



Profile Identification of Students' Attitude Towards Statistics Course: A case study in UiTM Pahang Branch (Raub Campus)

Nur Dalila Norshahidi

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Pahang Branch, Raub Campus, Pahang, Malaysia.
dalila664@uitm.edu.my

Noor Halimatus Sa'diah Ismail

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Pahang Branch, Raub Campus, Pahang, Malaysia.
halimatusaadiyah@uitm.edu.my

Syazwani Zainal Abidin

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Pahang Branch, Raub Campus, Pahang, Malaysia.
syazwanizainal@uitm.edu.my

Nor Fatihah Abd Razak

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Kelantan Branch Machang Campus, Kelantan, Malaysia
nfatih570@uitm.edu.my

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ABSTRACT

This paper is concerned about the students' attitude from Faculty Business and Management in UiTM Pahang Raub Campus, towards the Statistics course. The objective of this study is to determine the mean difference of students' performance between gender, to identify students' attitude towards Statistics course and to profile the students' attitude towards Statistics course. The survey was retrieved from the Survey of Attitude Towards Statistics (SATS) instrument. The independence T- test and Mean Score was used to retrieve the results. The results show a difference of test scores between genders, in which female students show a greater performance compared to male students. In addition, students demonstrate a positive attitude towards Statistics courses through Mean Score of the component (Affective, Effort, Cognitive Ability and Value). Even though female students show an outstanding performance than male students in test scores, through profiling male students tend to be more positive in attitude to understand this subject better. Overall, those findings help instructors to improve their teaching methodologies in making statistics courses more interesting to be learned.

Corresponding Author:

Nur Dalila Norshahidi

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Pahang Branch, Raub Campus, Pahang, Malaysia.

email: dalila664@uitm.edu.my

1. Introduction

Statistics is a structural method that plays a vital role in scientific studies to improve our lives and it is applied in various areas including in education. One of the fundamentals subjects in Higher Education Institutes in Malaysia is statistics. In the University of Technology MARA, Introduction to Statistics is a compulsory subject for students from Faculty Business and Management. The educators and students have conducted many studies on statistical attitudes because they believe

that in the process of teaching and learning, attitudes towards statistics are very essential in order to require personal feedback.

From the demographic data, most of the students took additional mathematics subjects during secondary school. However, the result is not satisfactory even though they have experiences or exposure on the subject. Difficulties in understanding the statistics subject contributed to low levels of examination performance due to these attitudes, such as affective, effort, cognitive, and value of students will affect them. In light of these issues, a survey to determine the mean difference of students' performance between gender, to identify students' attitude toward Statistics course and to profile the students' attitude towards Statistics course has been conducted in this study in order to investigate this issue.

2. Literature Review

In 2009, Mahmud [1],[2] had studied the profiles of statistics learners' attitude toward statistics through the classification process of discriminant function. In this research, the researcher implies the multivariate technique method to profile the subjects' attitude into either positive or negative attitude towards statistics. Then once again by using the Attitudes Toward Statistics (ATS) instruments the learners' attitudes toward statistics were measured, see [1]. As the result of this research, it can be concluded that learners with positive attitudes can be reliably distinguished from learners with negative attitudes toward statistics across the four ATS sub-scales, types of learners, mode of study and learner's evaluation towards the course.

According to Ghulami et. al [3], students with great efforts showed a positive attitude towards statistics compared to other latent variables such as interest, value, difficulty, and cognitive competence. also supported those full efforts from the students implies a highly positive attitude. The instrument used for the study is a questionnaire that was adopted and adapted from the reliable instrument of Survey of Attitudes towards Statistics© (SATS©). The results were consistent with [4 & 5]. However, [6] found that neutral attitudes among their students.

Opstad [7] had studied different variables, by combining mathematical skills and personal traits using The Big Five Model, to see which have the most influence on business students' attitudes towards statistics. The methods used were pairwise comparisons (t-test) and a linear regression model, using a sample from a Norwegian business school. The result shows that there is a substantial gender gap towards attitudes towards statistics but taking mathematical skills and personal characteristics into consideration then results in this gap becoming much smaller. See also [8-11].

Similar research as in [7] also has been conducted in recent years by Ashaari et al. [12]. Due to humongous interest in the area, [12] had studied the attitude towards a statistics course and analysis of the relationship between the six factors to the demographic variable of the students. Unlike the research in [13] that uses pairwise comparisons (t-test) and a linear regression mode, Ashaari et al. [12] uses the method of mean score to analyze the result. The data collected by using the survey of the Attitudes Towards Statistics (SATS) observed student's attitude towards the statistics course. The research in [12], implies that the students show a highly positive attitude in making necessary efforts to understand the subject better.

Motivated by the work [12][7], this research paper focuses on the students' attitude and the profile towards statistics subject for the new targeted population that is students in the Faculty of Business and Management in UiTM Pahang Branch, Raub campus. Similar approach in [12] [7] in finding the results as pairwise comparisons (t-test) and mean score method will be used. Adding up to improve the research paper, the profiling of the students' attitude towards Statistics course will also be investigated. Thus, a new result will be obtained in this paper.

3. Research Method

3.1 The survey data

This study was carried out on semester three students from the Faculty of Business Management taking Introduction to Statistics subject. A stratified sampling procedure was used to select a sample 160 from 265 of total students in 10 registered groups. This method was chosen to make sure all groups will be selected with equal proportion since there are different instructors for each group. Students' performance found differ across different instructors teaching the same course [13]. They were asked to fill in several questions including their demographic information and

importantly their perceived attitude towards statistics via online survey form. The survey was retrieved from the Survey of Attitude Towards Statistics (SATS) instrument [3]. The survey has been designed and divided into Part A and Part B. Demographic section is inserted into Part A, which includes questions such as gender, course, group, and questions as to whether they had taken additional mathematics in their previous study. Meanwhile, Part B consists of four components of attitude towards statistics such as affective, effort, cognitive ability, and value. The student should answer their perceived questions given in a 7-point Likert scale, strongly disagreeing, and strongly agreeing as endpoints. Reliability assessment is the evaluation of a test or a research study's accuracy. The Cronbach's Alpha value is 0.973 for all factors, which is considered as very strong consistency. The reliability index for each factor also has very high consistency; Effort (0.934); Affective (0.938); Cognitive (0.958) and Value (0.953) respectively. All the values that lie between 0.76 to 0.95 are considered as fairly high consistency[14].

3.2 Mean Score in Measuring Attitude Instrument

A mean score was employed to conclude the respondents' feedback towards each item in the attitude instrument (Effective, Effort, Cognitive ability, and Value) as given in the survey form. According to Mahmud [2], the students' attitude towards the statistics course is categorized as positive if the mean score is 4.50 to 7.00, neutral for 3.51 to 4.49 and negative for scores 0.00 to 3.50.

3.3 Independent t- test

An independent sample t-test is used to calculate the mean score between an independent variable and a dependent variable. There are several assumptions that should be fulfilled and there are error terms that must be normal, independent and have a constant variance. The normality of the data is checked using the value of skewness. If the skewness value lies between -0.5 and 0.5, the distribution is approximately symmetric, [15]. Therefore, the data are fairly normal distributed. After checking the normality, an equal variance must be assumed to proceed with the Independent Sample T-Test. Equal variances considered to be estimated equal when p-value in the Levene Test is more than 0.05. After that, check forward to the p-value for (2-tailed) in t-test for equality of means. If the value less than the p-value is less than $\alpha = 0.05$, then there is significant difference between the two variables.

4. Results and Discussion

4.1 Descriptive Statistics

This section will discuss results of descriptive analysis to illustrate the characteristics of the respondent. The summary statistics of students is shown in Table 1.

Table 1. Summary statistics on sample of (n=160) students

		Frequency	Percentage
Gender	Male	52	32.5
	Female	108	67.5
Program	BA111	96	60.0
	BA119	64	40.0
Add Math	Yes	98	61.3
	No	62	38.8

The total number of students who are enrolled in STA104 is 160. There is 100% of response rate and there is non-response error. Clearly stated that all respondents were able to answer all questions given. 32.5% of respondents were male and 67.5% were female. 60% were students from the Business Studies program (BA111) and 40% from the Banking Studies program (BA119). This study also asked who sat for additional mathematics during their '*Sijil Pelajaran Malaysia*' (SPM) and it shows that about 98 (61.3%) of them have sat for additional mathematics and another 62 (38.8%) have not studied additional mathematics during their SPM.

4.2 The Difference of Statistics Test Score According to Gender and Program Taken

The independent t-test used to identify whether there is a significant difference in student achievement (test score) between gender and program. The result is shown in Table 2.

Table 2. The Independent t-test according to gender and program

Test Score	N	Mean	SD	Levene Test	Independent t-test
				F (Sig. Value)	t (Sig. Value)
Male	52	19.8558	6.53373	2.422 (0.122)	-5.963 (<0.0001)
Female	108	25.7593	5.51781		

Test Score	N	Mean	SD	F (Sig. Value)	t (Sig. Value)
				BA111	96
BA119	64	24.0859	6.22817		

According to Table 2, the outcome of the test shows that there exists a difference of Statistics test score between genders ($t = -5.963$ and $p < 0.0001$) with a mean of test score for male and female is 19.86 and 25.76, respectively. The result also indicated that there is no significant difference in Statistics test score according to the programs taken ($t = -0.390$ and $p = 0.697$).

4.3 Student Attitudes toward Statistics Course

Table 3 presents the mean score of each item under Affective, Effort, Cognitive Ability and Value Instruments.

Table 3. Mean Score of Attitude Instruments

Affective Attitude Items	Mean	Overall Mean
I will like statistics	5.4750	5.3125
I will feel secure when I solve statistics problems	5.5625	
I will get relaxed when answering statistics tests	5.1500	
I will clear-headed during statistics class	5.1813	
I will enjoy taking statistics courses	5.3875	
I am confident with statistics	5.1188	
Effect Attitude Items	Mean	Overall Mean
I plan to complete all my statistics assignments	5.6438	5.7359
I plan to work hard in my statistics course	5.7375	
I plan to study hard for every statistics test	5.7187	
I plan to attend every statistics class session	5.8437	
Cognitive Attitude Items	Mean	Overall Mean
I will have ease understanding statistics because of how I think	5.0438	5.2104
I will have an idea of what is going on this statistics course	5.0875	
I will solve a lot of math problems in statistics	5.1687	
I can learn statistics	5.4687	
I will understand statistics equations	5.3063	
I will find it is easy to understand statistical concepts	5.1875	
Value Attitude Items	Mean	Overall Mean
Statistics is worthwhile	5.2750	5.1132
Statistics should be a required part of professional training	5.0937	
Statistical skills will make me more employable	5.3062	
Statistics are useful to the typical professional	5.4063	
Statistical thinking is applicable in my life outside my job	5.1812	
I use statistics in my everyday life	4.7125	
Statistics conclusions are rarely available in everyday life	4.9312	
I will have an application for statistics in my profession	5.0063	
Statistics is relevant in my life	5.1063	

Table 3 shows the mean score for each item under all attitude components (Affective, Effort, Cognitive Ability and Value). The respondents have exhibited their agreement and disagreement towards the items in the component. According to the value of mean score for each of the items in the following attitude component, students gave positive feedback since the value of means score is above 4.50.

Meanwhile, student level of interest toward this subject can be measured by using the average score of the items in the components. Therefore, the overall mean score for the Affective, Effort, Cognitive Ability and Value are 5.3125, 5.7359, 5.2104 and 5.1132, respectively. As overall, students show a positive attitude toward this Statistics course since the overall mean score for the component is above 4.50.

4.4 Profiling of Students Attitude

This section will discuss the profiling of male and female students based on their attitude towards Statistics courses. The profiling is done according to gender since there is a significant mean difference in statistics score among gender (refer Section 4.2). Therefore, this section aims to identify the profiling of students' attitudes according to gender.

Table 4. Profiling of MALE students based on attitude.

	MALE					
	NEGATIVE		NEUTRAL		POSITIVE	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
RESULTS						
Pass	26	50				
Fail	26	50				
COURSE						
BA111	32	61.5				
BA119	20	38.5				
ADD MATH						
Yes	33	63.5				
No	19	36.5				
ATTITUDE						
Effort	4	7.7	2	3.8	46	88.5
Effective	2	3.8	8	15.4	42	80.8
Cognitive	5	9.6	4	7.7	43	82.7
Value	6	11.5	9	17.3	37	71.2

Table 4 shows the profiling for male students based on attitude. Majority of the male students are from Diploma in Business Study (BA111) and half of them pass this course. 61.5% of male students sat for additional mathematics during their 'Sijil Pelajaran Malaysia' (SPM). Based on Table 4, clearly shown that more than 80% of male students have a positive attitude towards effort, effective and cognitive. They choose to act positively while a minority of male students show neutral and negative attitudes towards effort, effective and cognitive ability. For attitude values, 71.2% male students showed a positive sign while 11.5% had a negative attitude on value. This profiling aims to identify the attitude owned by male students especially during the teaching and learning process.

Table 5. Profiling of FEMALE students based on attitude.

	FEMALE					
	NEGATIVE		NEUTRAL		POSITIVE	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
RESULTS						
Pass	90	83.3				
Fail	18	16.7				
COURSE						
BA111	64	59.3				
BA119	44	40.7				
ADD MATH						
Yes	65	60.2				
No	43	39.8				
ATTITUDE						
Effort	3	2.8	11	10.2	94	87
Effective	7	6.5	17	15.7	84	77.8
Cognitive	6	5.6	21	19.4	81	75
Value	3	2.8	24	22.2	81	75

Table 5 shows the profiling of female students based on four attitudes accordingly. Contrary with the findings of male students, female students tend to be positive also, but the percentage is lower compared to male students. Only attitude for effort gained more than 80% while for attitude effective, cognitive and value, the percentage is on average 75% only. However, female students have a lower percentage of negative attitude compared to male students. Performance of female students are outstanding compared to male students where 83.3% of them passed this subject. Majority of the female students are from Diploma in Business Study (BA111) and 60.2% of them take an additional mathematics course during *SPM*.

5. Conclusion

As a limitation of this research, due to time constraint and pandemic, the limitation of number data collection is very crucial. Thus, as a result, this research cannot be extended to inferential statistical research, such as to determine the factor that contributes to students' attitude towards statistics courses. Furthermore, with the limited research references in this area, not many of the references can be highlighted. Thus, it is a big loss in the research area and therefore, this paper is highly concerned with the interesting research idea.

The result stated in the previous sections shows that there is a significant difference of Statistics test score between genders with means of test score for male and female is 19.86 and 25.76, respectively. This clearly shows that females have higher performance in Statistics courses than male. Meanwhile, the same section shows that there is no difference of Statistics test score between students who take additional mathematics during *SPM*.

In addition, students were found to show a positive attitude toward Statistics courses. The result shows that the mean score of all attitude components (Affective, Effort, Cognitive Ability and Value) either for each of the items in the component or the overall mean score of the component are all above 4.50.

As a conclusion, this study summarized that even though the performance of female students is more outstanding compared to male students and majority female students have a positive attitude however, male students tend to be more positive in attitude especially in effort, affective, cognitive and value. Overall, the result shows that students have given a great effort in

understanding and learning this course. They were able to demonstrate the positive attitudes toward this course despite the fact that they felt this course was not relevant to their field of study. Even though the attitude shown by students is positive toward learning statistics, instructors must focus on increasing their students' achievement. Instructors must be more aware of the changes in behavior and the effect of the performance (Test Score). They need to improvise their teaching methodologies rather than using cognitive ability in their teaching approach then they can apply the affective ability in applying the knowledge and skill of statistics in their student's daily life.

As a recommendation for future study, this research can be extended to the population for UiTM Pahang students in both campuses (Raub and Jengka) who are taking Statistics courses in their study plan. In addition, this study can also be applied to other courses that are related to Statistics, such as Mathematics.

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