International Journal of Integrative Sciences (IJIS)
Vol.2, No.7, 2023: 1057-1068

Analysis of the Use of Sistem Kelola Pembelajaran Based on the Technology Acceptance Model Approach

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A R T I C L E I N F O

Keywords: Self Efficacy, Compatibilty, Technology Acceptance Model

Received : 15 May
Revised : 24 June
Accepted: 21 July

A B S T R A C T

This research aims to determine the influence of self-efficacy, compatibility, and TAM on the acceptance of SIKOLA among students of the Faculty of Economics and Business at Hasanuddin University. Primary data obtained through a questionnaire with 363 respondents were analyzed with structured equation modeling analysis using IBM SPSS Statistics AMOS 23 software. Results showed that compatibility and ease of use significantly influenced usefulness. Self-efficacy did not affect usefulness, while self-efficacy and compatibility significantly influenced ease of use. Usefulness had a significant effect on actual usage, while ease of use did not impact actual usage. This research highlights that self-efficacy and compatibility are external factors suitable for examining the level of acceptance of the learning management system among users

DOI: https://doi.org/10.55927/ijis.v2i7.5209
ISSN-E: 2985-9050
https://journal.formosapublisher.org/index.php/ijis

INTRODUCTION

Based on the Nielsen Consumer & Media View (CMV) report in the second quarter of 2016, young individuals in Indonesia predominantly rely on television, internet, and radio as their primary sources of information. The survey, encompassing 17,000 respondents aged 10-19 years, was conducted between 2010 and 2016 in major Indonesian cities, such as Jakarta, Semarang, Bandung, Yogyakarta, Surakarta, Denpasar, Surabaya, Medan, Banjarmasin, Palembang, and Makassar. While TV remains the most favored media among pre-adolescents, the internet assumes a vital role in the lives of teenagers.

In education, the use of technology also plays a crucial role in the learning methods of young people. Symkowiak et al. (2021) explain that traditional educational methods are not suitable for educating young people who prefer to use modern technology to support their learning. Modern educational tools allow them to learn at their own pace through various means such as games, mobile applications, videos, or even podcasts. Providing digital learning facilities and setting an example of their use in the classroom by teachers would greatly help in encouraging and supporting students' learning journey. This holds significance because the younger generation today exhibits a shorter attention span, impatience, and a preference for consuming information from diverse global sources via digital media, as opposed to traditional media. They constantly seek out various types of new information. In response to these trends, educational institutions are actively innovating by offering education systems that facilitate online learning. Consequently, this shift to online learning necessitates adaptations from students, teachers, and even parents to effectively engage in this new mode of education.

One of the media used to bridge the online learning process is the Learning Management System (LMS). The LMS is widely used by educational institutions as an online learning portal. LMS is software used to distribute online learning materials, organize learning activities and evaluations, and provide interaction media between teachers and students. In short, LMS is also known as a learning platform, referring to various systems that support teacher and student learning services during online learning (Paulsen, 2002). In Indonesia, many universities use LMS to support their programs of study.

The application of LMS in universities has greatly helped both educators and students in conducting their online learning programs. Adzharuddin (2013) studied the workings of LMS, the problems faced by students, and their acceptance of LMS. The results of the study stated that LMS is an important tool for students as they can not only track their learning progress but also receive instant notifications about their daily assignments. Teachers also find it easier to reach their students outside of class hours through LMS to discuss assignment-related issues. Although the use of LMS may encounter some issues, it is an integral part of learning and a completely new system.

Mödritscher et al. (2010) examined the influence of LMS on student performance by dividing them into four groups: the best, good, positive, and bad learners. This study categorized student performance into two categories: the duration of topic learning and the number of exercises performed. The

research concluded that the use of LMS can enhance the performance of the three categories of students: the best, good, and positive, in terms of the duration of topic learning and the number of exercises performed. In contrast, the performance of the bad learner category decreased with the implementation of LMS. Students in the bad learner category spent significantly less time on learning and completing exercises compared to the other three categories. This makes the research interesting in understanding how students at Hasanuddin University perceive the implementation of information system technology in their learning.

Hasanuddin University, also known as UNHAS, is one of the many public universities in Makassar that has developed an LMS to support its learning process. Sistem Kelola Pembelajaran (SIKOLA) is a development of the previous LMS used by UNHAS, which has been operating since 2019. SIKOLA is a Chamilo-based e-learning portal that facilitates student learning activities. Hasanuddin University has prepared guidelines, tutorials, and supporting videos that contain the necessary basic information for users to effectively use SIKOLA according to their individual needs.

Various methods can be used to study the factors that influence the acceptance of information systems, and one of them is TAM. Davis developed the Technology Acceptance Model (TAM) in 1985 to address the failures of systemic adoption in organizations in the 1970s (Chuttur, 2009). TAM is influenced by two main factors that affect an individual's intention to use new technology, namely perceived ease of use and perceived usefulness (Charness & Boot, 2015). The construct of perceived ease of use is defined as the level of confidence a person has in using a particular system to maximize their performance, while the construct of perceived usefulness is the extent to which a person believes that the system can be used without much effort (Davis, 1985). With the advancement of time, the TAM framework has been innovated by adding various external variables. This study focuses on two external factors: self-efficacy and compatibility.

The primary external determinant is self-efficacy, which refers to an individual's belief in their ability to effectively utilize a system in a given situation (Bandura, 1977). Wong et al. (2012) introduced the concept of computer self-efficacy as a crucial factor influencing the acceptance of technology in an educational context. Their research demonstrated that higher self-efficacy positively influences technology acceptance, whereas lower self-efficacy can lead to reluctance in adopting new technology. Additionally, Park et al. (2006) conducted a related study and found that self-efficacy significantly impacts technology acceptance, with higher self-efficacy leading to greater acceptance of technology.

The last external factor is compatibility. Compatibility is defined as a person's belief that their needs can be met with the help of technology in line with their past experiences and values (Karahanna & Agarawal, 1998). This study relates to students perception of the benefits they can gain from using e-learning systems. A study by Chau & Hu (2001) found that compatibility has a strong relationship with usefulness. Agarawal & Prasad (1999) also found a

strong relationship between compatibility and usefulness. Both of these studies indicate that compatibility has a positive influence on user acceptance of the adoption of information system technology. This study aims to test and analyze the influence of self-efficacy and compatibility on perceived ease of use and perceived usefulness, the influence of perceived ease of use on perceived usefulness, and the influence of perceived usefulness and perceived ease of use on actual system use.

LITERATURE REVIEW

Technology Acceptance Model

The Technology Acceptance Model (TAM) is a highly influential theory of IT usage that is often applied to explain the level of acceptance towards adopting an information technology system. TAM, developed by Davis (1989), is a model of technology acceptance based on the Theory of Reasoned Action (TRA) with the addition of two variables: perceived ease of use and perceived usefulness.

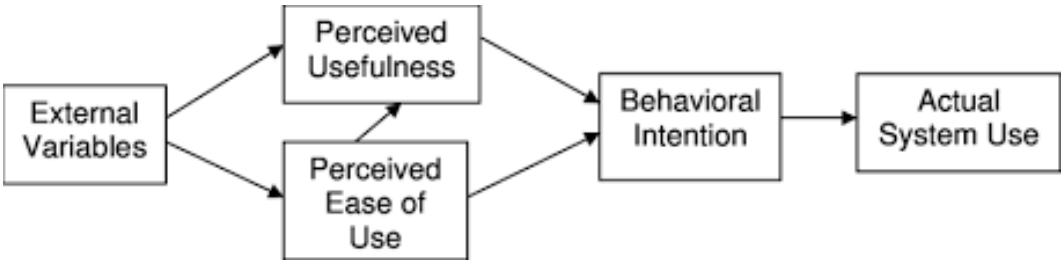

Figure 1. Conceptual Model TAM
Source: Davis & Venkatesh (1996)

Self-efficacy is the belief that an individual has the ability to perform a specific behavior (Bandura, 1977). In relation to the TAM theory, self-efficacy is one of the external factors in the TAM extension. Wong et al. (2012) conducted a study that successfully demonstrated that self-efficacy has a significant positive influence on perceived ease of use, perceived usefulness, and attitude toward computer use. This indicates that users' self-confidence in their ability to apply LMS will affect how they use the LMS. Based on this research, the hypothesis formulation in this study is as follows

H1: Self-efficacy has a positive and significant impact on the usefulness of SIKOLA among students of Hasanuddin University.

H2: Self-efficacy has a positive and significant impact on the ease of use of SIKOLA among students of Hasanuddin University.

Compatibility refers to how confident an individual is in its alignment with their understanding and experience (Agarwal & Karahanna, 1998). A study conducted by Isaac et al. (2016) stated that compatibility has a positive impact on perceived ease of use and perceived usefulness. Another research by Kemp et al. (2021) showed that compatibility does not directly influence the strength and fit of the TAM model, but the inclusion of the educational compatibility variable can moderate the nature of the constructs to make them more specific to learning. This means that an LMS that is compatible with the

needs of students will have an impact on the usefulness in using the LMS. Based on these studies, the hypothesis formulation in this research is as follows

H3: Compatibility has a positive and significant impact on the usefulness of SIKOLA among students of Hasanuddin University.

H4: Compatibility has a positive and significant impact on the ease of use of SIKOLA among students of Hasanuddin University.

Perceived ease of use is defined as the level of confidence an individual has in using a particular system that reduces their effort in performing tasks (Davis et al., 1989). Research conducted by Salloum et al. (2019), Kemp et al. (2021), and Surya & Makhmudin (2019) states that perceived ease of use has a significant influence on perceived usefulness. Davis (1989) argues that perceived ease of use is a factor of perceived usefulness because it assumes that users can consider a system more useful if it provides many benefits. Based on these studies, the hypothesis formulation in this research is as follows

H5: Perceived ease of use has a positive and significant impact on the usefulness of SIKOLA among students of Hasanuddin University.

Davis et al. (1989) also defined actual usage as the real condition of system application. Research conducted by Gusni et al. (2020) stated that perceived usefulness and perceived ease of use have a significant influence on actual usage. This indicates that the easier an LMS is to use, the more likely it will be utilized by users. Based on this research, the hypothesis formulation in this study is as follows

H6: Usefulness has a positive and significant impact on the actual system use of SIKOLA among students of Hasanuddin University.

H7: Perceived ease of use has a positive and significant impact on the actual system use of SIKOLA among students of Hasanuddin University.

Conceptual framework for this study can be described as follows

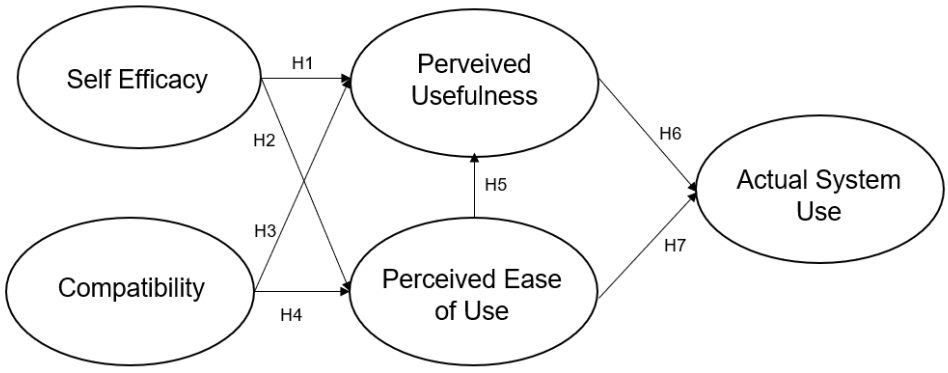

Figure 2. Conceptual Framework

METHODOLOGY

This research can be categorized as hypothesis testing. The data used in this study is primary data obtained through a questionnaire. The questionnaire distributed used a 5-point Likert scale consisting of strongly agree (SS), agree (S), neutral (N), disagree (TS), and strongly disagree (STS). The study was conducted at Hasanuddin University, Makassar, and lasted for approximately one semester.

The sampling method used in this study is probability sampling, specifically employing the simple random sampling technique. The population of this research consists of students from the Faculty of Economics at Hasanuddin University, batch 2020 and 2021. The process of distributing and collecting the questionnaires took approximately one month. The total number of returned questionnaires used for data analysis was 363.

This research employed Structural Equation Modeling (SEM), which involved several steps, including testing the normality of data, confirmatory factor analysis, goodness-of-fit analysis, and hypothesis testing. Normality testing was conducted by looking at the critical ratio and then bootstraping it with the bollen-stine bootstrap. Confirmatory factor analysis was conducted by looking at the validity and realibility testing. The validity testing is performed by examining the loading factor values. The correlation values of each indicator with the measured construct are considered valid if the validity test result exceeds 0.7 The testing of composite reliability is done by examining the values of each data with the benchmark of composite reliability greater than 0.7. Goodness-of-fit assessment is to find out how well the hypothesized model "fits" or matches the sample data. Goodness of fit is determined by testing Chi-Square, Significance Probability, RMSEA, GFI, AGFI, CMIN/DF, TLI and CFI. The hypothesis presented is tested by observing the value of the critical ratio. The data analysis tool used for this research is IBM SPSS Statistics AMOS version 23.

RESULTS

Validity and Reliability Testing

Validity and reliability testing is conducted in this study. Validity testing is done by examining the loading factor values. The correlation values of each indicator with the measured construct are considered valid if the validity test results exceed 0.7. Loading factor values in the range of 0.5 to 0.6 can still be used in the research. However, items PU.3, PU.5, PEOU.1, and PEOU.4 are found to be invalid and will be removed from the hypothesis testing. After the removal, all research items are considered valid. The reliability testing technique applied in this study is composite reliability. Composite reliability testing is done by assessing the values of each data against the criterion of composite reliability being greater than 0.7. The instrument can be considered reliable when the composite reliability result is above 0.7. After removing the invalid items, validity and reliability testing are conducted again with the results presented in Table 1.

Table 1. Confirmatory Analysis

Variabel	Item	Factor Loading	Keterangan	Composite Realibility
Self efficacy	SE.1	,672	Valid	0.93
	SE.2	,804	Valid	
	SE.3	,822	Valid	
	SE.4	,874	Valid	
	SE.5	,869	Valid	
Compatibility	CA.1	.773	Valid	0.95
	CA.2	.837	Valid	
	CA.3	.953	Valid	
Perceived Usefulness	PU.1	.807	Valid	0.88
	PU.2	.757	Valid	
	PU.4	.708	Valid	
	PU.6	.762	Valid	
Perceived Ease of Use	PEOU.2	.847	Valid	0.88
	PEOU.3	.772	Valid	
	PEOU.5	.760	Valid	
	PEOU.6	.709	Valid	
Actual Technology Use	ATU.1	.855	Valid	0.81
	ATU.2	.551	Valid	
	ATU.3	.767	Valid	

Sumber: Processed Primary Data, 2023.

Normality Testing

Normality testing is conducted to determine whether the data is normally distributed. This can be observed by comparing the critical ratio (c.r) values with the z-score values (obtained by subtracting the mean and dividing by the standard deviation) of the data. The accuracy significance level of the SEM processing result is approximately 99%, which is 0.1, meaning that the obtained results should fall between -2.58 and +2.58. The normality testing results yield a critical ratio of 30.024, indicating that the data is not multivariately normal.

Bollen and Stine (1993) provided a tool for testing the normality of data using a resampling procedure, where the sample is assumed to represent the population, and a portion of it is randomly selected to form a sample. The output of the Bollen Stine procedure is as follows:

Bollen-Stine Bootstrap (Default model)
The model fit better in 998 bootstrap samples.
It fit about equally well in 0 bootstrap samples.
It fit worse or failed to fit in 2 bootstrap samples.
Testing the null hypothesis that the model is correct, Bollen-Stine bootstrap p = ,003

Sumber: Processed primary data, 2023.

The Bollen-Stine Bootstrap results indicate that p = 0.003 < 0.05, which means that the Bollen-Stine does not accept the model. Based on these results,

adjustments are needed in the research model used, and the normality testing results for the adjusted model can be seen in Table 2.

Table 2. Normality Test Result

Variable	min	max	skew	c.r.	kurtosis	c.r.
ATU3	2,000	5,000	-,284	-2,206	-,525	-2,044
ATU1	2,000	5,000	-,246	-1,914	-,627	-2,440
PEOU2	2,000	5,000	-,272	-2,118	-,655	-2,549
PEOU3	1,000	5,000	-,404	-3,142	-,291	-1,133
PU2	2,000	5,000	-,157	-1,222	-,781	-3,037
PU1	2,000	5,000	-,160	-1,247	-,769	-2,990
CA2	2,000	5,000	-,280	-2,175	-,826	-3,211
CA3	2,000	5,000	-,315	-2,454	-,770	-2,995
SE2	2,000	5,000	-,106	-,822	-,687	-2,670
SE3	2,000	5,000	-,141	-1,095	-,724	-2,817
SE5	2,000	5,000	-,160	-1,247	-,601	-2,336
Multivariate					29,863	14,405

Sumber: Processed Primary Data, 2023.

The table provides a critical ratio value of 14.405, indicating that the data is not multivariately normal. Bollen-Stine bootstrap was conducted again, and the result obtained is p = 0.480, which exceeds 0.05. This means that the Bollen-Stine bootstrap accepts the model, allowing hypothesis testing to proceed. Here are the results of the Bollen Stine output:

Bollen-Stine Bootstrap (Default model)
The model fit better in 521 bootstrap samples.
It fit about equally well in 0 bootstrap samples.
It fit worse or failed to fit in 479 bootstrap samples.
Testing the null hypothesis that the model is correct, Bollen-Stine bootstrap p = ,480
Sumber: Processed primary data, 2023.

Goodness of Fit Model

The goodness-of-fit assessment in SEM is used to determine how well the hypothesized model fits the sample data. Goodness of fit is determined through Chi-Square testing, Significance Probability, RMSEA, GFI, AGFI, CMIN/DF, TLI, and CFI. The Chi-Square value used at a significance level of 0.1 is 2.706. A Chi-Square value < 2.706 indicates a good fit for the research design. CMIN/DF is a pairwise fit index that measures the goodness of fit of the model in terms of the expected number of estimated coefficients reaching a

good fit. A CMIN/DF result < 2.0 indicates that the expected coefficient estimates are appropriate.

The Goodness of Fit Index (GFI) indicates the overall level of model fit calculated from the squared residuals in the predicted model compared to the actual data. RMSEA is an index used to compensate for the Chi-Square value in large samples. AGFI is the GFI adjusted for the ratio of the proposed degrees of freedom to the degrees of freedom of the null model. TLI is a measure of fit that is influenced by the sample size. CFI is a measure that is relatively insensitive to sample size and model complexity. The scores of these four indices to indicate the adequacy of the research model are 0.9. Values below 0.9 indicate a well-fitting model, while values approaching 0.9 indicate a marginally fitting model. The results of the goodness-of-fit assessment can be seen in Table 3.

Table 3. Goodness of Fit Testing Result

Goodness of Fit Index	Research Model	Cut of Value	Goodness of Fit
Chi-Square	53,791	<66,548197	Fit
Probability	,444	>0,05	Fit
GFI	,977	<,9	Fit
AGFI	,961	<,9	Fit
RMSEA	,006	<,08	Fit
TLI	,999	>,95	Fit
CFI	1,000	<,95	Fit
CMIN/DF	1,015	<2	Fit

Sumber: Processed Primary Data, 2023.

Table 3 indicates that the research model meets all the criteria for goodness of fit. These results suggest that the overall model can be considered a good fit, indicating that the proposed model in this study is accepted.

Hypothesis testing

The hypothesis testing conducted aims to answer the research questions in this study. The analysis of hypothesis data can be observed from the regression weight values, which indicate the coefficient of influence between variables. The significance of the influence can be determined from the P-value. The significance level (alpha = α) used is 0.1. If the P-value is greater than 0.1, then the hypothesis is accepted. The results of the hypothesis testing for the influence between variables can be seen in Table 4.

Table 4. Hipotesis Testing Result

			Estimate	S.E.	C.R.	P	Label	Limit	Explanation
PEOU	<---	SE	,120	,062	1,922	,055	par_13	<0,1	Supported
PEOU	<---	CA	,103	,059	1,747	,081	par_15	<0,1	Supported
PU	<---	SE	,052	,070	,742	,458	par_10	<0,1	Not Supported
PU	<---	CA	,200	,064	3,114	,002	par_14	<0,1	Supported
PU	<---	PEOU	-,153	,076	-2,028	,043	par_16	<0,1	Supported
ATU	<---	PEOU	,078	,081	,957	,339	par_17	<0,1	Not Supported
ATU	<---	PU	,116	,058	2,012	,044	par_18	<0,1	Supported

Sumber: Processed primary data, 2023

DISCUSSION

The results of this study indicate that self efficacy does not have a significant influence on perceived usefulness. Hypothesis 1 (H1) states that self efficacy does not affect perceived usefulness, with a probability value of 0.458 ($p > 0.1$). Therefore, Hypothesis 1 of this study is rejected. This suggests that the self efficacy of SIKOLA users may not necessarily affect the perceived usefulness of SIKOLA. Users can still perceive the usefulness of SIKOLA even if they do not have confidence in their ability to operate it.

Hypothesis 2 (H2) states that self efficacy has a positive and significant effect on perceived ease of use, with a probability value of 0.055 ($p < 0.1$). Therefore, Hypothesis 2 of this study is accepted. The results show that self efficacy does have a significant influence on perceived ease of use. This suggests that SIKOLA users will perceive SIKOLA as easy to use if they have confidence in their ability to operate it.

Hypothesis 3 (H3) states that compatibility has a significant effect on perceived usefulness, with a probability value of 0.002 ($p < 0.1$). Therefore, Hypothesis 3 of this study is accepted. The results indicate that compatibility has a significant influence on perceived usefulness. This implies that for SIKOLA users, the higher the compatibility of the provided features, the higher the perceived usefulness of SIKOLA.

Hypothesis 4 (H4) states that compatibility has a significant effect on perceived ease of use, with a probability value of 0.081 ($p < 0.1$). Therefore, Hypothesis 4 of this study is accepted. This suggests that for SIKOLA users, the higher the compatibility of the provided features, the higher the perceived ease of use of SIKOLA.

Hypothesis 5 (H5) states that perceived ease of use has a significant effect on perceived usefulness, with a probability value of 0.043 ($p < 0.1$). Therefore,

Hypothesis 5 of this study is accepted. The relationship between perceived ease of use and perceived usefulness is a well-established and widely supported finding in previous studies.

Hypothesis 6 (H6) states that perceived usefulness has a significant effect on actual system use, with a probability value of 0.044 ($p < 0.1$). Therefore, Hypothesis 6 of this study is accepted. This implies that SIKOLA users tend to use SIKOLA based on its perceived usefulness. Students who perceive the benefits of using SIKOLA will affect their level of SIKOLA usage.

Hypothesis 7 (H7) states that perceived ease of use does not have a significant effect on actual system use, with a probability value of 0.339 ($p > 0.1$). Therefore, Hypothesis 7 of this study is rejected. This suggests that SIKOLA users do not consider the factor of perceived ease of use as a tendency to use SIKOLA. This may be because SIKOLA is the main information system used in supporting teaching and learning activities, and its ease or difficulty of use does not necessarily affect the frequency of SIKOLA usage among students.

CONCLUSION

Based on the data collected and the results of the study using structural equation modeling, it can be concluded that the factors influencing the perceived usefulness of SIKOLA are compatibility. Self efficacy does not have an effect on the perceived usefulness of SIKOLA. The results also show that the factors influencing the perceived ease of use of SIKOLA are self efficacy and compatibility. The study also indicates that perceived ease of use has an impact on perceived usefulness. Perceived usefulness, in turn, influences actual system use, while perceived ease of use does not have an impact on actual system use.

The hypothesis testing results indicate that out of the five factors influencing the acceptance of SIKOLA, five hypotheses are accepted: self efficacy on ease of use, compatibility on usefulness, compatibility on ease of use, ease of use on usefulness, and usefulness on actual system use. This can be observed from Table 4 which provides a summary of the hypothesis testing results. Based on the conducted study, it can be concluded that self efficacy and compatibility are external factors suitable for researching the acceptance level of a learning management system and can be used as a reference to develop the system further in order to enhance user acceptance.

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