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The role of digital leadership, system of information, and service quality on e-learning satisfaction

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A B S T R A C T

This study aims to determine and analyze the influence of private university digital leadership and information system success models (system quality, information quality, service quality) on the satisfaction of e-learning users of agricultural students. This research method is a quantitative survey, and the number of research samples is 323 agricultural students who were selected by a random sampling system. The sampling technique used is simple random sampling. The analytical method used is SEM with the help of SmartPLS 3.0 software. The results show that the role of digital leadership had a significant positive effect on the three variables of the information system success model. Likewise, system quality, information quality, and service quality have a significant positive and significant effect on user satisfaction of e-learning systems. This finding can increase the exploration ability of agricultural students as users to obtain various agricultural information. This finding confirms previous studies which state that usage has a significant effect on user satisfaction. Suggestions for further research, in this study only involves a single student perspective. Future research is recommended to use the perspective of the organization/institution (e-learning system management unit), lecturers, and university employees and agricultural stakeholders.

1. Introduction

At Digital era, information can be accessed easily and help educational institutions reach information quickly and flexibly. According to Borah et al. (2022), the digital era is also very influential on improving human resources where everyone can develop his/her passion and ideas in a field so that they are better known, since in the current era, information is very easy to disseminate using digital technology. Education in the digital era allows students to get more information and knowledge more easily, considering that in ancient times access to journals or materials to be used for learning was very limited and usually they had to come to the library looking for reliable and accurate sources to help make it easier understand the material which would be explained during the learning process and we can feel that the learning process in the past and present is very different, nowadays more and more interesting learning media are created so that students are not bored in learning. As we know that currently the education system must always be used to existing technological developments so that education can be a good forum for the formation of the character of a student. This requires guidance so that the energy that comes out of the effects of the times is positive energy and has a good impact on others. The development and use of technology in Indonesia shows an increasing trend and one of the means of using technology in Indonesia is the internet. Internet users in Indonesia at the beginning of 2022 reached 204.7 million people. The phenomenon of the development and use of Science and Technology as described greatly influences the tendency of change in the world of education. This is indicated by: (1) learning

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resources are very easy to find, (2) the use and utilization of information and communication technology (ICT) such as media and multimedia as well as e-learning, mobile learning, web-learning and others in learning activities, and (3) learning models with systems individual learning or blended learning. The e-learning system provides new hope as an alternative solution to most educational problems in Indonesia, with functions that can be adapted to needs, either as a supplement (additional), complement (complementary), or substitution (substitute) for learning activities in the classroom that been used (Mohammadi, 2015; Selim, 2007; Yoo et al., 2012). The use of the e-learning system is expected to be able to assist students in improving learning both in the classroom and outside the classroom. Individuals and groups will take advantage of the e-learning system if the system can provide benefits for them.

According to Purwanto et al. (2022), the digital transformation of Indonesian education is difficult to avoid with the current situation and conditions. Inevitably, every stakeholder in the education sector and government must move towards digitizing the world of education. The industrial revolution 4.0 has touched almost every aspect of our lives. The industrial revolution has changed the long history of agriculture, digital developments in the agricultural industry have played a dominant role in recent years. Significant changes in the world of agriculture when it is very accessible to agricultural students. More than 3.5 billion people have access to the internet, and it is estimated that more than 5 billion have mobile device and half of them are smartphones. This level of connectivity has impacted the way people engage with others, get news, and see the world around them. It is therefore no wonder that this trend of digital transformation is also having a profound impact on the education industry. From elementary school educators to higher education, digital transformation has affected classrooms and the way these teachers reach their students. According to Benitez et al. (2022) and Muniroh et al. (2022), the emergence of the COVID-19 pandemic has limited teaching and learning activities in schools. Inevitably demanding that many schools and teachers use information technology to help them overcome these conditions.

Hsu et al. (2011) and Smola (2011) investigated on e-learning system users using the Moodle platform by comparing learning with conventional methods and e-learning system methods and found out the gap between high-achieving students and low-achieving students. The results showed that there was a negative relationship between the efficiency of the e-learning system and accessibility to computers, while there was a positive relationship between the frequency of taking the e-learning system and students' test scores. The success model of information systems has been developed by many researchers (Chen, 2008; Ojo, 2017). Of the several models of information system success, the DeLone and McLean (1992) model received much attention from subsequent researchers (Aldholay et al., 2018; Ojo, 2017). Ojo (2017) empirically tested the DeLone and McLean (D and M) model, the results prove that the success of information systems is influenced by the quality of information systems and the quality of information generated from the system in question and the quality of services. This study focuses on individual perceptions, namely individual perceptions related to system quality, information quality, service quality, usage, and user satisfaction with the use of e-learning systems. Individual readiness for technology refers to a person's tendency to accept and use technology to accomplish goals in everyday life and at work (Parasuraman et al., 2005; Parasuraman, 2010).

The purpose of this study is to collect maximally useful knowledge to form valid hypotheses far from subjective input. Thus, the positivist theory was adopted in this study because it identified similarities that were seen through observation and work investigations. Therefore, a deductive approach is followed, seeking to propose and test hypotheses to fit existing theories. This study adopted a survey technique using quantitative analysis and to collect data on the effect of system quality, information quality, and service quality on user satisfaction. This technique was adopted because of its ability to collect data quickly compared to other tools, while allowing random sample selection, and allowing the researcher to measure and control multiple variables. After that, to identify findings or patterns in the related sample, the collected data is then analyzed in depth.

2. Method

This research method is a quantitative survey, and the number of research samples is 323 agricultural students who were selected by a random sampling system. The sampling technique used is simple random sampling. The analytical method used is SEM with the help of SmartPLS 3.0 software. For the purposes of this study, the questionnaire was designed in several parts: The first part includes demographic questions in which students anonymously state their gender, age, and tenure in the company. The second part includes three question items that measure the system quality variable, five question items that measure the information quality variable, three question items that measure the service quality variable and three question items that measure user satisfaction variables. The instrument of these four variables was adapted from Aldholay et al. (2018). While the digital leadership variable uses 5 question/statement items which were adopted from Bogler (2001). The questionnaire was designed in such a way as to target students studying at one of the universities in Tangerang. To ensure the adequacy of the research tools in context, the researcher forwarded a questionnaire to four researchers whose notes were then entered. Furthermore, the questionnaire was piloted on 30 students. The trial resulted in multiple word changes in the questionnaire item scale for better understanding. From the list, a random sample was used to collect data from students.

In line with the discussion in the previous section, this study proposes the following main hypotheses:

H_1: *Digital leadership has a significant effect on system quality.*
H_2: *Digital leadership has a significant effect on the quality of information.*
H_3: *Digital leadership has a significant effect on quality system.*

H4: *System quality increases user satisfaction.*
H5: *Information quality increases user satisfaction.*
H6: *Quality of service increases user satisfaction.*

Based on the previous discussion, a theoretical framework is introduced as shown in Fig. 1 below.

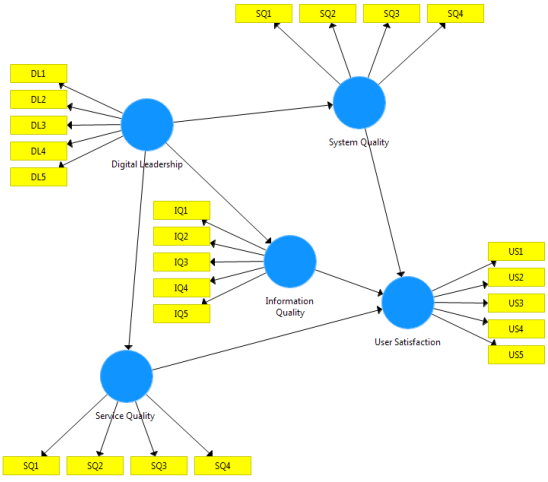

Fig. 1. Research Framework

3. Result and Discussion

3.1 Sample Description

A total of 323 students participated, consisting of men (68%) and girls (32%). They have different age groups, ranging from under the age of 20 years (25%), 20-25 years (57%), and over 25 years (18%). Their tenure in the companies where they work also varies, 33% of them are under 1 year, 54% have worked between 1-3 years, and the remaining 13% have worked more than 3 years.

3.2 Validity and Reliability Test Results of Research Indicators

The measurement model testing phase includes testing of convergent validity, discriminant validity. Meanwhile, to test construct reliability, Cronbach's alpha and composite reliability values were used. The results of the PLS analysis can be used to test research hypotheses if all indicators in the PLS model have met the requirements of convergent validity, discriminant validity and reliability testing.

3.3 Convergent Validity Test

Convergent validity test is done by looking at the loading factor value of each indicator to the construct. In most references, a factor weight of 0.7 or more is considered to have strong enough validation to explain the latent construct (Chin, 1998; Ghozali, 2014; Hair et al., 2010). In this study, the minimum accepted loading factor is 0.7, and provided that the AVE value of each construct is > 0.5 (Ghozali, 2014). After going through SmartPLS 3.0 processing, the results show that all indicators have a loading factor value above 0.7 and an AVE value above 0.5. The fit or valid model of this research can be seen in Fig. 2 or Table 1. Thus, the convergent validity of this research model has met the requirements. The values of loadings, Cronbach's alpha, composite reliability and AVE for each construct can be seen in Table 1 and Table 2.

3.4 Testing of Discriminant Validity

Discriminant validity is carried out to ensure that each concept of each latent variable is different from other latent variables. The model has good discriminant validity if the AVE squared value of each exogenous construct (the value on the diagonal) exceeds the correlation between the construct and other constructs (the value below the diagonal) (Ghozali, 2014). The results of the discriminant validity test are using the AVE quadratic value, namely by looking at the Fornell-Larcker Criterion Value obtained as shown in Table 3. The discriminant validity test results in Table 3 show that all constructs have an AVE square root value above the correlation value with the construct. other latent (via the Fornell-Larcker criteria). Likewise, the cross-loading value of all items from one indicator is greater than the other indicator items as mentioned in Table 3, so it can be concluded that the model has met discriminant validity (Fornell & Larcker, 1981). Furthermore, collinearity evaluation is carried out to determine whether there is a collinearity problem in the model. To find the collinearity, we need the VIF

collinearity statistics of each construct. If the VIF is more than 5, then the model has collinearity (Hair et al., 2014). As shown in Table 4, all VIF scores are less than 5, i.e. the results of the collinearity structural model reveal VIF values below 5. This indicates that this research model does not have multicollinearity problems.

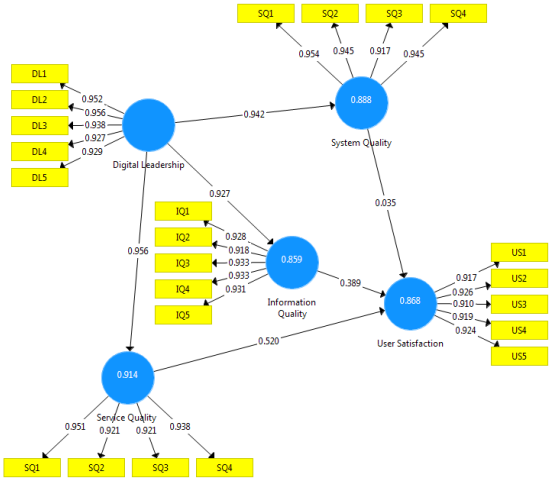

Fig. 2. Validity Testing

3.5 Construct Reliability Test

Construct reliability can be assessed from the value of Cronbach's alpha and composite reliability of each construct. The recommended value of composite reliability and Cronbach's alpha is more than 0.7 (Ghozali, 2014). The reliability test results in table 1 above show that all constructs have composite reliability and Cronbach's alpha values greater than 0.7 (> 0.7). In conclusion, all constructs have met the required reliability.

Table 1
The results of outer loading

	SQ	QI	US	QS	DL
SQ1	0.724				
SQ2	0.826				
SQ3	0.886				
SQ4	0.832				
SQ5	0.898				
QI1		0.812			
QI2		0.832			
QI3		0.854			
US1			0.812		
US2			0.756		
US3			0.712		
QS1				0.812	
QS2				0.865	
QS3				0.812	
QS1					0.812
QS2					0.843
QS3					0.731
QS4					0.765
QS5					0.734

Table 2
Construct Reliability and Validity

	Cronbach Alpha	Rho A	Composite Reliability	Average Variance
SQ	0.832	0.814	0.909	0.613
QI	0.867	0.813	0.813	0.713
US	0.754	0.745	0.814	0.613
QS	0.812	0.812	0.906	0.714
DL	0.814	0.843	0.814	0.623

Table 3
The results of discriminant reliability and validity

	SQ	QI	US	QS	DL
SQ	0.843				

QI	0.721	0.832			
US	0.621	0.743	0.723		
QS	0.721	0.612	0.612	0.813	
DL	0.523	0.612	0.623	0.412	0.712

Table 4
The results of Collinearity (Inner VIF Values)

	SQ	QI	QS	US	DL
SQ			3.846		
QI			2.487		
QS					
US			2.815		
DL	1.000	1.000		1.000	

Table 5
The results of R-Square

	R Square	R Square Adjusted
SQ	0.315	0.311
QI	0.365	0.361
QS	0.582	0.574
US	0.248	0.244

Table 6
The results of hypothesis testing

Correlation	P value	Result
DL → SQ	0.041	Supported
DL→ QI	0.000	Supported
DL → QS	0.043	Supported
QS → US	0.000	Supported
QI → US	0.000	Supported
SQ → US	0.000	Supported

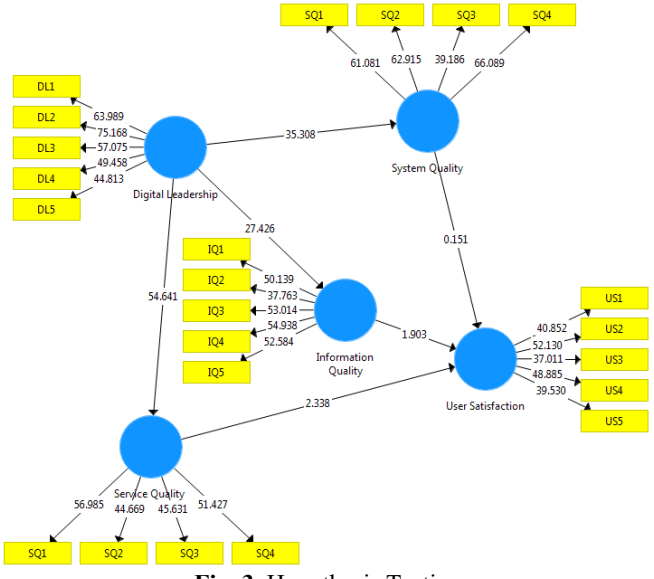

Fig. 3. Hypothesis Testing

Hypothesis testing in PLS is also known as the inner model test. This test includes a test of the significance of direct and indirect effects as well as measuring the magnitude of the effect of exogenous variables on endogenous variables. To determine the effect between the variables of this study, a direct effect test is needed. The effect test was carried out using the t-statistical test in the partial least squared (PLS) analysis model using the SmartPLS 3.0 software. With the bootstrapping technique, the R Square value and significance test value are obtained as Table 5 and Table 6. Based on Table 5 above, the R Square value of user satisfaction is 0.574 which means that the user satisfaction variable (KP) can be explained by the system quality variable. information quality and service quality are 57.4%, while the remaining 42.6% is explained by other variables not discussed in this study. This means that the substance of influence in the relationship model in this research model is fairly strong (Chin, 1998). Meanwhile, the R Square value of transformational leadership on system quality, information quality and service quality is 0.244; 0.311; 0.261. Meanwhile, Table 5 displays the t-statistics and p-values which show the influence between the aforementioned research variables.

4. Discussion

4.1 Influence of Digital Leadership on Information system success Model

Testing the hypothesis between the relationship of digital leadership to user satisfaction is completely presented in Table 6, quantitatively presented as follows: SEM analysis produces p-values of 0.000, so digital leadership has a significant effect on system quality information quality and quality of service. So the hypotheses H1, H2, and H3 are confirmed. Since the estimated value of the relationship is positive, which means that there is a unidirectional relationship between digital leadership and system quality, information quality and service quality. This means that the better the digital leadership role of leaders in universities, the higher the quality of the available e-learning system. This research can be used as a basis for further research for wider exploration. However, there are many similarities between the results of this study and previous studies. Resume results from previous research stated that transformative leaders are people who encourage followers to act for certain goals that represent the values and motivations - wants and needs, aspirations and expectations - of leaders and followers. They are able to change the consciousness of followers and instill normative values, ideals to achieve higher morality, such as equality, freedom, justice, humanitarianism, and peace (Asbari, Novitasari, et al., 2020; Asbari, Purwanto et al., 2020; Asbari & Novitasari, 2020; Bernarto et al., 2020; Novitasari et al., 2020, 2022; Novitasari & Asbari, 2020). The quality of the information system is a characteristic of the inherent information about the system itself. As perceived ease of use, which is the level of how much computer technology is felt, it is relatively easy to understand and use. This shows that if the users of the information system feel that using the system is easy, they do not require much energy and time to use it, so they will be more happy to work and feel satisfied. The findings of this study confirm and expand the Theory of Reasoned Action (TRA) developed by Ajzen (1991), in which a person will use an information system on the grounds that the system will produce benefits for himself. This TRA describes the stages of human behavior. In the early stages, behavior is assumed to be determined by intention. Meanwhile, the intention in the case of this research emerged because of the encouragement of a good digital leadership role from university leaders (Aldholay et al., 2018; Dreheeb et al., 2016; McKnight et al., 2017).

4.2 Effect of Information system success User Satisfaction Model

Testing the hypothesis between the relationship between system quality and user satisfaction is completely presented in Table 6, quantitatively presented as follows: SEM analysis produces an estimate value of 0.155 and p-values of 0.043, so that the quality of the system has a significant effect on user satisfaction (H4 is accepted). Considering the value of the estimate is positive, this means that there is a unidirectional relationship between the quality of the system and user satisfaction, namely the higher the quality of the e-learning system provided by the campus. The quality of information systems is a characteristic of information attached to the system itself. As perceived ease of use, which is the level of how much computer technology is felt, it is relatively easy to understand and use. This shows that if the users of the information system feel that using the system is easy, they do not require much energy and time to use it, so they will be more happy to work and feel satisfied. The findings of this study confirm and expand the Theory of Reasoned Action (TRA) developed by Ajzen (1991), in which a person will use an information system on the grounds that the system will produce benefits for himself. This TRA describes the stages of human behavior. In the early stages, behavior is assumed to be determined by intention. At the next stage, intentions can be explained in the form of attitudes toward the behavior and subjective norms in the form of beliefs about the consequences of doing behavior about the normative expectations of relevant people. When someone receives a system with a good system quality, then in the person's mind he will feel happy and satisfied with the information system. The findings of this study also confirm and expand the opinion of DeLone and McLean (1992) that good system quality and information quality, represented by the usefulness of the system output obtained, can affect the level of intended use and user satisfaction. Information system success is influenced by perceived information quality and perceived system quality, which are significant predictors of user satisfaction. User satisfaction is a significant predictor of intended use and perceived individual impact (Aldholay et al., 2018; Dreheeb et al., 2016; McKnight et al., 2017).

Regarding the influence of the relationship between the quality of information on user satisfaction quantitatively, it is presented as follows: SEM analysis produces an estimate value of 0.192 and p-values of 0.041, so that the quality of information has a significant effect on user satisfaction (H5 is accepted). Considering the value of the estimate is positive, this means that there is a unidirectional relationship between the quality of information and user satisfaction, namely the higher the quality of information provided by the e-learning system, the better it will lead to a higher level of satisfaction for users of the e-learning system. Information quality is the quality of output in the form of information generated by the information system used. Users of information systems certainly hope that by using the system they will get the information they need. The characteristics of the information produced by a particular information system may differ from information from other information systems. An information system that is able to produce timely, accurate, appropriate, and relevant information and fulfills other criteria and measures of information quality will have an effect on user satisfaction. The findings of this study also confirm to Borah et al. (2022); Haudi et al. (2022); Benitez et al. (2022); Muniroh et al. (2022) and Ajzen (1991). The construct is perceived behavioral control. This construct is used to control the shortcomings and limitations of the lack of resources used to perform the behavior. The limitations of a human in providing or inputting information will be supported by the quality of the information obtained, so that users become satisfied. The findings of this study also confirm and expand the opinion of Aldholay et al. (2018) which confirms that user satisfaction on computer systems is reflected by the quality of

the information they have. User satisfaction with an information system is how the user perceives the information system in real terms, not on the technical quality of the system (Aldholay et al., 2018; Laumer et al., 2017; McKnight et al., 2017; Phuong & Dai Trang, 2018). Finally, the relationship between service quality and user satisfaction is quantitatively presented as follows: SEM analysis produces an estimate value of 0.482 and p-values of 0.000, so that the quality of service has a significant effect on usage (H6 is accepted). Considering the value of the estimate is positive, this means that there is a unidirectional relationship between service quality and usage, namely the higher the quality of services provided by the e-learning system, the higher the level of use of the e-learning system (Sasono & Novitasari, 2020). The findings of this study confirm and extend the research conducted by Wang (2008) examining the success of e-commerce in Taiwan and Wang & Liao (2008) examining the success of e-government in Taiwan. Both studies show a significant positive relationship between service quality and system use. The digital transformation of higher education cannot be separated from Education 4.0. The term Education 4.0 is used by educational theorists to realize various ways of integrating cyber technology both physically and not into learning. Education 4.0 responds to the needs of the Industrial Revolution 4.0, where humans and machines are aligned to find solutions, solve problems and of course find new innovation possibilities. The development of the 4.0 revolution has helped a lot in the development of agricultural technology (Kovach, 2018). The use of digital technology will certainly help in everyday life. Digital technology can build the creativity that is needed in information technology. What is expected from a technological advance is an acceleration to obtain the information needed. The development of digital technology is so rapid that it is difficult for us to control it. Almost every second of digital technology products are created in all parts of the world. Currently all walks of life rely heavily on the role of technology as a learning activity in terms of the introduction of progress. Knowing some examples of the use of digital technology, it can be said that nowadays human life relies heavily on technology assistance in their socio-economic life. Because technology is developing so fast, it indirectly requires humans to use it in all their activities include in the agricultural stakeholder. Digital leadership, information systems, and service quality can be applied in agricultural organizations so that they can improve the quality and quantity of agricultural products.

5. Conclusion

This study aims to investigate the effect of digital leadership on system quality, information quality, and service quality of agricultural students. Likewise, measuring the influence of the three on the satisfaction of users of a website-based e-learning system at one of the ng universities. The conclusions that can be drawn are as follows: First, the better the digital leadership role of university leaders, the better the information system success model in e-learning. Second, the better the perceived quality of the system, the more user satisfaction of the e-learning system will be. The findings can improve the exploration ability of agricultural students as users to get various agricultural information. This finding confirms previous studies which state that the quality of the system has a significant effect on user satisfaction. Third, the better the perceived quality of information, the higher the satisfaction of e-learning system users. This finding confirms previous studies which state that the quality of information has a significant effect on user satisfaction. Fourth, the better the quality of e-learning services, the more user satisfaction of the e-learning system will be. Digital leadership, information systems, and service quality can be applied in agricultural organizations so that they can improve the quality and quantity of agricultural products. This finding confirms previous studies which state that usage has a significant effect on user satisfaction. Suggestions for further research, in this study only involves a single student perspective. Future research is recommended to use the perspective of the organization/institution (e-learning system management unit), lecturers, and university employees and agricultural students.

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