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Exploring vocational students' satisfaction with online learning

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Abstract

This study aimed to explore the factors that influence vocational students' perceptions of their online learning experiences and assess the quality of online learning that has an impact on student satisfaction. This research used structural equation modeling and partial least square (PLS-SEM) analysis. The purposive sampling technique was chosen to determine the sample of respondents. A total of 3206 students who participated in online learning from various vocational schools in Indonesia filled out an online survey. The results indicate that communication, digital media, interaction, facilities and tutorials have a direct effect on the quality of online learning. Schools that offer online education must prioritize the essential factors required for successful implementation to ensure that students have an enjoyable online learning experience. Teachers should focus on improving the quality of online learning to increase student satisfaction with it. Furthermore, teachers should consider the findings of this research when developing strategies for vocational education in online settings.

Keywords: Communication, Digital media, Facilities, Interaction, Online learning, Students satisfaction, Vocational education.

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Ethical: This study followed all ethical practices during writing.

Contents

Contribution of this paper to the literature

Several research studies have presented findings from empirical investigations into the extent of student satisfaction with online learning. However, there are still few studies that focus on vocational students' perspectives. Therefore, this study contributes to the body of knowledge in the form of literature on adopting online learning in vocational education. It also contributes to practice by identifying the challenges that need to be addressed to enhance the adoption of online learning.

1. Introduction

Recently, online learning has gained significance in education due to the COVID-19 pandemic. The Indonesian government set a policy to close schools to prevent the spread of the virus. During school closures, the government instructs every school to organize online learning so that the teaching and learning process continues. All Indonesian schools are trying to provide the facilities needed to support the implementation of online learning. However, several studies have highlighted the difficulties experienced by many students who prefer face-to-face learning to online learning (Alnusairat, Al Maani, & Al-Jokhadar, 2021; Lowenthal, Bauer, & Chen, 2015). Several studies have found a relationship between student satisfaction and student learning outcomes (Kuo & Belland, 2016; Lee & Lee, 2014; Li, Marsh, & Rienties, 2016; Parahoo, Santally, Rajabalee, & Harvey, 2015). Therefore, it is necessary to examine the quality of online learning in schools from the student's perspective to determine student satisfaction with online learning.

Numerous studies have examined various factors that can impact a student's experience with online learning. Among these factors, tutorials have been highlighted as a significant determinant of student satisfaction and perceived learning in online education (Asadpour, 2021; Barbera, Clara, & Linder-Vanberschot, 2013). Teachers conduct online learning and how students perceive this mode of education is crucial to improve its quality and enhancing student satisfaction. Communication between teachers and students (Al-Drees, Khalil, Meo, & Abdulghani, 2015; Alhosban & Ismaile, 2018; Kuo & Belland, 2016), digital media integration and support facilities are important factors in online learning environments (Asadpour, 2021). Although students accept online learning they are still not satisfied with the quality of interaction with the teacher and their friends (Cole, Shelley, & Swartz, 2012; Heirdsfield, Walker, Tambyah, & Beutel, 2011).

This study primarily focuses on the perspectives of vocational students on online learning. Conventionally, vocational learning is carried out through face-to-face communication between teachers and students, observation and practice in the workshop and teamwork (Belaya, 2018). However, these conventional teaching strategies and tactics changed due to the pandemic. Many countries try to reuse learning strategies taken from conventional learning (Sangster, Stoner, & Flood, 2020). The findings of previous researchers revealed that online vocational learning offers a unique experience for vocational students (Sangsawang, 2020). In addition, other researchers point out that vocational schools can carry out online vocational learning and achieve their goal (Han, Zhou, Shi, & Yang, 2021). This shows that the challenges of implementing online vocational learning can turn into opportunities, although various aspects still need to be researched.

This study aims to analyze the factors that influence student satisfaction during online vocational learning in Indonesia. It also provides some suggestions for teachers on how to manage online vocational learning. Accordingly, the development of vocational learning needs to consider and implement reform pathways driven by systems and strategies and put them into action. Therefore, there is a need to examine the quality of online vocational learning to better explore the challenges and associated opportunities.

2. Materials and Methods

2.1. Research Design

Quantitative methods were employed in this study to identify the factors that impact the quality of online vocational learning and student satisfaction. The study incorporates various elements that influence students' online learning experiences such as communication, digital media, interaction, facilities and tutorials. This study uses partial least square structural equation modeling (PLS-SEM) analysis to predict and explain the relationship between several variables (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). The research model developed is presented in Figure 1.

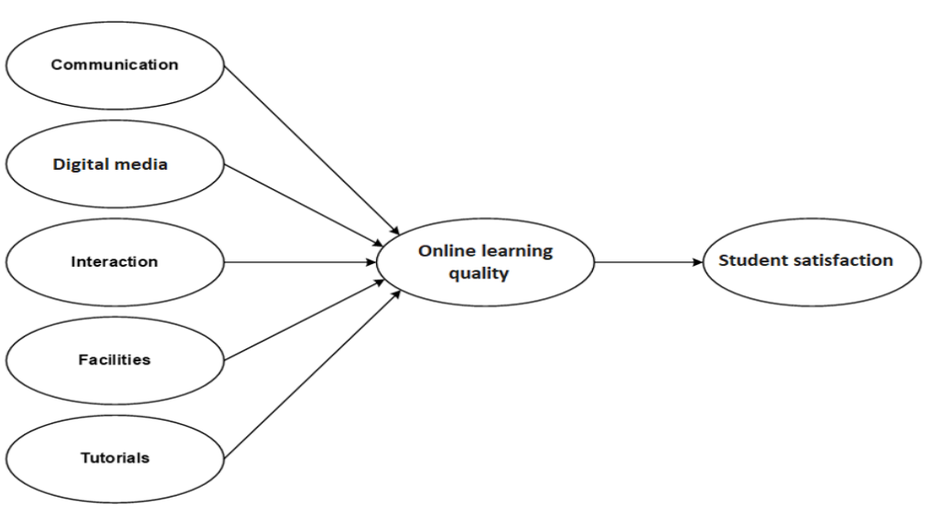

Figure 1. Research model.

2.2. Sample

In this study, the population under investigation consisted of vocational students located in Indonesia. Purposive sampling was adopted to select respondents who met the criteria for having experienced online vocational learning. Determination of the sample using the "10-times rule" method which is widely used in determining the estimated sample size of PLS-SEM (Hair, Black, Babin, & Anderson, 2010). 3206 Indonesian vocational students provided the samples for this study.

2.3. Data Collection Technique

The data collection employed in this study was an online questionnaire. The instrument used referred to the factors that influence students' online learning experiences adapted from the results of several studies (see Table 1). The research questionnaire used a Likert scale of 1-4 with indicators ranging from "strongly disagree" to "strongly agree".

Table 1. Research instrument.

Model construct	Code	Item
Communication	C1	Teachers need good communication skills to manage online learning.
	C2	Teachers need good communication skills to solve problems in online learning.
	C3	Students are active in responding to teacher explanations in online learning.
Digital media	DM4	Teachers use digital media as a tool for online learning.
	DM5	Teachers have the ability to use digital media features used in online learning.
	DM6	Students are able to operate digital media as recommended by the teacher.
	DM7	Students are able to use digital media features recommended by the teacher.
	DM8	The use of digital media in online learning is very important.
	DM9	The use of digital media can facilitate online learning.
	DM10	The use of digital media can increase the ease of learning online.
Interaction	I11	Students are able to use good language when interacting online.
	I12	Students are able to behave well when interacting online.
Facilities	F13	Electronic devices are indispensable for online learning.
	F14	Internet access is indispensable for online learning.
	F15	Online classes are indispensable as a place to manage online learning.
Tutorials	T16	The role of the teacher as a facilitator is indispensable in online learning.
	T17	The teacher's ability to provide guidance is indispensable in online learning.
	T18	Online learning needs to be designed by the teacher as an activity-oriented discussion class.
Online learning quality	OLQ19	Good learning management is indispensable in online learning.
	OLQ20	A communicative teaching and learning process is indispensable in online learning.
	OLQ21	Student responses are needed to boost online learning.
Student satisfaction	SS22	Fulfillment of facilities is indispensable in online learning.
	SS23	Communication between teachers and students is indispensable in online learning.
	SS24	The teacher's ability to manage online classes is indispensable in online learning.
	SS25	Teacher responsiveness is indispensable in online learning.

2.4. Data Analysis

The analysis techniques used in this study were demographic analysis and PLS-SEM analysis. First, the researcher analyzed the demographic data of the respondents and then the researcher conducted a PLS-SEM analysis to test the measurement and structural model. In the measurement model, the tests were carried out including convergent validity, composite reliability, average variance extracted and discriminant validity. In the structural model, the tests carried out included path coefficient (β), effect size (f^2), coefficient of determination (R^2) and T statistics.

Convergent validity testing is used to evaluate the correlation between indicators and their constructs. Composite reliability testing assists in measuring the construct's reliability. Average variance extracted tests are employed to assess convergent validity while discriminant validity tests ask whether each reflective indicator is an accurate measure of a construct. This process involves reviewing cross-loading values in order to compare indicators with related constructs.

The path coefficient (β), effect size (f^2), coefficient of determination (R^2) and T statistics testing are all used to analyze the strength and significance of the relationship between constructs. The path coefficient establishes the relationship whereas effect size compares its magnitude; the coefficient of determination determines how much a given exogenous variable explains an endogenous variable and T statistics validate hypotheses by looking at P values.

3. Results

The results of the demographic analysis in this study are shown in Table 2 which describes the profile of the research respondents. The total number of respondents in this study was 3206 vocational students from various Indonesian vocational schools. The results showed that the respondents who participated in this study were male students comprising 48.9 percent of the total respondents while female students made up 51.1 percent. A larger percentage (44.8) is found in students with two years of online vocational learning.

This study uses partial least squares (PLS) analysis to test the research model (Hair, Hult, Ringle, & Sarstedt, 2016). In the measurement model, several tests were conducted including composite reliability (CR) to assess the reliability of the constructs, convergent validity to evaluate the relationship between indicators and their constructs based on loading values and average variance extracted (AVE) to assess convergent validity. Discriminant validity was evaluated using cross-loading values.

Table 2. Profiles of respondents.

Demographic	Frequency (N = 3206)	Percentage (%)
Gender		
Male	1567	48.9
Female	1639	51.1
Length of time in online learning		
< 1 Year	636	19.8
1 Year	792	24.7
2 Year	1436	44.8
> 1 Year	342	10.7

Table 3. Assessment of measurement model.

Model construct	Measurement item	Outer loading	CR	AVE
Communication	C1	0.842	0.875	0.699
	C2	0.868		
	C3	0.798		
Digital media	DM4	0.768	0.924	0.633
	DM5	0.800		
	DM6	0.793		
	DM7	0.821		
	DM8	0.801		
	DM9	0.815		
	DM10	0.770		
Interaction	I11	0.928	0.926	0.862
	I12	0.930		
Facilities	F13	0.845	0.861	0.673
	F14	0.824		
	F15	0.791		
Tutorials	T16	0.863	0.895	0.739
	T17	0.869		
	T18	0.847		
Online learning quality	OLQ19	0.885	0.900	0.751
	OLQ20	0.873		
	OLQ21	0.842		
Student satisfaction	SS22	0.812	0.910	0.717
	SS23	0.854		
	SS24	0.864		
	SS25	0.856		

In Table 3, the CR value of each construct has exceeded the recommended value of 0.7 (Hair et al., 2010), so the test results show that the indicators used have good internal consistency and reliability. The loading values for all indicators have also exceeded the minimum limit value of 0.7 (Hair et al., 2010). This indicates that the construct has met the criteria. In addition, the AVE test produces a value above the minimum criteria of 0.5 (Henseler, Ringle, & Sarstedt, 2014) indicating that all constructs have met the requirements. The results of the discriminant validity test show good results where the correlation of each variable is smaller than the square root of the average variance that measures the indicators for that variable. Thus, the research model designed has met the requirements and has good statistical characteristics.

The research model was tested by considering the results of f^2 to assess the magnitude of the influence between constructs (with f^2 values of 0.35, 0.15 and 0.02) which are interpreted as large, medium and small (Sarstedt, Ringle, & Hair, 2017). The results of the f^2 value show that there is an influence between the constructs of online learning quality and student satisfaction. A moderate effect exists between the constructs of tutorials and online learning quality and a small effect is found in the relationship between the constructs of communication, digital media, interaction and facilities on the constructs of online learning quality. In addition, testing on the structural model also considers the results of R^2 with values of 0.67, 0.33 and 0.19 which are interpreted as substantial, moderate and weak (Chin, 1998). The results of the R^2 value indicate that the change in online learning quality is 0.712. Thus, the influence of communication, independent learning, digital media, interaction, facilities and tutorials is 71.2 percent which proves that this model is substantial. Subsequently, the R^2 value of student satisfaction is 0.656. This shows that the influence of online learning quality is 65.6 percent, so the model is considered moderate.

The study employed the path coefficient test to evaluate the strength of the relationship between the dependent and independent variables (Chin, 1998). The research hypothesis was assessed based on the results of the T statistics test using the bootstrapping procedure (Sarstedt et al., 2017). A confidence level of 95 percent was used with an accuracy limit of $(\alpha) = 0.05$ (5%). Therefore, the hypothesis testing results were deemed "supported" if the P value was < 0.05. The structural model testing results are given in Table 4.

Table 4. Assessment of structural model.

Hypothesis	Path	β	F^2	R^2	P values	Decision
H1	Communication -> Online learning quality	0.126	0.025	0.712	0.000	Supported
H2	Digital media -> Online learning quality	0.177	0.035	0.712	0.000	Supported
H3	Interaction -> Online learning quality	0.134	0.026	0.712	0.000	Supported
H4	Facilities -> Online learning quality	0.144	0.025	0.712	0.000	Supported
H5	Tutorials -> Online learning quality	0.381	0.172	0.712	0.000	Supported
H6	Online learning quality -> Student satisfaction	0.810	1.910	0.656	0.000	Supported

4. Discussion

The research findings reveal an important framework supporting the quality of online vocational learning for vocational students. The six hypotheses proposed cover important factors including communication, digital media, interaction, facilities and tutorials that affect the quality of online vocational learning and have a direct effect on student satisfaction. Statistical findings show that online learning quality has a major influence on student satisfaction. The construct of online learning is a determinant of student satisfaction with online learning. Several studies' findings revealed that the quality of online learning affects student satisfaction (Croxton, 2014; Harvey, Parahoo, & Santally, 2017; Landrum, Bannister, Garza, & Rhame, 2020; Rienties & Toetenel, 2016; Tratnik, Urh, & Jereb, 2019). Thus, teachers as facilitators need to focus on improving the quality of online learning to increase student satisfaction with it.

The main determinants of the quality of online vocational learning are the tutorial constructs that measure the teacher's role as a facilitator in online learning, the teacher's ability to provide guidance and the class's design as an activity-oriented discussion class. This construct refers to the need to change the criteria and class design for online learning. Several researchers agree that tutorials in online learning must be changed by adjusting the online learning environment (Asadpour, 2021; Barbera et al., 2013; McClellan, 2016). Therefore, teachers are expected to evaluate their teaching strategies by emphasizing their role as facilitators in online learning and optimizing guidance for students even though they follow the learning activity online. In addition, teachers are directed to be more creative in managing their class by choosing a class design that emphasizes discussion and is activity-oriented so that the class design improves students' activeness in online learning.

Another factor that influences the quality of online learning is digital media. This construct measures the presence of digital media as an online learning tool and the ability of teachers and students to use digital media. Recently, several studies have focused on digital media used in online learning that affect student satisfaction (Asadpour, 2021; Damnjanovic, Jednak, & Mijatovic, 2013). The results of this study show that the use of digital media in online learning is important. However, it needs special attention and emphasis on the ability of teachers and students to use digital media used in online learning (Wijaya, Lestari, Rahmawati, Handayani, & David, 2022). The digital media used can facilitate teachers and students in achieving online learning goals.

This study also found an association between the construction of facilities and the quality of online learning. This construct measures support for online learning and internet support for the implementation of online learning. Online learning must ensure the availability of the facilities needed for online learning (Asadpour, 2021; Castro & Tumibay, 2021) to ensure teachers and students have adequate facilities to organize online learning.

Recent research focuses on student learning which emphasizes student- student and student-teacher interactions (Cole et al., 2012; Heirdsfield et al., 2011; Wang, Zhao, Wu, & Goh, 2022). The results show that interaction is one of the factors that affects the quality of online learning. In this study, the interaction constructs measure several things such as the use of language and attitudes in online learning. Thus, the interactions carried out in online learning need to be observed.

Several studies have found that communication is an important factor in online learning (Al-Drees et al., 2015; Alawamleh, Al-Twait, & Al-Saht, 2020; Alhosban & Ismaile, 2018; Kuo & Belland, 2016). Communication is the key to create a pleasant classroom atmosphere (Lin & Yeh, 2013).

5. Conclusion, Implications and Limitations

Several studies have shown the results of empirical studies conducted to investigate student satisfaction with online learning. This study adopts various factors from previous studies which include communication, digital media, interaction, facilities and tutorials to investigate the quality of online vocational learning and see student satisfaction with online learning. Teachers need to consider the results of this research when developing online vocational learning strategies. Improving the quality of online learning in the context of vocational learning can support the effectiveness of the teaching and learning process. Based on the test results, it is concluded that communication, digital media, interaction, facilities and tutorials have a significant and positive effect on the quality of online learning which has a major impact on student satisfaction. Schools need to pay attention to the implementation of online learning.

This research model has some theoretical implications. The instruments developed and modified are reliable and valid enough to provide valuable tools in different contexts. The model proposed in this study goes beyond traditional research by investigating factors related to the adoption of online learning in public and private educational institutions. However, the results of this study may only hold up across some kinds of educational institutions since user characteristics can vary widely across them. Additionally, our data is limited to three provinces in Indonesia. Therefore, further studies may involve other provinces yielding an intriguing result.

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