

The Influence of Online Learning on Academic Performance and Students' Satisfaction

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Abstract

The study aims to examine the implementation of an online learning approach to improving academic performance and students' satisfaction. Analysis of Variance (ANOVA) was used to test the impact of online learning on academic performance and students' satisfaction. The study found that the variance of online learning is different, revealing that different levels of online learning influence academic performance. It is also found that approximately 49.7% of the variance in academic performance can be explained or accounted for by online learning differences. It is confirmed that the variance of online learning is different, revealing that different levels of online learning influence students' satisfaction. The study also found that approximately 78% of the variance in students' satisfaction can be explained or accounted for by online learning differences.

Keywords: online learning, academic performance, students' satisfaction

1. Introduction

The online learning approach used by lecturers is supposed to be one of the important variables that influence academic performance and students' satisfaction at university. The concept of online learning has witnessed an increase in the higher education sector, where enrolment rates in online courses have significantly grown in recent years. According to the literature, one of the critical components of the quality of online education is to ensure learner engagement (Rajabalee, Santally, & Rennie, 2020). Online education has now become an integral part of the educational landscape, where it serves as the primary source of enrollment growth in higher education. The rising student population in online learning mandates instructors and instructional designers to be aware of the importance of cultural factors that influence students' learning experiences and academic performance in online environments (Kumi-Yeboah, 2018). With technology at the fingertips of most undergraduate students, it has been difficult for instructors to fully engage students in the classroom, which has resulted in the creation of several innovative online cognitive assessment tools. These tools often integrate several cognitive learning strategies within an assessment, to enhance learning, as opposed to just measuring it (Shaw, MacIsaac, & Singleton-Jackson, 2019). Recently, flipped

learning has been attracting as an alternative teaching and learning method for university education (Chun, & Heo, 2018). According to Umek, L., Aristovnik, A., Tomaževic, N., & Keržic, D. (2015) the use of e-learning techniques in higher education is becoming ever more frequent, and in some institutions, e-learning has completely replaced the traditional teaching methods, while in others it supplements classical courses.

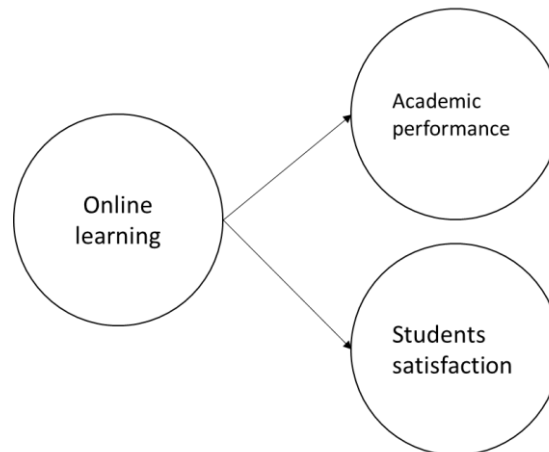
The study aims to investigate the implementation of an online learning approach to improving academic performance and students' satisfaction at university. The research questions are as follows: (1) Do different levels of online learning differ in terms of academic performance? (2) Do different levels of online learning differ in terms of students' satisfaction?

2. Theoretical framework and literature review

Conceptual framework

The conceptual framework for the study, as shown in figure 1, is developed from a review of existing evidence about the relationship between the interested variables. The review including a search for relevant empirical research through Sage and ERIC, using the keywords online learning, academic performance, and students' satisfaction. The results of the study were interpreted in terms of research conducted in the field.

Figure 1: Conceptual framework



Literature review

The impact of online learning on academic performance

Online learning in university education is thought to be one of the important variables to increase academic performance in university studies.

Chun, & Heo (2018) pointed out that the flipped learning is an effective method in terms of both self-efficacy and academic performance, and Halabi, Essop, Carmichael, & Steyn (2014)

provide empirical evidence to show that students who spent more time online significantly improved their course mark. Students felt satisfied with their online learning and their academic performance was correlated with their usage of the online content materials (Kuo, Luo, & Brielmaier, 2016); meanwhile, Wei, & Chou (2020) indicated that students' computer or internet self-efficacy and motivation for learning exerted a direct, positive effect on their online discussion score and course satisfaction. There is a significant but weak positive correlation between the engagement of students in the online module and their performances in the final learning activity (Rajabalee, Santally, & Rennie, 2020); and instructional strategies that facilitate cross-cultural collaborative online learning, including group work, self-introductions, and cultural awareness activity, computer-supported collaborative learning activity, the inclusion of global examples, and internationalized curriculum (Kumi-Yeboah, 2018).

Shaw, MacIsaac, & Singleton-Jackson (2019) indicated that students had high test scores using the online tool compared to multiple-choice paper-and-pencil exam marks; and Akhter, & Mahmood (2018) show that improving online technology fosters dynamic learning opportunities for students through online education. The relationship between learning activities in the online package and assessment component grades was found to be weak but meaningful, and the total number of attempts and performance in individual online learning activities, are predictors of the final course grade (Foung, & Chen, 2019); meanwhile, the blended data set combining online, and traditional critical factors had the highest predictive students' performance (Lu et al., 2018). Learner interaction in an online web-based course and LMS use could be assessed concerning academic performance (Strang, 2017; Alkis, & Temizel, 2018); meanwhile, Zhang et al. (2020) concluded that personalized learning intervention can effectively improve students' learning behaviors, attitude, motivation, self-efficacy, and academic performance in a blended learning environment. Students' engagement from the online learning community were higher than the ones who used the English learning system only, although the learning achievement is not significant (Lai, Lin, Lin, & Tho, 2019; Mercer (2018) confirmed the predictive effects of online learning attitudes, online learning readiness on student motivation; meanwhile, Bailie (2019) show the influence of learner pre-term access to graduate-level courses delivered entirely online.

There is a relationship among inquiry framework (social, teaching, and cognitive), and students' learning-related outcomes (satisfaction, continuous academic-related online performance, and academic achievement) (Choy, & Quek, 2016; Main, & Griffith, 2019); and Marshall (2017) indicated a high level of statistical significance in first-time online students with academic success as well as overall persistence in students who completed the online orientation. Online and flipped instructional approaches, as well as self-reported adoption, had a greater impact on student academic performance than the traditional approach (Sharp, & Sharp, 2017); Han, & Ellis, 2020); meanwhile, Mingfang, & Wang (2018) concluded that students' online learning performance influence life satisfaction and social identity. Through online dynamic assessment using Google docs were evidenced academic writing skills development, and, is also beneficial for student engagement (Ebadi, & Rahimi, 2019; Sneed (2019), and Harris (2017) indicated that ethnicity was systematically related to academic performance for online education at the undergraduate level.

In a different point of view, online pedagogy had a negative effect on student academic performance when compared with the traditionally taught group, and online students underperform compared with face-to-face students (Bir, 2019; Dendir, 2019); and Stark (2019) found that while online students reported lower levels of motivation compared to face-to-face students, particularly for online courses. Thus, it is evidenced that online learning impacts academic performance at university. In conclusion, the investigation of the relationship between online learning and academic performance, as resulted in previous research, is important. Therefore, based on the above literature review it is hypothesized that:

H # 1: Academic performance is a function of online learning

The impact of online learning on students' satisfaction

Online learning in university education is meant to be one of the important variables to improve students' satisfaction. Umek, Aristovnik, Tomaževic, & Keržic (2015) reveal a positive correlation between the proportion of the course implemented in the Moodle e-learning platform and students' performance on one hand and their satisfaction on the other; and Wei, & Chou (2020) indicated that students' computer or internet self-efficacy and motivation for learning exerted a direct, positive effect on their online discussion score and course satisfaction. Increasing student interaction, and orientation of students to an online learning environment, have been important components to enhance a sense of community in online learning and improve student satisfaction (Brown, Schroeder, & Eaton, 2016; Boz, & Adnan, 2017). Online learning influence student satisfaction and perceived learning (Gray, & DiLoreto, 2016; Ashford, 2014); meanwhile, Cakir, Karademir, & Erdogdu (2018) found a significant correlation between the students' motivation levels and their online learning experiences and satisfaction.

Library and information science courses, as well as interactive course influence students' motivation and attitude (Combes, & Carroll, 2012; Turley, & Graham, 2019), and Alexander, Lynch, Rabinovich, & Knutel (2014) found out that online learning has generated high student satisfaction. Cole, Shelley, & Swartz (2014) revealed that there were no statistically significant differences in the level of satisfaction based on gender, age, or level of study of online instruction, and Alqurashi (2019) found that learner-content interaction was the strongest and most significant predictor of student satisfaction, while online learning self-efficacy was the strongest and most significant predictor of perceived learning.

From the other point of view, Swart, & MacLeod (2020) showed that there was no significant difference in satisfaction between the online and face-to-face offerings, and Tratnik, Urh, & Jereb (2019) indicate that the students taking the face-to-face course were generally more satisfied with the course on several dimensions than their online counterparts. Hence, it is evidenced that online learning influence students' satisfaction at university. In conclusion, the investigation of the relationship between online learning and students' satisfaction, as resulted in the above research, is important. Therefore, based on the above literature review it is hypothesized that:

H # 2: Students' satisfaction is a function of online learning

3. Methodology

Method and design

The quantitative approach was the method used in the research. The design of the study employed a sample of 117 law students. Online learning was selected to be used as an independent variable; meanwhile, academic performance and students' satisfaction were selected as dependent variables.

Online learning, as an independent variable has four levels: 1=never attending (0% of classes), 2= low attending (33.3% of classes), 3= high attending (66.6% of classes) , 4= fully attending (100% of classes). Academic performance, as dependent variable has five levels: 1= 0-40 scores, 2= 41-60 scores, 3= 61-80 scores, 4= 81-90 scores, 5= 91-100 scores. Students' satisfaction, as the dependent variable has also four levels: 1=low level, 2=medium level, 3= high level, 4= very high level.

Sample and data collection

A non-random sample of 117 law students was selected to be investigated in the research. Regarding the study program, 77 respondents (65.8%) study in the Civil Law program, meanwhile, 40 of the experimental group (34.2%) study in the Criminal Law program. The sample of respondents is composed of 73 females (62.4%), and 44 (37.6%) males. A structured questionnaire was used to gather the primary data from the students in the 2019-2020 academic year.

Analysis

Central tendency values, as well as frequency values, were used to describe online learning, academic performance, and students' satisfaction. A one- way fixed-effect between-subjects analysis of variance (ANOVA) was conducted to evaluate the null hypothesis that academic performance, and students' satisfaction population means were equal across four levels of online learning levels. Preliminary assumption testing was conducted to check for normality, linearity, univariate outliers, homogeneity of variance, and multicollinearity, with no violations noted.

4. Results and discussion

Descriptive statistics

Table 1: Online learning frequencies

Online learning					
		Frequenc	Percen	Valid	Cumulati
		y	t	Percent	ve Percent
	Never attending	29	24.8	24.8	24.8
	Low attending	30	25.6	25.6	50.4
Valid	High attending	40	34.2	34.2	84.6
id	Fully attending	18	15.4	15.4	100.0
	Total	117	100.0	100.0	

Online learning' frequencies indicate that 24.8% of the respondents report never attending level in online learning approach; 25.6% of them low attending level; meanwhile, 34.2% of the respondents report high attending level, and 15.4% fully attending level. Central tendency values for experimental groups ($M= 2.4017$, $SD = 1.02604$), indicate the same tendency for values as measured by frequencies. Therefore, approximately half of respondents (49.6%) report high and fully attending level, and half of the respondents (50.4%) report never and low attending level in inquiry-based learning.

Table 2: Academic performance frequencies

Academic performance					
		Frequenc	Percen	Valid	Cumulati
		y	t	Percent	ve Percent
	0-40 scores	29	24.8	24.8	24.8
	41-60 scores	41	35.0	35.0	59.8
Valid	61-80 scores	23	19.7	19.7	79.5
	81- 90 scores	18	15.4	15.4	94.9
	91-100 scores	6	5.1	5.1	100.0
	Total	117	100.0	100.0	

Academic performance' frequencies indicate that 24.8% of the respondents achieved 0-40 scores in the final exam; 35.0% of them, 41-60 scores; 19.7% of them, 61-80 scores; 15.4% of them, 81-90 scores; meanwhile, only 5.1% of the respondents achieved 91- 100 scores. Central tendency values for experimental groups ($M= 2.4103$, $SD = 1.16821$), indicate the same tendency for values as measured by frequencies. Therefore, approximately one fourth (24.8%) of respondents failed in the final exam, the most of them (54.7%) achieved 41-80 scores; meanwhile, one five of them (20.5%) achieved 81-100 scores.

Table 3: Students' satisfaction frequencies

Students' satisfaction					
		Frequenc	Percen	Valid	Cumulati
		y	t	Percent	ve Percent
	Low	23	19.7	19.7	19.7
	Medium	24	20.5	20.5	40.2
Val id	High	52	44.4	44.4	84.6
	Very high	18	15.4	15.4	100.0
	Total	117	100.0	100.0	

Students' satisfaction frequencies indicate that 40.2% of the respondents report the low or medium level of satisfaction; meanwhile, 59.8% of them, high or very high level.

Central tendency values for experimental groups ($M= 2.5556$, $SD = .97772$), indicate the same tendency for values as measured by frequencies. Therefore, the most of respondents (59.8%) report a high or very high level of satisfaction.

Inferential statistics: Test of Hypothesis

H # 1: *Academic performance is a function of online learning*

Table 4: Levene's Test of Equality of Error' outputs

Levene's Test of Equality of Error Variances ^a			
Dependent Variable: Academic performance			
F	df1	df2	Sig.
6.38 2	3	113	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Online learning

Since the Levene's Test of Equality of Error Variances is statistically significant ($p = .000$), as shown in table 5, there is evidence to reject the null hypothesis of equality of variance across groups of the online learning' independent variable. This result suggests that somewhere among the variances in the population, there is an inequality. Therefore, different levels of online learning impact the academic performance of students.

Table 5: Tests of Between-Subjects Effects' outputs

Tests of Between-Subjects Effects

Dependent Variable: Academic performance

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	78.705 ^a	3	26.235	37.242	.000	.497
Intercept	693.765	1	693.765	984.835	.000	.897
Online learning	78.705	3	26.235	37.242	.000	.497
Error	79.603	113	.704			
Total	838.000	117				
Corrected Total	158.308	116				

a. R Squared = .497 (Adjusted R Squared = .484)

As shown in table 6, a statistically significant difference was found ($F = 26.235$ on 3 and 113 df, $p < 0.001$), with an estimated effect size of 0.497 (Eta squared). This result suggesting that approximately 49.7% of the variance in academic performance can be explained or accounted for by online learning differences. Therefore, based on ANOVA outputs, $H \# 1$: *Academic performance is a function of online learning*, is supported. The result was consistent with some previously reported works, who argued that academic performance is a function of online learning scores (Chun, & Heo, 2018; Halabi, Essop, Carmichael, & Steyn, 2014; Kuo, Luo, & Brielmaier, 2016; Rajabalee, Santally, & Rennie, 2020; Shaw, MacIsaac, & Singleton-Jackson, 2019; Akhter, & Mahmood, 2018; Fong, & Chen, 2019; Lu et al., 2018; Strang, 2017; Alkis, & Temizel, 2018; Sharp, & Sharp, 2017; Han, & Ellis, 2020). As a conclusion, different levels of online learning influence the academic performance of students.

H # 2: Students’ satisfaction is a function of online learning

Table 6: Levene's Test of Equality of Error' outputs

**Levene's Test of Equality of Error
Variances^a**

Dependent Variable: Students' satisfaction

F	df1	df2	Sig.
3.671	3	113	.014

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + Online learning

Since the Levene's Test of Equality of Error Variances is statistically significant ($p = .014$), as shown in table 6, there is evidence to reject the null hypothesis of equality of variance across groups of the online learning' independent variable. This result suggests that somewhere among the variances in the population, there is an inequality. Therefore, different levels of online learning influence students' satisfaction of students.

Table 7: Tests of Between-Subjects Effects' outputs

Tests of Between-Subjects Effects

Dependent Variable: Students' satisfaction

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	86.530 ^a	3	28.843	133.805	.000	.780
Intercept	706.754	1	706.754	3278.644	.000	.967
Online learning	86.530	3	28.843	133.805	.000	.780
Error	24.359	113	.216			
Total	875.000	117				
Corrected Total	110.889	116				

a. R Squared = .780 (Adjusted R Squared = .775)

As shown in table 7, a statistically significant difference was found ($F = 28.843$ on 3 and 113 df, $p < 0.001$), with an estimated effect size of 0.780 (Eta squared). This result suggesting that approximately 78.0% of the variance in students' satisfaction can be explained or accounted for by online learning differences. Therefore, based on ANOVA outputs, *H # 1: Students' satisfaction is a function of online learning*, is supported. The result was consistent with some previously reported works, who argued that students' satisfaction is a function of online learning scores (Umek, Aristovnik, Tomaževic, & Keržic, 2015; Wei, & Chou, 2020; Brown, Schroeder, & Eaton, 2016; Boz, & Adnan, 2017; Cakir, Karademir, & Erdogan, 2018; Combes, & Carroll, 2012; Turley, & Graham, 2019; Alexander, Lynch, Rabinovich, & Knutel, 2014; Alqurashi, 2019). In conclusion, different levels of online learning influence students' satisfaction.

5. Conclusion and implication

One limitation of the study should be acknowledged as part of the conclusion. The measurement of students' satisfaction is made by using self-reported instruments. The study aimed to examine the implementation of online learning to improve academic performance and students' satisfaction at university. The prior assumption was that academic performance and students' satisfaction are a function of online learning.

The study found that approximately half of the respondents (49.6%) report high and fully attending level, and half of the respondents (50.4%) report never and low attending level in inquiry-based learning. It is found that approximately one fourth (24.8%) of respondents failed in the final exam, the most of them (54.7%) achieved 41-80 scores; meanwhile, one five of them (20.5%) achieved 81-100 scores. It is confirmed that the most of respondents (59.8%) report a high or very high level of satisfaction.

Levene's Test of Equality of Error Variances suggests that different levels of online learning impact the academic performance of students. A statistically significant difference was found ($F = 26.235$, $p < 0.001$), with an estimated effect size of 0.497 suggesting that approximately 49.7% of the variance in academic performance can be explained or accounted for by online learning differences. The other variance may be explained by hidden or unknown variables.

It is concluded that different levels of online learning influence the academic performance of students. Levene's Test of Equality of Error Variances suggests that different levels of online learning influence students' satisfaction of students. A statistically significant difference was found ($F = 28.843$, $p < 0.001$), with an estimated effect size of 0.780, suggesting that approximately 78.0% of the variance in students' satisfaction can be explained or accounted for by online learning differences. The other variance may be explained by hidden or unknown variables. It is concluded that different levels of online learning influence students' satisfaction.

The study's results, supported by other investigators about the influence of online learning on the improvement of academic performance, and students' satisfaction have implications for future research. Future studies should investigate the impact of other variables on the improvement of academic performance, and students' satisfaction. The results of this study also have key implications in practice. The important support should design to empower

lecturers and students because it is confirmed by this study that online learning influences the improvement of academic performance, and students' satisfaction.

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