

Research Analysis (Data Analysis)

The difference in perception of University experience between Mature and Young students

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Submitted in partial fulfilment for the award of the degree of
MSc (Hons)/PgDip/PgCert Software Engineering (Web Development)

University of Wales Trinity Saint David

January 2019

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The difference in perception of University experience between Mature and Young students

Introduction

Whilst studying literature [1] [2] it is evident that mature students experience a different university life than that of younger students. Whilst, it is common to stereotype younger students as “freshers” with a notion of heavy drinking and sleeping through 9am lectures, more mature students can express a sense of exclusion and an inability to fit in [3]. This is clearly demonstrated by Henri, Morrell & Scott [4] who report that mature students are portrayed in one of two ways. Firstly, as being highly-motivated and often regarded as the “here-by-choice” students displaying very high levels of engagement. Alternatively, the second description can be that younger students are “more intelligent” and better suited to the university life-style and the challenges it can present. Of course, it is easy to forget that younger students are often those that have been in full time education for most of their life whilst mature students are those that come back to education after a big gap in learning. Thus, this assignment will aim to evaluate these differences in both groups through appropriate data analysis methods.

Aims & Objectives

This assignment will explore the difference in student satisfaction and university experience in a group of 10 mature and 10 young students, and whether there is a significant difference in student satisfaction in both age groups. The results from the tests will be studied using appropriate data analysis techniques and the p-value will be evaluated in order to reject or accept the null hypothesis. All hypotheses presented in this assignment will be tested to 3 different significance levels:

1. $P = 0.10$
2. $P = 0.01$
3. $P = 0.02$

Null Hypothesis

In order to perform appropriate data analysis techniques on the given dataset, appropriate hypothesis' must first be established. The first hypothesis is referred to as the Null Hypothesis (H0), this states that everything we observe is due to chance alone, thus in this case, there is no real difference between younger and mature students. H1 is the term given to the alternative hypothesis which states that everything we observe cannot be responsible by chance alone and there is a significant difference in mature and young student's university experience.

H0 = There is no difference in means between mature and young students student satisfaction experience

H1 = There is a difference in means between mature and young students student satisfaction experience

Raw Data

Prior to this assignment, a trial study was conducted between a group of ten mature students (aged 45-52) and ten young adults (17-20); to test whether university experience satisfaction differed between groups. The test given to the two sets of students was a university experience satisfaction test. Scores from this test were measured on a scale of 0-60 with high score indication of a higher satisfaction rate and a low score relating to lower satisfaction. The results from this study are shown in table 1.

Mature Students	Young Students
45	34
38	22
52	15
48	27
25	37
39	41
51	24
46	19
55	26
46	36

Initially descriptive statistics were conducted using IBM SPSS, these are displayed below. A bar graph (Figure 1) was conducted using the mean satisfaction scores between both groups. The graph displays mature students to have the greatest mean satisfaction score of 44.5 compared to young student who's mean satisfaction score is 28.1, a considerable difference. Therefore, our statistical tests will aim to determine the significance in this noted difference.

Group Statistics					
Student		N	Mean	Std. Deviation	Std. Error Mean
Satisfaction	Mature	10	44.50	8.683	2.746
	Young	10	28.10	8.543	2.702

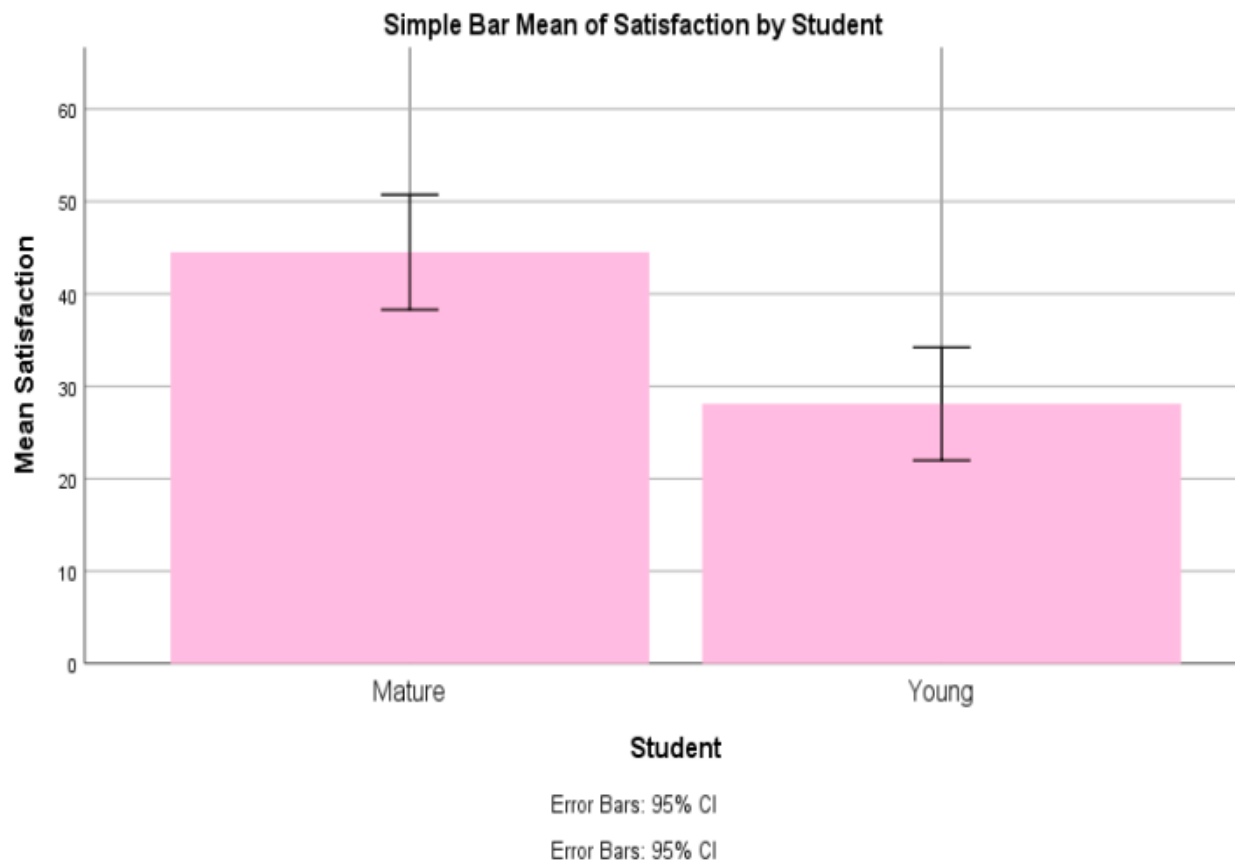


FIGURE 1. A BAR GRAPH TO REPRESENT THE MEAN SATISFACTION SCORES OF MATURE AND YOUNG STUDENTS

Selection of Data Analysis Methods and Reasoning

As a comparison of means is needed to detect a difference in the data, one of two tests can be utilized. Either a student's t-test or an analysis of variance (ANOVA). For the purpose of this assignment, the student's t-test was deemed the most appropriate method of analysis as only two variables are being studied, if more variables were needed then the ANOVA would be most appropriate.

Results

Independent t-tests allow for the comparison of means of two sets of data, in this case between young and mature students. The basis of the independent t-test follows 3 rules. An assumption that

1. The samples are independent
2. The samples follow a normal distribution
3. The samples have equal variances

For each of these assumptions various tests will be conducted. To test for independence a Pearson's Chi-Squared will be performed. To check for normal distribution a histogram will be produced and finally, to determine the homogeneity of variances an F-test will be conducted.

Pearson's Chi-Square:

The Pearson's Chi-Squared analysis tests for independence between samples. For our dataset, the results from the chi-squared will determine whether satisfaction in university experience is dependent on the age of the student or if the samples are independent of each other. Thus, our hypothesis for Pearson's Chi-Square are as follows:

H0 = There is no association between age and university satisfaction

H1 = There is an association between age and university satisfaction

The equation for chi-squared is:

$$\chi^2_c = \sum \frac{(O_i - E_i)^2}{E_i}$$

Chi-squared analysis was run using IBM SPSS. The results of which can be found below. We can see that the output determined a p-value of 0.333. This result is great than 0.05 and thus, not significant, therefore we can accept the Ho that age and university satisfaction are not associated, therefore independent of each other.

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	20.000 ^a	18	.333
Likelihood Ratio	27.726	18	.066
Linear-by-Linear Association	9.533	1	.002
N of Valid Cases	20		

a. 38 cells (100.0%) have expected count less than 5. The minimum expected count is .50.

Histogram:

To determine whether the samples were normally distributed, a histogram was plotted in XLSTAT and is shown below. Although a small sample size, we can see the residuals seem to be relatively normal in distribution thus we can run the t-test assuming normality.

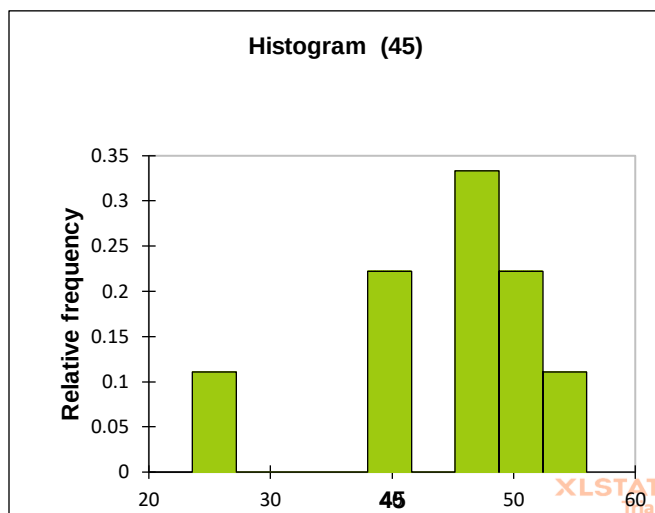


FIGURE 2 A HISTOGRAM FOR DATASET

F-test:

Finally, an f-test was performed through excel to determine whether variances were equal or unequal. The hypothesis for the f-test are as follows:

Ho = The variances of both samples are equal

H1 = The variances of both samples are not equal

The results are shown below. As the F value (1.033) is lower than the F critical value (3.179), we can accept Ho. Therefore, we can conclude that the variances of both samples are equal and perform a two-sample t-test assuming equal variances.

F-Test Two-Sample for Variances

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	44.5	28.1
Variance	75.3888889	72.9888889
Observations	10	10
df	9	9
F	1.03288172	
P(F<=f) one-tail	0.48117644	
F Critical one-tail	3.1788931	

Independent t-test:

t-Test: Two-Sample Assuming Equal Variances 0.1

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	44.5	28.1
Variance	75.3888889	72.9888889
Observations	10	10
Pooled Variance	74.1888889	
Hypothesized Mean Difference	0	
df	18	
t Stat	4.25754667	
P(T<=t) one-tail	0.00023683	
t Critical one-tail	1.33039094	
P(T<=t) two-tail	0.00047366	
t Critical two-tail	1.73406361	

t-Test: Two-Sample Assuming Equal Variances

0.01

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	44.5	28.1
Variance	75.3888889	72.98888889
Observations	10	10
Pooled Variance	74.1888889	
Hypothesized Mean Difference	0	
df	18	
t Stat	4.25754667	
P(T<=t) one-tail	0.00023683	
t Critical one-tail	2.55237963	
P(T<=t) two-tail	0.00047366	
t Critical two-tail	2.87844047	

t-Test: Two-Sample Assuming Equal Variances

0.02

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	44.5	28.1
Variance	75.3888889	72.98888889
Observations	10	10
Pooled Variance	74.1888889	
Hypothesized Mean Difference	0	
df	18	
t Stat	4.25754667	
P(T<=t) one-tail	0.00023683	
t Critical one-tail	2.21370325	
P(T<=t) two-tail	0.00047366	
t Critical two-tail	2.55237963	

The results of the independent t-tests are displayed above. We can analyse that for each p-value 0.1, 0.01 and 0.02 the tStat (4.26 for all three) value is larger than the t Critical value (1.73, 2.88 and 2.55, respectively). Therefore, in all three cases we can reject the null hypothesis, that there is no difference in means and accept the alternative hypothesis that there is a difference in the mean satisfaction between mature and young students, initially represented for us in figure 1.

Data outliers

It is important to acknowledge the presence of data outliers within the results however, it can be argued that the exclusion of outliers can affect the final results. For the purpose of this assignment, outliers were not removed. This is because the dependent variable is student satisfaction based on a scale of 0-60, a subjective variable, Thus, it is impossible to determine whether an observation is in fact a true outlier and so we cannot treat it as such. Although one value may be distributed far from the mean thus appearing as an anomaly, this value is still representative the real-world scenario and the population statistics.

Future Directions

For future work and directions, it would be beneficial to this study that more variables that are confounding factors on university experience for students of all ages to be included. For example, one aspect the data has not included is the effect of stress on the individuals. Stress in this sense could be due to exams or from other sources such as home and social life. Moreover, albeit an old review, Trueman & Hartley (1996) discuss the difference in time-management skills and academic performance in mature and young students [5]. Trueman & Hartley found that more mature students were able to handle time-frames significantly better than younger students. However, the effects of academic performance on age were modest [5]. This is only a small insight on factors that can affect a student's perception of university. It should also be taken into consideration that more mature students may well have families of their own thus, greater responsibilities such as being parents when compared to more "traditional students", a factor which could also add to stress levels.

Conclusion

This report has analysed the dataset between the difference in university satisfaction of mature and young students. The results of our final analysis of an independent t-test showed tStat values of 4.26 for all p-value levels (0.10, 0.01 and 0.02). In all three cases the tStat value was larger than the tCritical value and this translated into the acceptance of H0. Therefore, it was determined that there was significant evidence to conclude that mature students have a higher university satisfaction than younger students. This may in part be due to higher motivation levels as mature students often return to university after a break in learning for a specific reason such as career advancement [6]. However, it is noteworthy to mention that data collection via a scale of satisfaction may not be the most reliable method to gaining accurate results. Moreover, a sample size of 20 is rather small and may not be representative of the wider student population and thus not generalisable. Further to this, the data gathered does not consider confounding factors that may have effect student experience and thus satisfaction.

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