

The role of information system quality and perceived usefulness on user satisfaction and sustainable e-learning

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ABSTRACT

This research aims to analyze the relationship between information system quality and user satisfaction, the relationship between perceived usefulness and user satisfaction and the relationship between user satisfaction and sustainable e-learning. The research method used in this research is associative research. The population in this study were all students who had undergone lectures using e-learning. In this study, the analytical model was used, namely Structural Equation Modeling (SEM) and the number of respondents was 456 high school students in Indonesia, who have undergone lectures using e-learning. The sampling technique used in this research is nonprobability sampling. The data collection method used was the questionnaire method and the instrument used to measure this research variable was a 5-point Likert scale. Data processing in this research uses SmartPLS software. The data analysis stage in this research is the outer model test including convergent validity, discriminant validity and composite reliability and inner model analysis, namely hypothesis testing. The results of the study indicate the quality of the information system has a positive effect on user satisfaction, Perceived Usefulness has a positive effect on user satisfaction and user satisfaction has a positive effect on sustainable e-learning. The implication is that every element at every level in formal educational institutions must pay serious attention to personal factors, including attention to student achievement expectations, relative excellence expected by students, student suitability with the e-learning system chosen in an institution's formal education, and the attitude of students who are willing to accept and continuously use e-learning. In this way, students will be consistent in using e-learning so that student achievement, which is the main goal of every school, can be achieved. The limitation of this research is that it does not provide prior understanding to respondents regarding the scope of the meaning of sustainable e-learning.

1. Introduction

The application of information technology to support the operational activities of a school, both on a small and large scale, has developed into a basic need in facing the global era. Schools must be able to design and develop quality information

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systems to support performance (Liaw, 2008; Liaw & Huang, 2013). Information systems are currently developing into computer-based information systems that can increase user satisfaction because of the ease of access obtained in making decisions (Baker-Eveleth & Stone, 2020). A computerized information system allows report users to view reports at any time more quickly and accurately. Presenting information can be done more easily with the support of school information system program packages, which nowadays have more and more variations and can be obtained easily on the market. Research on information system user satisfaction is important to measure the success of implementing an information system. Satisfaction is often used as a proxy for the success of an information system compared to other proxies such as level of use and perceptions of usefulness. Chang et al. (2012) developed a model of information system success, proving that there are several factors related to the satisfaction of information system users in a company, namely: information system quality, information quality, and perceived usefulness.

Hadji and Degoulet (2016) from research results state that there is a positive and significant influence between the quality of information systems on information system user satisfaction. Oscarius et al. (2023) stated that the quality of the school information system influences user satisfaction with the accounting information system application program package. Dreheeb et al. (2016) found the same results in their research where the quality of the school information system had a significant influence on user satisfaction. This means that the better the quality of the school information system, the higher the level of user satisfaction. The school system allows accountants to process large amounts of school information and process it quickly. Duy Phuong and Dai Trang (2018) found that school information systems have a significant effect on user satisfaction of information systems in the organization. Bernarto et al. (2024) stated that the use of school information systems can help workers carry out tasks more efficiently. Work that is done more effectively and efficiently will increase a person's satisfaction because tasks can be completed more quickly and precisely. However, Chang et al. (2012) reported conflicting research results which indicated that the quality of the school information system does not affect user satisfaction. Accounting information system user satisfaction is also formed from the quality of the information delivered. Without good quality information, this will certainly result in inaccurate data describing the company's financial performance. Chang et al. (2012) argued that information quality can be interpreted as measuring the quality of the content of an information system. An information system that can produce information in a timely, accurate and relevant manner and meets other criteria and measures regarding information quality will have an impact on user satisfaction.

Another factor that can influence school information system user satisfaction is perceived usefulness (Joshi & Rai, 2000). Perceived Usefulness is defined as the level to which a person believes that using a particular system can improve performance. If the user sees the benefits and ease of using the information system, it will cause the user's actions to accept the use of the information system. Users of the information system believe that the accounting information system will make their work better, easier, can be useful for their work, and will influence the satisfaction of information system users. User confidence that the accounting information system will be able to increase work productivity, effectiveness and user performance will certainly have an impact on the level of satisfaction of users of the accounting information system (Zviran et al., 2005). Teaching and learning scenarios need to be prepared carefully in a learning curriculum that is designed to be internet-based. Implementing internet-based learning does not mean just putting teaching materials on the web. Apart from teaching materials, learning scenarios need to be prepared carefully to invite active and constructive involvement of students in their learning process (Asbari et al., 2023).

E-learning is distance learning that uses computer and internet technology. This method is a teaching alternative that can survive in the long term compared to traditional face-to-face methods in terms of time flexibility and student satisfaction. E-learning is also directed at diffusing and connecting content as well as concept trends that no longer only emphasize computer-based (Wilson et al., 2021). In implementing e-learning, information system factors are very crucial to pay attention to and evaluate. Many developing countries are interested in implementing e-learning in their education systems but face many obstacles. These obstacles include lack of skills, technological complexity, compatibility, costs, lack of infrastructure, security and privacy issues. Lack of understanding of the benefits of implementing IT, lack of policies, and resistance to change also often become obstacles. Kassim et al. (2012) stated that the integration of technology in education in developing countries has its complexities due to political, social, linguistic, cultural and economic problems. Tajuddin et al. (2013) recommend that any effective implementation of e-learning systems needs to address technology, pedagogy, management, and individuals. Salam and Farooq (2020) identified several factors that influence e-learning adoption, namely involvement and interaction. Various aspects of e-learning have been researched in other countries including pedagogy-based components of student and teacher relations and their acceptance participant interactions in the online environment and student experiences (Song et al., 2017).

The positive contribution of using the e-learning system as an actual solution to the difficulties of face-to-face learning due to the COVID-19 pandemic is the main reason this research was conducted (Kurniasari & Abd Hamid, 2020). The focus of this research is to analyze what factors should exist so that the use of e-learning occurs sustainably. Apart from that, the use of sustainable e-learning is very much in line with the findings of a new approach model in the education system, namely pedagogy. The implementation of the e-learning system will familiarize students with becoming independent individuals in determining their learning system both while they are still at college and when they enter their workplace (Kamaruddin et al., 2024). Thus, this pedagogical approach also becomes the theoretical basis for implementing an e-learning learning system on

an ongoing basis which aims to improve student achievement. To achieve this goal, determining factors are needed that enable sustainable use of e-learning to occur.

2. Literature Review

2.1 Quality of Information Systems

The quality of an information system is a characteristic of the inherent information about the system itself (Chang et al., 2012). Information system quality is also defined by Dreheeb et al. (2016) as perceived ease of use which is the level of how much computer technology is felt to be relatively easy to understand and use. Information quality is the degree to which information has characteristics of content, form, and timing, which give value to certain end users. Information quality is the quality of output in the form of information produced by the information system used. Gorla et al. (2010) stated that information with the best quality will increase users' perceived usefulness and increase the use of information systems. Information quality can also be seen from the potential to produce unlimited information both within the organization and outside the organization (Gürkut & Nut, 2017).

2.2 Perceived Usefulness

Kurniasari and Abd Hamid (2020) define usefulness as the degree to which a person believes that the use of a particular subject will improve that person's work performance. Perceived usefulness is a belief about the decision-making process, if someone believes that an information system is useful then he will use it (Alsohime et al., 2019). On the other hand, if someone believes that the information system is less useful, he/she will not use it. So, from this definition, it can be interpreted that the benefits of using computers can improve the performance and work performance of people who use them. Calisir and Calisir (2004) examined the relationship between perceived usefulness and user satisfaction using three models of information system success.

2.3 User Satisfaction

User satisfaction is defined as a user's level of feeling which is the result of a comparison between the user's expectations of a product and the actual results obtained by the user from that product. According to Alsohime et al. (2019), an information system that can meet user needs will increase user satisfaction. This is manifested by a tendency to increase the use of information systems. On the other hand, if the information system cannot meet the needs of the user, then user satisfaction will not increase, and further use will be avoided. User Satisfaction is a consideration of a product or service that provides a pleasant level of fulfilment of user desires at lower or higher levels (Ohk et al., 2015). This definition emphasizes consumers rather than customers because even though customers pay for products or services, they are unlikely to use or service them directly. Satisfaction with a product or service requires experience and use of a product/service for everyone (Tandon et al., 2016).

2.4 Sustainable e-Learning

Sustainable e-learning defines e-learning as any teaching and learning that uses electronic circuits (LAN, WAN, or internet) to convey learning content, interaction, or guidance (Wu et al., 2010). Some interpret e-learning as a form of distance education carried out via the Internet. Meanwhile, Rajabalee and Santally (2021) define learning as asynchronous learning activities through computer electronic devices that obtain learning materials that suit their needs. Cheok and Wong (2015) emphasize that e-learning refers to the use of Internet technology to deliver a series of solutions that can improve knowledge and skills. Ho and Dzung (2010) essentially emphasize the use of the Internet in education as the essence of learning. e-learning is used as a term for all technology used to support teaching efforts via internet electronic technology. Internet, Intranet, satellite, audio/video tape, interactive TV and CD-ROM are some of the electronic media used. Teaching can be delivered 'synchronously' (at the same time) or 'asynchronously' (at different times). Teaching and learning materials delivered through this media have text, graphics, animation, simulation, audio and video (Nortvig et al., 2018). They must also provide facilities for 'discussion groups' with the help of professionals in their field. The difference between traditional learning and e-learning is that in 'traditional' classes, lecturers/teachers are considered to be people who know everything and are tasked with imparting knowledge to their students. Meanwhile, in 'e-learning' learning, the main focus is students. Students are independent at certain times and are responsible for their learning. The 'e-learning' learning atmosphere will 'force' students to play a more active role in their learning. Students make designs and search for materials with their efforts and initiative. Simply put, e-learning is defined as a learning process that is specifically delivered from one place to another via internet-based information and communication technology to enhance or support learning. With the help of the internet, students utilize network technology to create, foster, transmit and facilitate learning anytime and anywhere. With this approach, students are empowered so that the teacher/trainer/tutor is no longer the gatekeeper of knowledge but plays more of a role as a facilitator. This sustainable e-learning design can realize and perpetuate heutagogy, namely an approach that places students as active participants and centers in the learning process. Purwanto et al. (2023) define continuous intention as the persistent behavior of a user to use a service repeatedly. Students' intention to use the e-learning system on an ongoing basis shows the extent to which the

individual is willing to use the e-learning system in the future and recommend the system to others. Through student participation in online learning systems or continuous e-learning, student achievements are realized (Lu & Chiou, 2010; Han, 2013).

2.5 Relationship between information system quality and user satisfaction

Chang et al. (2012) found that system quality can influence user satisfaction. DeLone and McLean's success model suggests that system quality measures technical success, information quality measures semantic success, and system use, user satisfaction, individual impact, and organizational impact measure effectiveness success. Dreheeb et al. (2016) assume that system quality and information quality, individually and jointly, influence user satisfaction and use.) Gürkut and Nut (2017) research revealed similar results that user satisfaction can be influenced by system quality. The research results obtained by Gorla et al. (2010) also show that the quality of information systems has a positive effect on user satisfaction. Based on research Tajuddin et al. (2013), information system users believe that if the quality of the information system used is good, then they will feel satisfied using the system. So, the first hypothesis in this research is that the higher the quality of information produced by the software used, the higher user satisfaction will be based on their perceptions. Based on this explanation, the proposed research hypothesis is as follows:

H₁: *Information system quality has a positive effect on user satisfaction.*

2.6 Relationship between Perceived Usefulness and user satisfaction

Perceived usefulness is defined as the level of user confidence that the use of an information system will improve the user's performance. Baker-Eveleth and Stone (2020) examined the relationship between perceived usefulness and user satisfaction using three models of information system success. Zviran et al. (2005) model which was modified by adding a relationship between perceived usefulness and system use. The overall research results show that perceived usefulness influences user satisfaction. Zviran et al. (2005) researched the success of a newly implemented information system for users of a mandatory information system in an organization. The results of Daud et al. (2018) research on the relationship between the perceived usefulness variable show that there is an influence on user satisfaction. So it can be said that if information system users feel the benefits of the system they use, then they will feel satisfied using the system. Based on the description above, the third hypothesis in this research is that the higher the perceived usefulness, the higher the user satisfaction will be based on their perception

H₂: *Perceived Usefulness has a positive effect on user satisfaction.*

2.7 The relationship between user satisfaction and sustainable e-learning

Easy-to-use e-learning will have an impact on the level of student intention to use the technology (Kurniasari & Abd Hamid, 2020). The system itself is considered quality if it is designed to meet user satisfaction through ease of use; not only the ease of learning and using the system but also the ease of carrying out a job or task, where users will find it easier to carry out activities using the system rather than doing it online. Convenience in this case is not only limited to the ease of using e-learning but is also related to whether this system makes it easier for students in the online learning process compared to offline or face-to-face. Perceived ease of use influences the risk of acceptance or adoption of an e-learning system. An e-learning system that is not too complicated will minimize this risk. Several studies by Ho and Dzung (2010) and Yilmaz et al. (2017) show that perceived convenience influences the intention to use e-learning systems. Based on the results of Nortvig et al. (2018) research, it can be assumed that the easier the e-learning is to use, the higher the intention to use the system, and vice versa, if the system is difficult to use, the intention to use the system will be lower. Therefore, the relationship between the convenience variable and intention to use can be hypothesized as follows,

H₃: *User satisfaction has a positive effect on sustainable e-learning.*

3. Method

The research method used in this research is associative research. Associative research is research that aims to determine the relationship between two or more variables. In this way, we can build a theory that functions to predict and control a phenomenon. The population in this study were all students who had undergone lectures using e-learning. In this study, the analytical model was used, namely Structural Equation Modeling (SEM). In this study, the number of respondents was 456 high school students in Indonesia who have undergone lectures using e-learning? The sampling technique used in this research is nonprobability sampling. In this research, the data collection method used was the questionnaire method. The instrument used to measure this research variable was a 5-point Likert scale. Data processing in this research uses SmartPLS software. The data analysis stage in this research is the outer model test including convergent validity, discriminant validity and composite reliability and inner model analysis, namely hypothesis testing. Fig. 1 shows the structure of the proposed study.

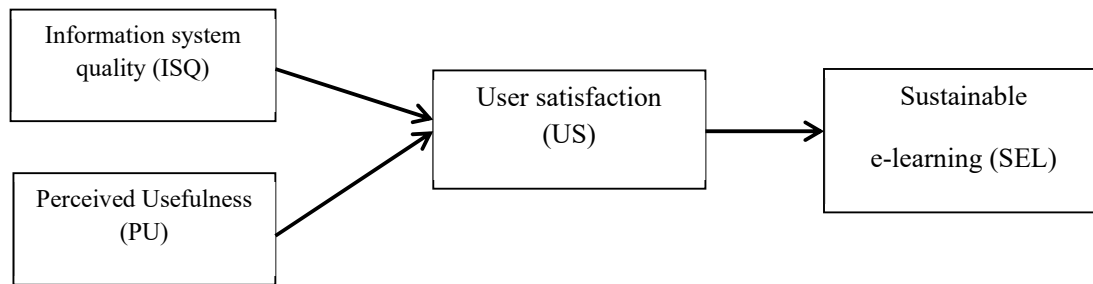


Fig. 1. Research Model

4. Results and Discussion

4.1 Outer Model Analysis

Outer model analysis is an evaluation of the relationship between variables and their indicators. The following is a display of the SmartPLS output results below:

Table 1
Validity and reliability testing

Variable	Item	Loading	CR	AVE
Information system quality (ISQ)	ISQ1	0.808	0.813	0.717
	ISQ2	0.834		
	ISQ3	0.801		
Perceived Usefulness (PU)	PU1	0.824	0.819	0.708
	PU2	0.817		
	PU3	0.835		
User satisfaction (US)	US1	0.810	0.809	0.754
	US2	0.806		
	US8	0.805		
Sustainable e-learning (SEL)	SEL1	0.817	0.883	0.776
	SEL2	0.808		
	SEL8	0.834		

4.2 Convergent Validity

To test convergent validity, the outer loading value is used. An indicator is declared to meet convergent validity in the good category if the outer loading value is > 0.7 , but an outer loading value between 0.5-0.6 is considered sufficient. The outer loading value of each indicator in the research variable appears in Table 1.

4.3 Discriminant Validity

Discriminant Validity is looking at and comparing discriminant validity and the square root of the average extracted (AVE). If the AVE square root value for each construct is greater than the correlation value between the construct and other variables in the model, then it is said to have good discriminant validity values and the expected AVE value is > 0.5 . The AVE value for each variable is presented in Table 1. Based on the data presented in Table 1 above, it is known that the AVE value for all variables is > 0.5 . Thus, it can be stated that each variable has good discriminant validity.

4.4 Composite Reliability

Composite Reliability is an index that shows the extent to which a measuring instrument can be trusted to be relied upon. Data that has composite reliability > 0.7 has high reliability. The composite reliability value of each variable is shown in the following table. Based on the data presented in Table 1 above, the composite reliability value for all variables is > 0.7 . These results indicate that each variable has met composite reliability so it can be concluded that all variables have a high level of reliability.

4.5 Cronbach's Alpha

The reliability test with composite reliability above can be strengthened by using Cronbach's alpha value. A variable can be declared reliable or meets Cronbach's alpha if it has a Cronbach's alpha value > 0.7 . The Cronbach's alpha value of each

variable appears in Table 2. Based on the data presented above in Table 2, Cronbach's alpha value of each variable is > 0.7 . Thus, these results can indicate that each research variable has met the requirements for Cronbach's alpha value, so it can be concluded that all variables have a high level of reliability.

Table 2
Cronbach's alpha testing

Variable	Item	Loading	Cronbach's alpha
Information system quality (ISQ)	ISQ1	0.808	0.732
	ISQ2	0.834	
	ISQ3	0.801	
Perceived Usefulness (PU)	PU1	0.824	0.712
	PU2	0.817	
	PU3	0.835	
User satisfaction (US)	US1	0.810	0.713
	US2	0.806	
	US8	0.805	
Sustainable e-learning (SEL)	SEL1	0.817	0.733
	SEL2	0.808	
	SEL8	0.834	

4.6 Hypothesis testing

Based on the analysis of the data that has been processed, the results can be used to answer the hypothesis in this research. Hypothesis testing in this research was carried out by looking at the t-statistic values and probability values. The research hypothesis can be declared accepted if the t statistic is > 1.96 and the probability value is < 0.05 . The following are the output results from SmartPLS shown in Table 3 and Fig 2.

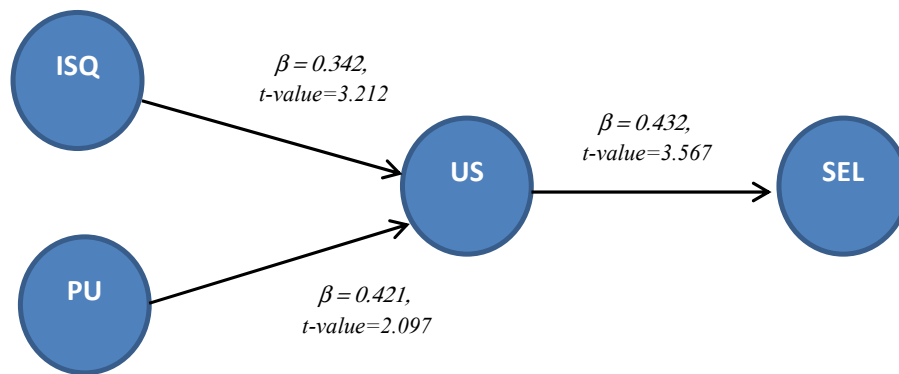


Fig. 2. Hypothesis Testing

The results of hypothesis testing on the influence of each independent variable on the dependent variable can be described as follows.

Table 3
Direct Effect Analysis

Hs	Path	β	p-value	t-value	supported
H_1	ISQ→US	0.342	0.000	3.212	Yes
H_2	PU→US	0.421	0.000	2.097	Yes
H_3	US→SEL	0.432	0.000	3.567	Yes

Table 4
Indirect Effect Analysis

Hs	Path	β	p-value	t-value	supported
H_4	ISQ→US→SEL	0.654	0.000	5.323	Yes
H_5	PU→US→SEL	0.234	0.000	3.234	Yes

Relationship between information system quality and user satisfaction

The first hypothesis in this research is that the quality of the information system has a positive effect on end-user satisfaction with accounting software. The results of testing the first hypothesis (H_1) show that the quality of the information system has

a positive influence on end-user satisfaction with a significance level of 0.000 ($\text{sig} < 0.05$) and a regression coefficient b_1 value of 0.342. The results of this analysis show that the first hypothesis is accepted. The results of this research are in line with research by Gürkut and Nut (2017) which found that the quality of information systems has a positive effect on user satisfaction. Gorla et al. (2010) define information system quality as perceived ease of use, which is the degree to which computer technology is felt to be relatively easy to understand and use. This shows that if information system users feel that using the system is easy, they do not need much effort to use it, so they will have more time to do other things which will likely improve their overall performance. Eom and Laouar (2017) found that the higher the users' perception of system quality, the more satisfied they were with the system.

The results of this research are by Tajuddin et al. (2013) which states that behavior is influenced by intentions, while intentions are influenced by attitudes and subjective norms. Attitudes themselves are influenced by beliefs about the results of previous actions. Subjective norms are influenced by beliefs about other people's opinions and motivation to comply with those opinions. If information system users have good confidence in the quality of an information system, this will give rise to information system user satisfaction and create a desire to use the information system continuously. The second hypothesis in this research is that information quality has a positive effect on end-user satisfaction with accounting software. Park et al. (2018) state that information quality is the quality of output in the form of information produced by the information system used. Meanwhile, according to Salam and Farooq (2020), information quality is the level of relevance, timeliness, security and presented with an appropriate information design. good on a website. Information with the best quality will increase the user's perceived usefulness and increase the use of the information system (Pham, et al., 2019). The quality of information can also be seen from the potential to produce unlimited information both within the organization and outside the organization. The measure of user satisfaction with an information system is reflected by the quality of the information produced by a system (Puška et al., 2021). If information system users believe that the information produced from the system is optimal, they will feel satisfied using the system. This is in line with Kassim et al. (2012), which says that a person will do an action if he views the action as positive and if he believes that other people want him to do it. So, the higher the quality of information produced by an information system, the system users will feel satisfaction in using the information system because the information provided is optimal according to the user's needs.

The relationship between Perceived Usefulness and user satisfaction

The second hypothesis in this research is that perceived usefulness has a positive effect on end-user satisfaction with accounting software. The results of testing the second hypothesis (H2) show that perceived usefulness has a positive influence on end user satisfaction with a significance level of $0.011 < 0.050$ which examines the relationship between perceived usefulness and user satisfaction using three models of information system success. The overall research results show that perceived usefulness influences user satisfaction. Perceived usefulness is defined as the extent to which someone believes that using technology will be useful in improving their work performance. Perceived usefulness is a measure of trust if an information technology provides many benefits for its users. If information system users believe that the information system, they use is useful, then the user will feel satisfied and use the information system continuously. On the other hand, if information system users believe that the information system is less useful, this will lead to a reluctance to use the system. This is by Tandon et al. (2016) which states that a person's reactions and perceptions of something will determine that person's attitudes and behavior. The results of the data analysis state that perceived usefulness has a positive and significant effect on user satisfaction with the Information System. This means that the higher the perceived usefulness, the higher the user satisfaction. The results of this research are the results of research conducted by Ohk et al. (2015) which stated that perceived usefulness has a positive effect on end-user satisfaction with information systems. The results of this research mean that the better the perceived usefulness, the greater the satisfaction of end users of the software.

The relationship between user satisfaction and sustainable e-learning

The third hypothesis in this research is that user satisfaction has a positive effect on sustainable e-learning satisfaction. The results of testing the first hypothesis (H3) show that user satisfaction has a positive effect on continuous e-learning satisfaction with a significance level of 0.000 ($\text{sig} < 0.05$) and a regression coefficient value of 0.432. The results of this analysis show that the third hypothesis is accepted. Calisir and Calisir (2004) in their research stated that Perceived usefulness is the extent to which a person believes that using a technology will improve their work performance. The definition above reveals that perceived usefulness is a belief about the decision-making process. Information system users who believe that the information system they use is useful will use it (Siritongthaworn & Krairit, 2006). On the other hand, if an information system user believes that the information system is less useful, he/she will not use it. According to Ho and Dzen (2010), perceived usefulness is defined as the level of a person's belief that the use of an information system improves performance in their work. Siswanto et al. (2023) state that perceived benefits are defined as the level at which a person believes that using a technology will increase their performance at work, meaning that the benefits of an accounting information system will be able to increase performance productivity for people who use the system. The definition above reveals that perceived usefulness is a belief about the decision-making process. User satisfaction is an overall evaluation of the user's experience in using an information system and the potential impact of the information system. Alsohime et al. (2019) define satisfaction as the level of user thinking that the information system is available to respond to the information needed. In this context, user

satisfaction is something that can comprehensively measure the success of an information system. Information system user satisfaction is the level of user satisfaction with the accounting software used and the output produced by the accounting software. According to Puška et al. (2021) information systems certainly have a big impact on user satisfaction of accounting information systems. This statement is strengthened by the results of research conducted by Ohk et al. (2015) who in his research results stated that the quality of the information system has a positive effect on user satisfaction of the Accounting Information System. Daud et al. (2018) stated that system quality has a positive effect on user satisfaction of accounting information systems. The results of this research are also supported by research conducted by Alsohime et al. (2019) which also obtained the same results where the quality of the information system had a positive effect on information system user satisfaction.

Gürkut and Nut (2017) stated something similar that information quality influences user satisfaction. Gorla et al. (2010) show similar research results that user satisfaction is influenced by information quality. Similar research results were also produced by Dreheeb et al. (2016) which showed that information quality can influence user satisfaction. Based on previous research, it can be concluded that if information system users believe that the quality of the information produced by the system used is good, then they will feel satisfied using the system (Joshi & Rai, 2000). So based on this, the second hypothesis in this research is that the higher quality of the information produced by the accounting software used will increase user satisfaction based on their perceptions. The better the perception of system quality, the more satisfied users of the e-learning system will increase.

5. Conclusion

The results of this research are that the quality of the information system has a positive effect on user satisfaction, Perceived Usefulness has a positive effect on user satisfaction and user satisfaction has a positive effect on sustainable e-learning. The advice that can be given is to improve the ability of the accounting information system to be able to increase the accuracy of the information and the timeliness needed to decide. Increasing the ease of use of accounting information systems in completing employee work and optimizing resources in using information systems so that they provide optimal benefits. On the other hand, when the quality of the information provided is getting worse/lower, the satisfaction of users of e-learning systems in higher education will be lower. The implication is that every element at every level in formal educational institutions must pay serious attention to personal factors, including attention to student achievement expectations, relative excellence expected by students, student suitability with the e-learning system chosen in an institution's formal education, and the attitude of students who are willing to accept and continuously use e-learning. In this way, students will be consistent in using e-learning so that student achievement, which is the main goal of every school, can be achieved. The limitation of this research is that it does not provide prior understanding to respondents regarding the scope of the meaning of sustainable e-learning. Therefore, we suggest that it is necessary to provide literacy regarding sustainable e-learning before carrying out further research on this theme, even if it is deemed necessary it can also be included as a variable in further research.

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