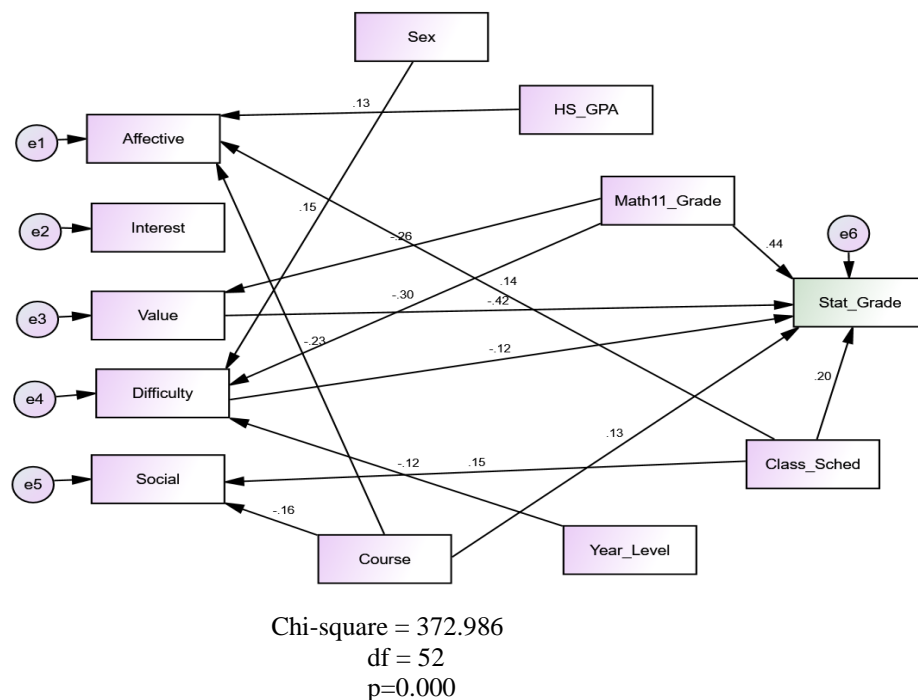


Figure 1. Interplay of the factors the influence statistics performance

Figure 1 shows the derived model where the exogenous variables with direct and indirect effects are clearly observed. As shown, the variables that have significant influence towards performance in statistics are the following: performance in Math with a path coefficient of 0.44, lecture class schedule in Statistics, value of the subject with a path coefficient of -0.42, and students' difficulty of the subject obtaining a path coefficient of -0.12.

DISCUSSION

Table 1 clearly indicates that most attitudes towards statistics are positive. The five extracted components were labeled as “affective” (feelings towards statistics), “interest” (interest for knowledge and activities in statistics), “value” (perceived usefulness of the subject personally and professionally), “difficulty” (considers the difficulty of the subject), and “social” (interest for group discussion about the subject).

It can be seen from Figure 1 that students' performance in math have a positive direct effect on their performance in statistics. This results supports the students cannot enroll statistics subject without passing first Math 11 or College Algebra. In addition, the result in which students' course also has a direct effect on their performance implies the difference in the performance of the students depending on the relation or relevance of the subject to their course. Also, stated above are the two factors affecting attitude towards statistics that have a direct effect on the college students' performance in statistics. Belief of the students on the value of statistics personally and professionally has a positive direct effect on their performance in the subject. This implies that the more students think that statistics is relevant to them and to their profession, the more they will take the subject seriously and will get a higher performance in the said subject. Belief on the difficulty similarly has a direct positive effect on the performance of the students. Believing that the subject is difficult make the students do their best to understand it and rather perform better.

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