Journal of Mathematics and Computing Science, 2024,
Volume 10, No 1, 1-6

Assessing the Influence of Teaching Strategies, Accessibility of Equipment, and Technological Influence on Students' Contentment with Online Education Using Multiple Linear Regression

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Received 30 April 2024; Received in revised 20 May 2024; Accepted 30 May 2024
Available online 15 June 2024

Abstract: The educational landscape has undergone a substantial transformation in recent years due to the widespread adoption of online education. Educational institutions have embraced digitalisation and incorporated online learning as a crucial tool for teaching and learning process. This study aims to measure the relationship between the lecturers' teaching strategies, the accessibility of equipment, and technological influence on students' contentment with online education. Additionally, the study aims to compare students' contentment levels of male and female students with online education. 150 participants enrolled in the Diploma in Mathematical Science programme at a prominent higher education institution in Kelantan were involved in this study. Data collection is done through self-administered questionnaires, and data analysis employed ordinary least squares estimation. The findings reveal significant relationships between teaching strategies, technological influence, and students' contentment with online education. Notably, no discernible differences in contentment levels were observed between male and female students. The study offers valuable insights for higher education administrators and policymakers seeking to enhance students' contentment with online education.

Keywords: Teaching strategies, Accessibility, Availability, Equipment, Technology, Online learning, Satisfaction, Contentment

1 Introduction

Recognising the need to adapt to the digital shift, educational institutions have embarked on digitising and formulating strategies for effective online education [1]. The surge in internet technology has elevated the significance of online education in academic settings and has become a pivotal tool in complementing traditional methods [2]. Online learning is education based on electronic tools and media via the Internet and network technologies. The internet is incorporated into online educational settings to extend learning activities without depending on traditional classroom space and time [3]. The most important element of online education is flexibility in terms of time and place. Online education has become known as a practical and efficient way to reach many students in different places when learning online. Nevertheless, online education poses many obstacles that students and educators need to deal with, including technological constraints, limited communication, and the convenience of online learning.

In education services, an important benchmark is students' contentment. Many factors influence students' contentment, such as system quality, interaction, student motivation, instructor knowledge, facilitation, and others. The quality of the learning system is seen as a critical factor in promoting the success of online education [4–6]. Successful online education depends on the quality of the website, technological tools, and the infrastructure available [7–9]. Instructor knowledge and facilitation also significantly influenced students' contentment [10].

Although much has been done, more studies on students' contentment with online education need to be conducted. The purpose of this study is to identify the relationship between teaching strategies, accessibility of equipment, and technological influence on students' contentment with online education. This topic has been identified as necessary for faculty, management teams, and policymakers because it provides them with essential background knowledge about the factors that influence the success of higher education.

2 Methodology

A Study Design, Sample and Instrumentation

The study framework is illustrated in Figure 1. This research employed a cross-sectional design and utilises a quantitative approach to assess the impact of independent variables, such as teaching strategies, accessibility of equipment, and technological influence on a dependent variable, students' contentment. The data collection method involved the use of primary data through a self-administered questionnaire. A total of 150 samples were randomly chosen from the Diploma in Mathematical Science programme at the University Teknologi Mara (UiTM) Kelantan Branch, Machang Campus. The questionnaire comprises two sections: Part A, which focuses on the demographic profile, and Part B, which contains questions related to the dependent and independent variables. Response options include Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), and Strongly Disagree (SD). Table 1 provides a summary of the number of items and sources of instrumentation employed in the study.

Table 1: Instrumentation

Variable	Number of items	Source
Students' contentment	4	[11]
Accessibility of equipment	5	
Teaching strategies	5	[12]
Technological influence	5	[11]

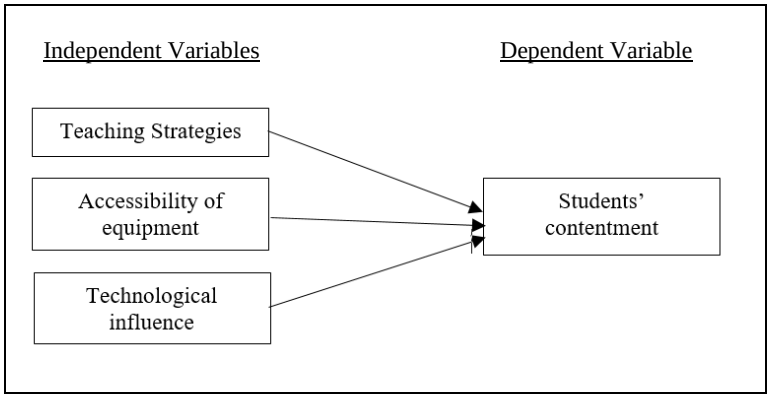

Figure 1: Theoretical Framework

B Method of Analyis

Descriptive statistics were utilised to delineate the demographic profiles of the respondents. Multiple linear regression (MLR) was applied to discern the connections between students' contentment and

independent variables. Furthermore, an independent t-test was performed to explore differences in students' contentment levels based on gender.

3. Findings

A Demographics of Respondents

Table 2 illustrates that most participants were female students, constituting 61.3% of the overall count, as opposed to male students. The respondents were predominantly between the ages of 21 and 23. Additionally, there was a higher representation of respondents among those in the 5th semester.

Table 2: Descriptive Table of Respondents Demographic

		Percentage (%)
Gender	Male	38.7
	Female	61.3
Age	18 – 20	14
	21 – 23	86
Semester	1	34.7
	3	30
	5	35.3

B Model Adequacy Checking

Model adequacy checks include the assumption of linearity between independent and dependent variables, normality of residuals, homoscedasticity, and multicollinearity [13-15].

i. Linearity

Table 3 indicates a noteworthy linear association between the accessibility of equipment, teaching strategies, technological influence, and students' contentment (p-value < 0.05) with online education.

Table 3: Pearson linear correlation

Dependent variable	Independent variable	p-value
Students' contentment	Accessibility of equipment	<0.05
	Teaching strategies	<0.05
	Technological influence	<0.05

ii. Homoscedasticity

Figure 2 shows that the residuals are randomly dispersed without any discernible pattern, suggesting the fulfilment of homoscedasticity, where residuals exhibit constant variance and lack bias.

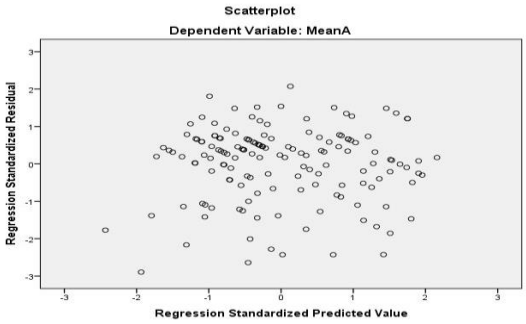

Figure 2: Scatter Plot for Academic Satisfaction

iii. Normality

In Figure 3, the plot aligns with a straight line, signifying that the residuals are normally distributed and, consequently, meet the assumption of normality of the residuals.

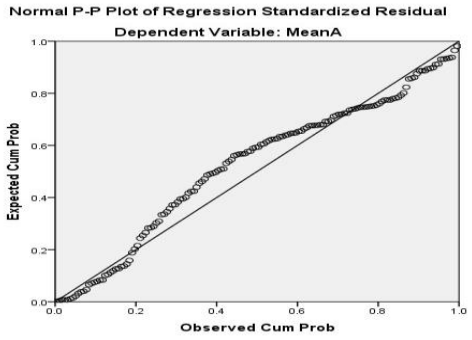

Figure 3: Distribution of Residual for Satisfaction

iv. Multicollinearity

The multicollinearity test aims to ascertain the degree of interrelation among the independent variables in the model. Table 4 reveals no indication of multicollinearity for all variables, given that the tolerance values for accessibility of equipment (0.741), teaching strategies (0.501), and technological influence (0.418) surpass the threshold of 0.1. The VIF values are also below 10, specifically 1.297, 1.995, and 2.394. Consequently, this model does not exhibit multicollinearity issues.

Table 4: Coefficients form multicollinearity assumption

Variables	Collinearity Statistics		Findings
	TOL	VIF	
Accessibility of equipment	0.771	1.297	
Teaching strategies	0.501	1.995	No Multicollinearity
Technological influence	0.418	2.394	

C Significance of Model

The model's significance is assessed to determine its suitability for the data in the linear regression. Subsequently, the R2 value gauges how much of the variance in the dependent variable is accounted for by the independent variables. A higher R2 value, approaching 1, indicates a better fit for the model. In Table 5, the F-statistic holds a significant value ($F = 112.136$, p-value < 0.05), signifying the existence of a noteworthy regression model. The R2 value (0.697) indicates that 69.7% of the total variation in students' contentment can be explained by accessibility of equipment, teaching strategies, and technological influence. The remaining 30.3% is attributed to other unaccounted factors.

Table 5: Analysis of Variance for MLR test

Model	ANOVA	F	Sig	R Square
1	Regression	112.136	<0.001	0.697

D Significance of Independent Variables

Based on the findings in Table 6, it can be inferred that teaching strategies and technological influence (p-value < 0.05) significantly influence students' contentment with online education. The variable of accessibility of equipment did not exhibit a statistically significant impact on the dependent variable.

Table 6: Coefficient for MLR test

Variable	Unstandardised coefficient	p-value	95% confidence interval	
			Lower	Upper
Constant	-0.129	0.812	-1.202 0.943	-1.202 0.943
Accessibility of equipment	0.182	0.102	-0.306 0.400	-0.306 0.400
Teaching strategies	0.462	0.000	0.276 0.648	0.276 0.648
Technological influence	0.306	0.004	0.102 0.509	0.102 0.509

E Independent T-test (Gender)

In assessing whether a statistically significant difference exists between the means of two unrelated groups, the independent t-test, an inferential statistical test, was employed. The findings, presented in Table 7, reveal that the F-value for Levene's test (p-value > 0.05) indicates homogeneity of variance. Furthermore, the independent t-test suggests no significant difference in students' contentment level between male and female students (t-statistic = -0.729, p-value = 0.467).

Table 7: Independent T-test Result

	Levene's Test for Equality of Variances		T-test for Equality Means	
Students' contentment	0.169	0.682	T	P-value
			-0.729	0.467

F Summary of The Findings

The results of the entire study are summarised in Table 8.

Table 8: Summary of The Findings

Relationships	Findings
There is a relationship between the accessibility of equipment and students' contentment.	Not Supported
There is a relationship between teaching strategies and students' contentment.	Supported
There is a relationship between a technological influence and students' contentment.	Supported
There is a significant difference in students' contentment between genders.	Not Supported

4. Conclusion

The MLR findings indicate that teaching strategies and technology significantly influence students' contentment with online education. Subsequently, an independent t-test was employed to address the second objective, revealing no significant difference in students' contentment between genders. These results are anticipated to aid the management team in formulating effective strategies for delivering high-quality online education and fostering a supportive academic environment conducive to attaining students' contentment. To replicate this study and delve into the various factors influencing students' contentment, a longitudinal design is recommended for its ability to yield more pertinent information. Furthermore, it is proposed that future investigations incorporate additional independent variables, considering the potential influence of various factors on students' contentment with online education.

Acknowledgements

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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