Design and Implementation of Online Learning System: An Analysis from Students' Perspectives

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Abstract: - The COVID-19 pandemic has changed the nature of education, leading to a move away from in-person instruction toward online training. This raises the question of how beneficial, given the COVID-19 epidemic, online schooling is. The effectiveness of e-learning and student efforts during the COVID-19 epidemic will be used in this study to measure the Telkom University S1 Business Administration department's level of learning satisfaction. This type of research is descriptive quantitative since it makes use of a questionnaire. A private university's hundred students made up the study's population. To evaluate data, use the SmartPLS program. The results of the data analysis show that learning satisfaction is significantly impacted by both student actions and the effectiveness of e-learning.

Key-Words: - Student initiatives, COVID-19, online learning, digital study, innovation, learning satisfaction

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1 Introduction

In 2020, the COVID-19 epidemic started to spread over the globe. The infectious condition is caused by the COVID-19 virus, a kind of coronavirus that is spread by particles that come out of the mouths and nostrils of affected people, according to the World Health Organization (WHO), [1]. Because of the COVID-19 virus's rapid spread, the government has created a social distancing policy to stop the virus's spread. Because this policy forbids meetings, activities like studying at school or the university must be completed online from their separate homes.

This encourages independent study at home, but youngsters still need to build the appropriate learning competencies, therefore learning strategies are needed. With the shift in learning methods from in-person instruction in the classroom to online learning (distance), we had to adjust right away. With technology that is connected to the internet, learning may still be done anywhere. Online learning is thought of as a solution for educational activities. Teachers and students that live far apart can interact and communicate more easily through online learning, [2]. Teachers can reach out to and interact with students at any time and from any location. In line with the advancement of contemporary educational trends, online instruction can replace in-person instruction in the classroom while simultaneously improving digital literacy.

Online learning strategies are currently being used at almost all educational levels to stop the COVID-19 infection from spreading. Using the Internet for online learning activities allows for both synchronous and asynchronous communication, one-to-one and one-to-many interactions, and an interactive component. Online learning is an open educational system that uses the internet, a network-based technology, as a learning instrument. It imparts knowledge through interactions and activities, [3]. Technology use is said to increase students' enthusiasm for studying since they can use it to create a more modern, fresh learning environment, [4].

One of the many benefits of e-learning is that it can help students retain more of the material that is provided, become more engaged, improve the quality of the course material, and become more

capable of learning on their own by forcing them to research the material further.

It is important to inspire students to think that their educational investments will help them achieve their goals. They want their education to apply to their experiences and to feel respected as capable learners, [5]. Students are more likely to feel motivated and engaged in their studies when these benchmarks are met. Some characteristics of successful students include time management skills and self-motivation, according to an online study that does not only target adult learners. The best indicator of learning achievement is independent study, especially regular study by the learning plan, prompt assignment completion, frequent access to learning resources, and reading important course materials, [6]. Students' behavior during learning activities can be used to gauge how enthusiastic they are about learning; motivated students will participate in learning activities with diligence, [7].

Online learning adheres to the same set of guidelines as traditional classroom instruction, [8]. There are similarities between the two in terms of how subjects and abilities are introduced, how students are guided through the learning process, and how independent assignments are provided. Learner-teacher interaction, student participation, an active learning environment, timely feedback, realistic learning objectives, and recognition of differences are the minimum number of factors that need to be considered. Two categories exist for online education.

The first is the wrap-around paradigm, which depends on basically unchanged online and offline learning resources. Collaborative learning activities, online tests, and group discussions are all part of the course requirements. The second strategy is known as The Integrated Model, and it resembles courses offered through other online learning platforms and system administration quite a bit, [9].

Numerous apps that can help with online learning have been made possible by technology, such as Google Meet and Zoom. The usage of learning programs, a relatively new development in educational technology, is entirely up to the user, [10]. A conference in which participants may still see and communicate with one another although they are in separate locations is referred to as "video conferencing", [11]. Online learning is supported by many colleges using video conferencing-based learning tools like Google Meet and Zoom, which may be downloaded for free on iOS, Windows, Android, and other operating systems.

The software is rated as having excellent quality because of its ability to integrate online meetings, chats, and video conferencing to allow users to virtually meet and converse with one another. Furthermore, both Zoom Meeting and Google Meet have a variety of ancillary features, such as the share screen feature that allows instructors to display slides with teaching materials. Additionally, there is a recording tool that allows us to capture lecture activities and save them so you may view them whenever you want.

Using Google Meet and Zoom as instructional tools, this study aims to ascertain the effects of online learning. It is hoped that the research will provide an objective picture of what students truly experience when participating in online learning and will work as a tool for assessment for different stakeholders to further enhance the quality of online learning.

2 Literature Review

E-learning Effectiveness

The quality of instruction provided by each teacher determines how effective online learning may be, [12]. Learning resources or content must also be able to be presented understandably for all students to properly absorb the knowledge presented, [13]. The effectiveness of the learning process is defined as the extent to which learning objectives have been met. The information obtained from the study of learning efficacy will help the university create better online course designs, [14].

Student Initiative

The student initiative states that proactive, self-initiated, and consistent activities used to achieve learning objectives are examples of learning attitudes. Academic achievement and student efforts have been demonstrated to be closely related. Active learning leads to improved knowledge acquisition and a deeper comprehension of the learning material. Self-learning management and learning efficiency and effectiveness are positively connected. Stated differently, kids who exhibit greater degrees of self-learning management also outperform their peers in terms of their academic performance, [15].

Learning satisfaction

One feels content when their needs, desires, and expectations are fulfilled. The service in question enhances students' pleasure with their education. Thus, learning satisfaction might be defined as a sense of completion that arises from the accomplishment of learning activities' objectives.

This is also consistent with Ko's claim that learning satisfaction is defined as the extent to which students are satisfied with the learning process and its results, [16]. Student happiness is a key factor in the effectiveness of the teaching and learning process for both educators and educational institutions. Students may be dissatisfied with their education for a variety of reasons, one of which is the discrepancy between their expectations and reality. Students will feel happier if the expectations, skills, and abilities they face during the teaching and learning process align with those expectations; on the other hand, if there is a discrepancy between learning ability, skills, and expectations, students will feel less satisfied. Factors such as surroundings, processes for teaching and learning, and services may all have an impact on how satisfied students are with their education. It is anticipated that by focusing on student satisfaction, the school would be able to expand efficiently, [17]. Students' enjoyment of their education is a reflection of how they feel about it. This relates to how successful online learning is generally. University programs are successful when there is a greater dedication to learning, higher levels of tenacity, and a lower dropout rate. Furthermore, student satisfaction aids in the development of specific online learning approaches and helps the institution identify areas that require improvement. Furthermore, a critical statistic for learning outcomes and student-related initiatives is student satisfaction. Furthermore, it has been claimed that student behaviors like managing their studies are positively correlated with their happiness with online learning, [18].

The following are the study's hypotheses:
Hypothesis 1 (H1) shows that learning satisfaction is positively impacted by e-learning satisfaction.
The second hypothesis (H2) shows that learning satisfaction is positively impacted by student initiative.
Hypothesis 3 (H3) shows that student initiative and the efficacy of e-learning positively affect learning satisfaction.

3 Methodology and Result

This study combines a descriptive technique with a quantitative strategy. Because it is based on the positivist school of thought, the quantitative method is also referred to as the positivistic method. It is used to research a specific population or sample, collect data using research instruments, and test predetermined hypotheses using quantitative and statistical analysis, [19].

All presently enrolled S1 Business Administration students at Telkom University from the classes of 2018, 2019, 2020, and 2021 made up the population of this survey, and the sample size was 100 responses. The study's findings were derived from an online survey consisting of five questions that reflected the differing levels of e-learning effectiveness (X1). The learner satisfaction variable (Y1) has seven questions, whereas the student initiative variable (X2) has three. Next, a Likert scale including the following 5 potential responses is displayed for this issue: strongly disagree, disagree, agree, unsure, and highly agree. This questionnaire was distributed to 100 S1 Business Administration majors at Telkom University. The answers to the questionnaire were then looked at descriptively.

An overview of the study's respondents is given in Table 1.

Table 1. General Images of Respondents' Demographics

Characteristic	Sum	Percent
Gender		
Male	45	45%
Female	55	55%
Year of admittance		
2018	15	15%
2019	69	69%
2020	15	15%
2021	1	1%

SmartPls software with Partial Least Squares Path Modeling (PLS-SEM) was employed in this investigation. The PLS-SEM looks at whether there is a link or influence between such structures to examine the predictive relationship between them, [20]. Evaluation of the measurement model occurs in two stages: the structural model (inner model) and the measurement model (outer model). This two-phase assessment of the measurement model aims to evaluate a model's validity and dependability, [21].

Model Testing (Outer Model)
The SmartPLS program evaluates the outer model based on three criteria: Convergent validity is shown by the loading factor and AVE value; discriminant validity is indicated by the AVE square root value; and composite reliability and The association between latent constructs and reliability tests is indicated by Cronbach's alpha.

Convergent validity

To execute the convergent validity test, first the loading factor value is compared with the general rule of thumb (>0.60), and then the AVE value is compared with the same rule of thumb (>0.50), [22]. Because the loading factor value in the first model is less than 0.5, it does not satisfy the convergent validity requirement. To remove the indication whose loading factor value was less than 0.5, the model change was done twice, [23]. Table 2 shows the values of our first model analysis.

Table 2. First Model

Variable	Factor Loading
Effectiveness of E-Learning	
X1.1	0.619
X1.2	0.630
X1.3	0.806
X1.4	0.820
X1.5	0.451
Student Initiatives	
X2.1	0.610
X2.2	0.791
X2.3	0.855
Learning Satisfaction	
Y1.1	0.783
Y1.2	0.733
Y1.3	0.781
Y1.4	0.760
Y1.5	0.743
Y1.6	0.743
Y1.7	0.745

Discriminant Validity

The discriminant validity test was carried out by looking at the value of the AVE square root and the correlation between the latent constructs with *the rule of thumb of* the AVE square root > the correlation between the latent constructs, [22], [23].

Table 3. Latent Variable Correlation, AVE and AVE Square Root Values

	Effectiveness of E-Learning	Student Initiatives	Learning Satisfaction	Ave	AVE Square Root
Effectiveness of E-Learning (X1)	1.000	0.505	0.552	0.554	0.744
Student Initiatives (X2)	0.505	1.000	0.479	0.576	0.759
Learning Satisfaction (Y1)	0.552	0.479	1.000	0.571	0.756

The effectiveness of e-learning regarding student initiatives had a correlation value of 0.505, and its effectiveness in connection to learning satisfaction had a correlation value of 0.552, which was less than the AVE root value of the latent variable of e-learning effectiveness, which was 0.744, as shown in Table 3. This phenomenon is also observed in the latent variables of learning satisfaction and student initiative, where the AVE root value for each latent variable is greater than the value of the latent intervariable correlation. In summary, all three constructions are legitimate.

Table 4. Second Model

Variable	Factor Loading
Effectiveness of E-Learning	
X1.1	0.630
X1.2	0.650
X1.3	0.845
X1.4	0.826
Student Initiatives	
X2.1	0.617
X2.2	0.785
X2.3	0.856
Learning Satisfaction	
Y1.1	0.782
Y1.2	0.727
Y1.3	0.787
Y1.4	0.768
Y1.5	0.736
Y1.6	0.740
Y1.7	0.745

Reliability Test

A reliability test is conducted to demonstrate the instrument's precision, consistency, and accuracy in measuring constructions, as shown in Table 4. To conduct reliability tests, the values of composite reliability and Cronbach's alpha (>0.60) for exploratory research were examined, [22], [23].

Table 5. Values of Cronbach's Alpha and Composite Reliability

	Cronbach's Alpha	Composite Reliability
Effectiveness of E-Learning	0.748	0.830
Student Initiatives	0.618	0.800
Learning Satisfaction	0.876	0.903

Source: Data Processing with Structural Equation Modeling PLS

Every indication has composite reliability and Cronbach's alpha values that are more than 0.6, as shown in Table 5. Consequently, it may be said that the whole study variables are deemed to fulfill reliability or dependability.

Structural Model Testing (Inner Model)

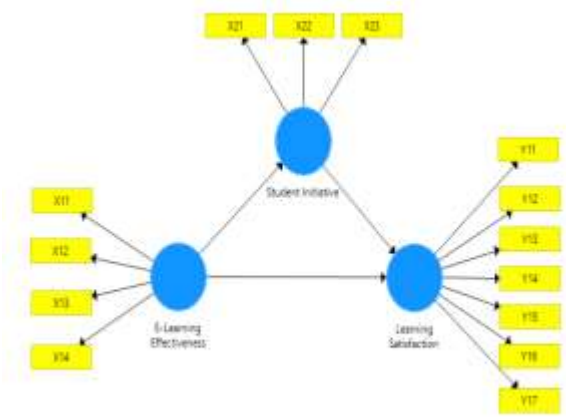

Fig. 1: Path Model

R-Square was used for dependent constructs and significant values in inner model testing (t-value 1.96 with a significant level of 5%), as shown in Figure 1.

R Square

The evaluation of R-Square attempts to quantify the degree of variance in the transformation of independent variables into dependent variables, [21]. R Square's default values of 0.75, 0.50, and 0.25 denote strong, medium, and weak models, respectively, [22], [23].

Table 6. R-Square

	R Square
Effectiveness of E-Learning	
Student Initiatives	0.255
Learning Satisfaction	0.358

The conclusion from the data in Table 6:

1. Student Initiatives' E-Learning Effectiveness Variable was 0.255, or 25.5% (weak). At the same time, other aspects that have not been further investigated affect the others.
2. Learning Satisfaction of 0.358 or 35.8% (weak) influences the E-Learning Effectiveness Variable. At the same time, additional elements that have not been further investigated affect the others.

Hypothesis Testing

The route coefficients table and the size of the predicted t value < t of table 1.96 demonstrate the importance of the hypothesis, [24].

Table 7. Hypothesis Testing of the Path Coefficient (Mean, STDEV, T-Values)

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Effectiveness of E-Learning -> Learning Satisfaction	0.416	0.436	0.086	4.834	0.000
Student Initiative -> Learning Satisfaction	0.269	0.270	0.102	2.643	0.008
Effectiveness of E-Learning -> Student Initiatives -> Learning Satisfaction	0.136	0.138	0.051	2.637	0.009

Table 7 leads to the following conclusions: Learning satisfaction is significantly and favorably impacted by the efficacy of e-learning and the impact of student initiatives and e-learning efficacy on learner satisfaction is substantial.

The Relationship between E-Learning Effectiveness and Learning Satisfaction

The test findings demonstrated a substantial value link between E-Learning Effectiveness (X1) and Learning Satisfaction (Y1). The t-statistical value of the effect between X1 and Y1 is 4.783, and the t-table value is 1.96 with a significance threshold of 0.05. The results demonstrated that the efficacy of e-learning (X1) had a substantial and positive influence on learning satisfaction (Y1), with the original sample value being positive at 0.416. Thus, it may be said that hypothesis 1 is true.

The Relationship between Student Initiative and Learning Satisfaction

According to the test findings, there was a substantial value in the association between student initiative (X2) and learning satisfaction (Y1). The value of 2.643 is displayed by the T-statistical value as being higher than the 1.96 t-table value. The initial sample value of 0.269 suggests that learning satisfaction (Y1) is significantly and favorably

impacted by student initiative (X2). This demonstrates the acceptance of hypothesis 2.

Relationship of E-Learning Effectiveness and Student Initiatives with Learning Satisfaction

The test findings demonstrated a substantial association between learning satisfaction (Y1), student initiative (X2), and e-learning (X1). t-table) with a T-statistical value of 2,637 higher than 1.96. The initial sample value, which was 0.136, is positive. These findings support hypothesis 3, which states that learning satisfaction (Y1) is significantly and favorably impacted by the efficacy of e-learning (X1) and student initiative (X2).

4 Discussion

The COVID-19 pandemic has changed the face of education and spurred the expansion of online learning. Research on the effectiveness of online learning is encouraged by the benefits that come with its rise, but it also has certain disadvantages, [25]. This study aims to assess the effectiveness of online education and its impact on student initiative and learning satisfaction in the context of the COVID-19 pandemic, [26]. Based on the collected and analyzed data, there is a favorable correlation between the efficacy of online learning and learner satisfaction. Student happiness is one indicator of learning outcomes and programs connected to students. Student activities also have a favorable effect on learning satisfaction, [27]. Furthermore, a significant portion of the enjoyment of learning is determined by the effectiveness of student initiatives and online learning. Student initiative shows that students are driven to learn even in the absence of explicit instruction, [28]. Encourage students to take the initiative by asking them to evaluate their abilities, dispositions, and overall college achievement. Perceived learning outcomes have a significant influence on student initiative because they are attained through positive reinforcement that encourages positive learning behaviors and piques students' interest in learning, [29]. These data can also offer suggestions to educators, learners, and institutions who need it on how to improve online learning. To guarantee the uninterrupted provision of education, establishments have to have the ability to evaluate the degree to which they are implementing remote learning effectively.

5 Conclusion

Unpredictable changes in the environment, like the COVID-19 virus's development, demand us to be nimble adapters, which necessitates adjustments in the educational system to keep it running. This study examines the efficacy of student-driven online learning and learning satisfaction among Telkom University S1 Business Administration students. The study's findings demonstrate that learning satisfaction is positively and significantly impacted by both student actions and the efficacy of online instruction. These outcomes can benefit several parties, including students and teachers as reference material to increase learning satisfaction in online learning and ensure effectiveness in the implementation of online learning.

The findings of this study should be a valuable source of ideas and knowledge for Telkom University, particularly for the S1 Business Administration study program. Furthermore, it can assist the institution in creating a sustainable online learning environment.

The effectiveness of online learning during COVID-19 is demonstrated by this study, although there are a few limitations that must be considered. It represents a portion of the ecosystem, not the entire environment. First off, the primary goal of this study is to examine the effectiveness of online education within the particular setting of Telkom University's active student body. Second, the success of online learning is the primary emphasis of the study's objective evaluations of student initiative and learning satisfaction. Thirdly, this study could not account for other variables including the result of online learning because data were acquired before the exam ended. This study only looked at participants' subjective satisfaction with meeting learning objectives.

Adding more respondents would help future research expand its emphasis and produce data that more accurately depicts the event. This is a result of the research's narrow focus in the current study. Researchers can assess the effectiveness of online learning by comparing the motivation of male and female learners, for example, by looking at aspects like learning motivation. An additional recommendation is to conduct a qualitative analysis of student initiatives and learning satisfaction in this study to identify the areas in which the professional development of teachers needs to be improved through online learning.

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