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Research Article

A Case Study to Increase the Intention to Use E-Learning Using A Combination Model of Tam, Utaut, and Delone & Mclean

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ABSTRACT

This research aims to determine the factors that positively influence the level of usage of the E-Learning application among students at XYZ junior high school level. Through this evaluation, it is hoped to increase the number of users and the intention to use the E-Learning application at XYZ junior high school level, as well as to enhance user satisfaction. This research utilizes a combination of the TAM model, which includes the independent variable: Popularity, the UTAUT model including the variable: Performance Expectancy, and the DeLone McLean IS Success model including six variables: Information Quality, Perceived Usefulness, Subjective Norm, System Quality, Intention to Use, and User Satisfaction. Data were collected through questionnaires from 100 students at XYZ Junior High School and analyzed using Partial Least Squares (PLS) with Structural Equation Modeling (SEM). Based on the research results, Popularity, Information Quality, Subjective Norm, and System Quality are factors influencing Intention to Use, with Perceived Usefulness as a mediating variable for the Popularity variable. Intention to Use also has an R square value of 68.3% and 72% for the User Satisfaction variable, indicating a high level of student satisfaction with the E-Learning application provided by XYZ Junior High School. Thus, it is concluded that several measures can be taken to increase satisfaction and intention to use the E-Learning application at XYZ Junior High School, such as: (a) ensuring the maintenance of information and data quality to remain well-preserved, (b) ensuring provide motivation and insights to students in the use of the E-Learning application, and (c) ensuring that the services provided by the E-Learning application can continue to undergo maintenance, improvisation, and innovation so that they can become better over time.

Keywords: E-Learning, Intention to Use, Popularity, Evaluation, School

1. INTRODUCTION

Technology is rapidly advancing, both in developed and developing countries. Indonesia is one of the countries experiencing this development. The number of internet users in Indonesia continues to increase, leading to a rise in people's interest in using internet-based technology. With this significant increase in internet users, every school can utilize the internet as an opportunity to enhance education for its students online. Generally, schools that develop online education are referred to as e-learning. E-learning is a relatively new information technology in Indonesia. E-learning plays a significant role in widening access to education and the enrolment of students. The Internet has become one of the vital ways to ensure the availability of materials for both research and student learning [1].

Educational statistics from the Ministry of Education and Culture in Indonesia (Kemendikbud) indicate that at least 25 million elementary school (SD) students, 10 million junior high school (SMP) students, and 10 million senior high school/vocational school (SMA/K) students were affected by school closures due to the pandemic. The use of learning applications is expected to reduce the mobility of students, reduce the spread of COVID-19, and minimize the impact of school closures [2].

Digital learning systems or e-learning have become one of the methods used to reach all students in their learning [3]. XYZ Junior High School is one of the schools from Singkawang, West Kalimantan that has developed and implemented e-learning as a learning tool. XYZ Junior High School has implemented e-learning and introduced it to students in 2020 to reduce the spread of COVID-19. Until now, e-learning is still actively used by students at XYZ Junior High School. The obligation to use e-learning applications is 100% to accelerate the learning process and save time and costs for both students and teachers. E-learning is used for task submissions, online material discussions, quizzes, and exams. Online learning using e-learning can be conducted because XYZ Junior High School provides free internet access and has a sufficiently good network speed.

Although it has been running for 3 years, based on data obtained from the e-learning application, there has been a 60% decrease in the total number of XYZ middle school students using e-learning due to the declining COVID-19 rates, especially in the Singkawang area, and the resumption of face-to-face learning. XYZ Junior High School continues to use e-learning for task submissions, quizzes, and exams via smartphones during face-to-face learning sessions. One of the success factors of e-learning can be seen in the level of acceptance and use by students [4]. The low usage among students indicates problems with the acceptance of e-learning by students. Through this e-learning, the author is interested in researching and understanding the factors that can influence students' satisfaction and willingness to use school e-learning.

2. LITERATURE REVIEW

2.1. E-Learning

E-learning is an innovation that can be utilized in the learning process, not only in delivering learning materials but also in changing various competencies of students. Through e-learning, students are not only listening to explanations from educators but also actively observing, practicing, demonstrating, and so on. One of the most positive effects of eLearning is its ability to bring together the students in the same city and country but also students located in other parts of the world [5].

E-learning is also an approach in learning activities where the collaboration between internet technology and communication media can create a learning communication in which interaction occurs among teachers, students, and learning materials [6].

Rosenberg [7] emphasizes that E-learning refers to the use of Internet technology to deliver a series of solutions that can enhance knowledge and skills.

2.2. Technology Acceptance Model (TAM)

TAM is a widely used acceptance theory aimed at understanding how users perceive and adopt new technology. Originally designed to explain computerization and behavior usage, TAM has since been adopted to explain technology usage in various contexts.

The TAM model is adopted from the TRA model, which is the theory of reasoned action with the premise that a person's reactions and perceptions towards something will determine their attitude and behavior [8]. TAM is a model for prediction rather than description, used to predict user acceptance of a system [9].

As we know that the technology acceptance model (TAM) is a very old model. Davis developed this model in 1986. There were several questions about the reliability and validity of the model according to the new technology trends. But several studies have demonstrated that this model is still valid and is used by researchers in different digital industries. [10].

2.3. Unified Theory of Acceptable and Use of Technology (UTAUT)

UTAUT is a model aimed at explaining technology acceptance based on eight technology acceptance theories. The eight models are the Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model, Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT) [11].

These three constructs also have effects on user behavior or use behavior through the mediation of user behavior intentions. The last construct, facilitating conditions, has a direct effect on user behavior intentions. The relationships

of these four variables with other variables are also influenced by several moderating variables, namely gender, age, and voluntariness of use.

2.4. Model DeLone & McLean

DeLone & McLean is a model for measuring satisfaction levels, and the measures used in the DeLone & McLean model to assess three dimensions of quality are as follows: System Quality measures the characteristics favored by users of a system based on ease of use, features, flexibility, and response time. Second is information quality measures the quality of the output from the system in the form of information provided by the information system when needed to be useful to users.

The measurement factors for system output are accuracy, speed, completeness, relevance, and consistency. The third dimension is service quality to measure the quality of service provided by the system developers. The customer service and support team provides service to system users, including ensuring infrastructure availability for users. Intention to use: to measure the re-use that will be done by previous users. System use: to measure whether the system usage meets user needs. User satisfaction: to measure user satisfaction with a system. Net benefit: to measure the impact of user satisfaction, whether positive or negative, on the organization or individual.

In a meta-analysis study of the DeLone & McLean model [12], it was found that several relationships in the DeLone-McLean model did not receive strong support at the individual level. Petter et al.'s findings summarized that "intention to use" and "use" as single variables of "system usage" to avoid model complexity. Additionally, they argued that intention to use is only suitable for individual-level analysis, while system usage can be measured at both individual and organizational levels. Furthermore, the research stated that since intention to use involves subjective measurement, it is advisable to avoid such judgments to obtain overall objective results.

3. METHOD

3.1. Research Model and Hypothesis

The model used in this study is a combination with modifications of the TAM, UTAUT, and DeLone & McLean models. The variables used in this study are Popularity, Perceived Usefulness, Subjective Norms, Performance Expectancy, Information Quality, System Quality, Intention to Use, and User Satisfaction.

Popularity, which is an external factor of TAM, is used to determine how the level of popularity influences the intention to use the school's e-learning. Popularity serves as a gateway to getting to know vendors and understanding processes and technology [13]. Thus, Popularity can be an independent variable that affects other dependent variables such as User Satisfaction through Intention to Use and Perceived Usefulness.

The research model and explanations are depicted in Figure 3.1 below:

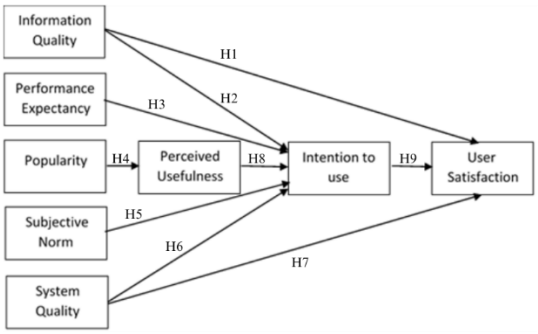

Figure 1. Propose Research Model

The following hypotheses will be tested:

H1: Information Quality (IQ) influences User Satisfaction (US).
H2: Information Quality (IQ) influences Intention to Use (ITU).
H3: Performance Expectancy (PE) influences Intention to Use (ITU).
H4: Popularity (P) influences Perceived Usefulness (PU).
H5: Subjective Norm (SN) influences Intention to Use (ITU).

H6: System Quality (SQ) influences Intention to Use (ITU).
H7: System Quality (SQ) influences User Satisfaction (US).
H8: Perceived Usefulness (PU) influences Intention to Use (ITU).
H9: Intention to Use (ITU) influences User Satisfaction (US).

3.2. Data Collection and Data Analysis Techniques

In this study, the data collection method used is a questionnaire and literature review. Data collection is carried out by distributing questionnaires in the form of surveys. A Likert scale is used to assess each research questionnaire. Google Forms is used to distribute the questionnaire. The literature review is used to gather information about theoretical references and models that will be used in developing this research, such as books, journals, and scientific articles.

Respondents in this study are all students of XYZ Junior High School who actively use the E-Learning application, totaling 100 respondents. The data analysis technique uses Smart-PLS software to process the data collection. The measurement model (outer model) consists of validity and reliability tests, while the structural model (inner model) consists of R-Square, and Path Coefficient using the Bootstrapping method to obtain t-statistics values processed using Smart-PLS.

4. RESULT AND DISCUSSION

4.1. Demographic

Demographics based on gender are divided into two categories, namely male and female, with 100 respondents participating in the trial. The male group consists of 39 respondents, or 39%, while the female group comprises 61 respondents, or 61%. Gender demographics can be seen in Figure 4.1 below.

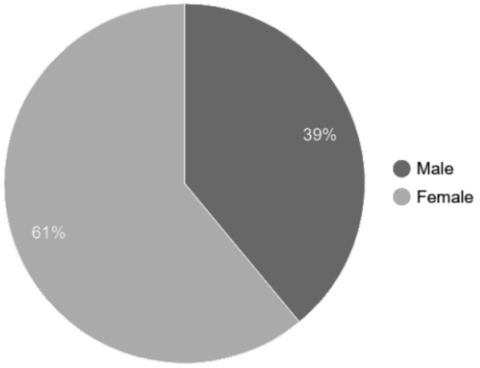

Figure 2. Demographic Group Based on Gender

Demographics based on grade level are divided into three categories: 7th grade, 8th grade, and 9th grade. With 100 respondents participating in the trial. The 7th-grade group consists of 43 respondents, or 43%, the 8th-grade group consists of 39 respondents, or 39%, and the 9th-grade group consists of 18 respondents, or 18%. Grade-level demographics can be seen in Figure 4.2 below.

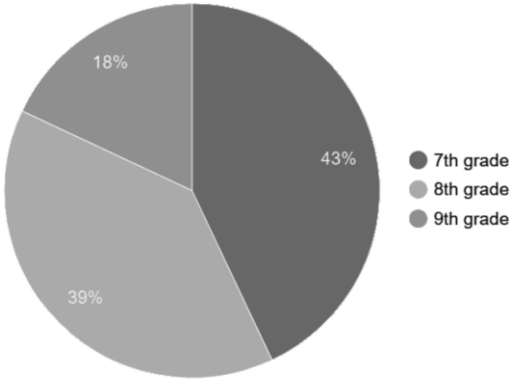

Figure 3. Demographic Group Based on Grade Level

4.2. Validity Test

In determining the measurement model, this study uses validity testing with Average Variance Extracted (AVE) and also conducts reliability testing using Cronbach's Alpha method.

4.2.1 Loading factor

The questionnaire validity testing process uses the SmartPLS3 application to facilitate calculations, by comparing the loading factor values with the established standard values. Validity measurement is conducted on 100 respondents, and indicators are considered valid if the loading factor value is greater than 0.60.

Table 1. Results of Outer Loading Data

Indicator	Loading Factor	Standard Value	Result
P1	0.875	0.60	Valid
P2	0.827	0.60	Valid
IQ1	0.841	0.60	Valid
IQ2	0.853	0.60	Valid
IQ3	0.802	0.60	Valid
IQ4	0.817	0.60	Valid
PE1	0.854	0.60	Valid
PE2	0.810	0.60	Valid
PE3	0.867	0.60	Valid
PU1	0.855	0.60	Valid
PU2	0.852	0.60	Valid
PU3	0.848	0.60	Valid
SN1	0.870	0.60	Valid
SN2	0.884	0.60	Valid
SN3	0.863	0.60	Valid
SQ1	0.807	0.60	Valid
SQ2	0.872	0.60	Valid
SQ3	0.835	0.60	Valid
ITU1	0.813	0.60	Valid
ITU2	0.884	0.60	Valid
ITU3	0.809	0.60	Valid
US1	0.896	0.60	Valid
US2	0.924	0.60	Valid
US3	0.880	0.60	Valid

4.2.2 Average variance extracted (AVE)

The next step in the validity testing will involve measuring the Average Variance Extracted (AVE). The AVE value reflects the level of shared variance, and if the AVE value reaches 0.50 or higher, it indicates that the construct can represent more than 50% of its indicator variance.

Table 2. Result of Average Variance Extracted

Indicator	Average Variance Extracted (AVE)	Standard Value	Result
Popularity	0.725	0.50	Valid
Information Quality	0.687	0.50	Valid
Performance Expectancy	0.713	0.50	Valid
Perceived Usefulness	0.725	0.50	Valid
Subjective Norm	0.761	0.50	Valid
System Quality	0.703	0.50	Valid
Intention to Use	0.699	0.50	Valid
User Satisfaction	0.810	0.50	Valid

4.3. Reliability Test

The importance of reliability testing lies in evaluating the stability or consistency of statements formulated in a questionnaire.

The values for composite reliability and Cronbach's Alpha are expected to fall within the range of 0.60 to 0.70 to be acceptable for exploratory research, and values between 0.70 to 0.90 are considered satisfactory, but values above 0.95 should be avoided as they indicate that the indicator variables measure the same phenomenon and may not be valid. Below are the results of the reliability testing of the collected data from various respondents using the SmartPLS 3 application, as outlined below.

Table 3. Result of Cronbach's Alpha

Indicator	Cronbach's Alpha	Result
Popularity	0.622	Reliable
Information Quality	0.849	Very Reliable
Performance Expectancy	0.799	Reliable
Perceived Usefulness	0.811	Very Reliable
Subjective Norm	0.843	Very Reliable
System Quality	0.789	Reliable
Intention to Use	0.785	Reliable
User Satisfaction	0.883	Very Reliable

From the reliability testing calculation, each variable shows a reliability coefficient value that exceeds Cronbach's Alpha coefficient value. Therefore, it can be concluded that the formulated questions are highly reliable.

4.4. Regression Test

At this stage, regression testing is conducted to find the R Square value, and the results are outlined as follows.

Table 4. Result of R-Square

Variable	R Square	Influence of Variables
Perceived Usefulness	0.201	20.1%
Intention to Use	0.683	68.3%
User Satisfaction	0.720	72%

Based on the results in Table 4.5, the variable Perceived Usefulness in this study has an R-value of 0.201, which means the variable Popularity has an influence of 20.1% on the Perceived Usefulness variable, while Intention to Use has an R-value of 0.683, indicating that the variables Performance Expectancy, Information Quality, Perceived Usefulness, Subjective Norm, and System Quality influence Intention to Use by 68.3%. The variable User Satisfaction has an R-value of 0.720, indicating that the variables Performance Expectancy, Intention to Use, and System Quality influence User Satisfaction by 72%.

4.4.1 Path coefficients

After the validity and reliability testing on the measurement model is confirmed, the next step is to run the bootstrapping method using SmartPLS 3. The aim is to obtain t-statistics values which will later be compared with the t-table value of 1.96. The following table displays the t-statistics values for each relationship between latent variables.

Table 5. Result of Relation Between Variables

Relation Between Variables	Path Coefficients	Decision
IQ -> ITU	-0.255	Not Significant

IQ -> US	0.319	Significant
ITU -> US	0.497	Significant
PU -> ITU	0.153	Significant
PE -> ITU	0.248	Significant
P -> PU	0.449	Significant
SN -> ITU	0.313	Significant
SQ -> ITU	0.476	Significant
SQ -> US	0.141	Significant

Based on the data shown in Table 4.7, the path coefficients range between -0.255 and 0.497. There is a negative value, which is Information Quality (IQ) -> Intention to Use (ITU) with a value of -0.255, indicating insignificance.
A total of 8 significant positive relationships are observed: Information Quality (IQ) -> User Satisfaction (US), Intention to Use (ITU) -> User Satisfaction (US), Perceived Usefulness (PU) -> Intention to Use (ITU), Performance Expectancy (PE) -> Intention to Use (ITU), Popularity (P) -> Perceived Usefulness (PU), Subjective Norm (SN) -> Intention to Use (ITU), System Quality (SQ) -> Intention to Use (ITU), and System Quality (SQ) -> User Satisfaction (US).

4.4.2 T-statistics

Table 6. Result of T-Statistics

Relation Between Variables	T-Statistics (|O/STDEV|)	Decision
IQ -> ITU	2.218	Significant
IQ -> US	2.784	Significant
ITU -> US	4.838	Significant
PU -> ITU	1.020	Not Significant
PE -> ITU	1.878	Not Significant
P -> PU	3.974	Significant
SN -> ITU	2.915	Significant
SQ -> ITU	4.026	Significant
SQ -> US	1.328	Not Significant

Based on the data in Table 4.8 above, the T-Statistics values range from 1.020 to 4.838, and there are no negative relationships. However, three results are not significant because they have T-Statistics values below 1.96, namely Perceived Usefulness (PU) -> Intention to Use (ITU), Performance Expectancy (PE) -> Intention to Use (ITU), and System Quality (SQ) -> User Satisfaction (US).
The total number of significant positive relationships with T-Statistics values above 1.96, as per the results, is 6 relationships: Information Quality (IQ) -> Intention to Use (ITU), Information Quality (IQ) -> User Satisfaction (US), Intention to Use (ITU) -> User Satisfaction (US), Popularity (P) -> Perceived Usefulness (PU), Subjective Norm (SN) -> Intention to Use (ITU), and System Quality (SQ) -> Intention to Use (ITU).

4.5. Hypothesis Test

At this stage, hypothesis testing is conducted using the p-value to assess the relationships between variables by comparing the p-value with the alpha value.
Based on the data provided in Table 4.9, conclusions can be drawn regarding the hypotheses as follows.

Table 7. Result of Hypothesis

	H0	HA	P Values	Result
H1	Information Quality (IQ) does not significantly affect User Satisfaction (US)	Information Quality (IQ) significantly affects User Satisfaction (US)	0.006	H0 rejected
H2	Information Quality (IQ) does not significantly affect Intention to Use (ITU)	Information Quality (IQ) significantly affects Intention to Use (ITU)	0.027	H0 rejected
H3	Performance Expectancy (PE) does not significantly affect Intention to Use (ITU)	Performance Expectancy (PE) significantly affects Intention to Use (ITU)	0.061	H0 accepted
H4	Popularity (P) does not significantly affect Perceived Usefulness (PU)	Popularity (P) significantly affects Perceived Usefulness (PU)	0.000	H0 rejected
H5	Subjective Norm (SN) does not significantly affect Intention to Use (ITU)	Subjective Norm (SN) significantly affects Intention to Use (ITU)	0.004	H0 rejected
H6	System Quality (SQ) does not significantly affect Intention to Use (ITU)	System Quality (SQ) significantly affects Intention to Use (ITU)	0.000	H0 rejected
H7	System Quality (SQ) does not significantly affect User Satisfaction (US)	System Quality (SQ) significantly affects User Satisfaction (US)	0.185	H0 accepted
H8	Perceived Usefulness (PU) does not significantly affect Intention to Use (ITU)	Perceived Usefulness (PU) significantly affects Intention to Use (ITU)	0.308	H0 accepted
H9	Intention to Use (ITU) does not significantly affect User Satisfaction (US)	Intention to Use (ITU) significantly affects User Satisfaction (US)	0.000	H0 rejected

H1: The relationship between Information Quality and User Satisfaction has a p-value of 0.006 because the p-value is 0.006 < 0.05 and the T-statistic is 2.784 > T table 1.96, thus rejecting H0 / accepting HA. Furthermore, the original sample's value is positive 0.319, indicating a positive influence of Information Quality on User Satisfaction in the use of E-learning.

H2: The relationship between Information Quality and Intention to Use has a p-value of 0.027 because the p-value is 0.027 < 0.05 and the T-statistic is 2.218 > T table 1.96, thus rejecting H0 / accepting HA. Additionally, the original sample's value is negative -0.255, indicating a negative influence of Information Quality on Intention to Use in the use of E-learning.

H3: The relationship between Performance Expectancy and Intention to Use has a p-value of 0.061 because the p-value is 0.061 ≥ 0.05 and the T-statistic is 1.878 < T table 1.96, thus accepting H0 / rejecting HA. Moreover, the original sample's value is positive 0.248, indicating that an increase in Performance Expectancy leads to an increase in Intention to Use.

H4: The relationship between Popularity and Perceived Usefulness has a p-value of 0.000 because the p-value is 0.000 < 0.05 and the T-statistic is 3.974 > t table 1.96, thus rejecting H0 / accepting HA. Furthermore, the original sample's value is positive 0.449, indicating a positive influence of Popularity on Perceived Usefulness in the use of E-learning.

H5: The relationship between Subjective Norm and Intention to Use has a p-value of 0.004 because the p-value is 0.004 < 0.05 and the T-statistic is 2.915 > T table 1.96, thus rejecting H0 / accepting HA. Additionally, the original sample's value is positive 0.313, indicating that Subjective Norm has a positive effect on Intention to Use in the use of E-learning.

H6: The relationship between System Quality and Intention to Use has a p-value of 0.000 because the p-value is 0.000 < 0.05 and the T-statistic is 4.026 > T table 1.96, thus rejecting H0 / accepting HA. Furthermore, the original

sample's value is positive 0.476, indicating a positive influence of System Quality on the Intention to Use in the use of E-learning.
H7: The relationship between System Quality and User Satisfaction has a p-value of 0.185 because the p-value is 0.185 ≥ 0.05 and the T-statistic is 1.328 < T table 1.96, thus accepting H0 / rejecting HA. Moreover, the original sample's value is positive 0.141, indicating that an increase in System Quality leads to an increase in User Satisfaction.
H8: The relationship between Perceived Usefulness and Intention to Use has a p-value of 0.308 because the p-value is 0.308 ≥ 0.05 and the T-statistic is 1.020 < T table 1.96, thus accepting H0 / rejecting HA. Additionally, the original sample's value is positive 0.153, indicating that an increase in Perceived Usefulness leads to an increase in Intention to Use.
H9: The relationship between Intention to Use and User Satisfaction has a p-value of 0.000 because the p-value is 0.000 < 0.05 and the T-statistic is 4.838 > T table 1.96, thus rejecting H0 / accepting HA. Furthermore, the original sample's value is positive 0.497, indicating that Intention to Use positively influences User Satisfaction in the use of E-learning.

4.6. Implication

The findings of this research can be used as material to consider and evaluate aspects such as motivation, opportunities, processes, challenges, and the performance of administrators that have occurred so far. Identifying various obstacles or issues faced during this period can serve as a guide for making improvements and enhancing the quality of E-learning in the future.

Table 8. Result of Managerial Implications

Variables	Managerial Implications
Information Quality (IQ) -> User Satisfaction (US)	Information quality significantly influences the level of user satisfaction in E-learning. To maintain user satisfaction, it is recommended that administrators uphold the quality of information and data provided.
Information Quality (IQ) -> Intention to Use (ITU)	Information quality has an impact on user intention, but it is inversely related. To maintain information quality and increase user intention, educators need to provide motivation and insights to learners in using E-learning.
Popularity (P) -> Perceived Usefulness (PU)	The popularity of E-learning affects the perceived benefits by users. Therefore, administrators can conduct more intensive education about the features presented in E-learning.
Subjective Norm (SN) -> Intention to Use (ITU)	Subjective norms influence the intention to use E-learning. This indicates that factors influencing usage are not only internal but also external, involving aspects related to users and the system. With the development of satisfying applications, subjective norms can be formed, such as through improvisation and innovation in E-learning.
System Quality (SQ) -> Intention to Use (ITU)	System quality influences the intention to use E-learning. Therefore, the existence of efficient and high-quality systems will encourage users to continue using the application, whereas system inadequacy can hinder application usage.
Intention to Use (ITU) -> User Satisfaction (US)	The use of E-learning has an impact on the level of user satisfaction, where frequent usage can be interpreted as a sign of satisfaction from the user's side. Therefore, applications that meet needs and can be used effectively will encourage users to use the application consistently, creating user satisfaction. Application developers can continue maintenance, improvisation, and innovation in E-learning so that over time, E-learning becomes better, with the hope that usage will continue to increase.

5. CONCLUSION

Based on the research findings, conclusions can be drawn from the analysis of factors influencing the intention to use E-Learning applications. Popularity, Information Quality, Subjective Norm, and System Quality are identified as factors influencing Intention to Use, with Perceived Usefulness as the mediating variable for Popularity. In this study, Intention to Use also has an R-square value of 68.3%, indicating that it exceeds half of the determinants of intention to use E-learning XYZ junior high school.

The research also found that the level of satisfaction among students towards the E-learning provided by XYZ Junior High School is quite high, with an R-square value of 72%, obtained from the factors of Information Quality and Intention to Use. Therefore, it can be concluded that the formulated problem regarding the level of satisfaction and usage of E-learning at XYZ Junior High School as an online learning tool is high.

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