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## Effectiveness of Online Learning at Universities: Do Sociocultural Differences Matter?

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**Abstract:** This study aims to explain the success factors of e-learning. The participants were 427 students in public universities in Indonesia. To demonstrate the success of this e-learning, we developed a more comprehensive e-learning evaluation model that considers the system's characteristics, students, and instructors. The results show that higher student performance is associated with higher student satisfaction. However, the increase in performance is not due to the use of e-learning. Social and cultural factors influence the use of e-learning. Culture and social environment influence students' use of e-learning. The instructor's ability to implement e-learning has been shown to influence student satisfaction. The difference in the implementation of e-learning compared to classroom learning requires different teaching methods that affect student performance. In addition, e-learning is used in all courses during the COVID-19 pandemic.

**Keywords:** *Culture, lecturer's performance, social influence, student's performance.*

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### Introduction

The COVID-19 pandemic caused various countries to implement lockdown measures, isolation, and social restrictions, including restrictions on social contact between lecturers and students. This phenomenon forced the government to close schools and higher education institutions (HEIs) (Ebner et al., 2020). To prevent the spread of the COVID-19 case, the regulatory body decided to close more than 100 schools (Sukendro et al., 2020).

On the one hand, education has a crucial function in the nation's life by improving skills and shaping students' character. To enhance the sustainability of this educational function, governments worldwide are taking steps to replace traditional learning (face-to-face learning) with distance learning (Dhawan, 2020; Rizun & Strzelecki, 2020). This distance learning system is implemented using information technology (Raza et al., 2020), such as Zoom, Google Meet, Edmodo, Blog, social media, Webex, Coursera, Microsoft Teams, or other platforms specifically developed by each HEIs (Arpaci & Basol, 2020). This learning is known as online or e-learning.

E-learning, as a learning system, was introduced before the pandemic. In the 1960s (Bezhovski & Poorani, 2011), e-learning was expanded in various ways in business, education, training, and the military. However, at that time, e-learning was used voluntarily by teachers who were willing to use this system. Moreover, e-learning is used as a supplement to traditional learning. However, since the pandemic, e-learning has been required of all teachers at various levels of education and has been the primary learning system during the pandemic (Alam et al., 2021). The readiness and function of e-learning are different before and after the pandemic.

These different circumstances create issues related to the network, Internet connectivity, the ability of devices to access the Internet, and the competency of teachers/students to use the technology (Aini et al., 2020; Hamid et al., 2020). Errors in downloading, logging in, installing, audio, and video can also affect the effectiveness of e-learning. Even students admit that e-learning bores them and makes them uninterested because they cannot interact both ways (Dhawan, 2020).

The question of the effectiveness of e-learning has led researchers to conduct studies, especially those that focus on the effectiveness of e-learning. The reason is that the COVID-19 pandemic is forcing college teachers and students to

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implement e-learning, despite a short period of readiness (Scherer et al., 2021) and unclear teacher readiness (Tang et al., 2021). A report by the International Institute for Higher Education in Latin America and the Caribbean - United Nations Educational, Scientific and Cultural Organization (IESALC-UNESCO) states that the pandemic is causing the adoption of a social disconnect and leading to a move to e-learning starting in March and April 2020, regardless of teacher readiness. This situation also prompts researchers to investigate faculty and student readiness for e-learning (Alqabbani et al., 2020; Ebner et al., 2020; Junus et al., 2021; Scherer et al., 2021). Evaluating the effectiveness of e-learning can be done by studying the factors that influence it, such as the system's quality and social, individual, and cultural factors (Kukulka-Hulme, 2012).

Other researchers are concerned with teachers' or students' abilities to do e-learning. Since e-learning is conducted using information technology (Romi, 2017), other researchers focus on the ability and frequency of teachers or students to use computers and information systems (Al-Marouf & Salloum, 2021; Khechine et al., 2020; S. H. Lin et al., 2020; Raza et al., 2020; Salikhova et al., 2020; Thongsri et al., 2018). Previous researchers have used many approaches to explain teachers' or students' ability to use e-learning, such as (a) Technology Acceptance Model (TAM) (Al-Fraihat et al., 2020; Alsabawy et al., 2016; Majid & Shamsudin, 2019; Siron et al., 2020; Yuen & Ma, 2008), (b) D&M ISS-DeLone and McLean information systems success (Al-Fraihat et al., 2020; Aparicio et al., 2016; W. A. Cidral et al., 2018; W. Cidral et al., 2020), (c) Extended Technology Acceptance Model (Ching-Ter et al., 2017), and (d) Unified Theory of Acceptance and Use of Technology (UTAUT) (Fianu et al., 2018, 2020; Mohan et al., 2020).

This study uses a different perspective than previous researchers in evaluating the use of systems in e-learning. We did not examine teacher or student readiness for e-learning. However, we did explore the success of online learning and the factors that influence e-learning. The reason is that the achievements of e-learning are due to the pandemic. Several researchers have also evaluated e-learning post-pandemic (Ouajdouni et al., 2021). In agreement with Al-Fraihat et al. (2020) that the development of an evaluation model is necessary to allow for a more comprehensive discussion, this study develops a different model than its predecessors to explain the successes of e-learning.

Al-Fraihat et al. (2020) and Ouajdouni et al. (2021) developed a comprehensive measure of e-learning success that includes satisfaction, utility, use, and student benefits. Safsouf et al. (2020) added the factors of collaboration service, information, teacher attitude, and diversity in assessment to explain the successful implementation of e-learning. In addition, Safsouf et al. (2020) also added the factors of self-effort and course flexibility. Alam et al. (2021) developed various learner, instructor, information, systems, and institutional quality indicators. However, studies evaluating e-learning success have largely ignored cultural factors. We added cultural factors to explain e-learning success because Mutambik et al. (2020) recommended that culture influences students' willingness to use e-learning. Studies on the success of e-learning during the inter-country student pandemic need to be conducted further to improve the success of e-learning during social distancing. This study aims to investigate the determinants of e-learning success based on the model we developed in the previous study (Figure 1).

## Literature Review

### *Theoretical Background*

Learning evaluation is a process of systematically comparing the achievement of learning objectives with benchmarking and learning evaluation to develop assessments and improvements needed to maximize learning outcomes. Thus, evaluation determines e-learning's quality, effectiveness, and continuous improvement of e-learning. Evaluation of e-learning is different from assessment and measurement of classroom learning. E-learning is conducted through an information system in which students and teachers use laptops, computers, gadgets, and smartphones as learning media. In this type of learning, using information systems indicates success in implementing e-learning (see Ouajdouni et al., 2021; Safsouf et al., 2020). We can classify the e-learning assessments developed by researchers as follows:

#### *Model DeLone & McLean (DM)*

The DM model is used to measure success in information systems. In this system, the accomplishments of the information system are measured by usability, user satisfaction, and the impact on individual users and organizations (see Figure 1). At the beginning of its development, the DM models were used to evaluate the use of e-commerce but later were used to assess e-learning. Yakubu and Dasuki (2018) developed the DM model to evaluate the success of implementing e-learning in students at a university in Nigeria. Safsouf et al. (2020) also used the DM model to assess the success of e-learning at several public universities in Morocco. This model evaluates the success of e-learning based on factors such as intention to use and the system's quality, information, and service (Yakubu & Dasuki, 2018). The DM model assumes that e-learning is successful when students continue to implement e-learning.

#### *TAM Model*

TAM is a model that describes computer users' behavior (Davis et al., 1989). This model assumes that the user will accept the technology based on two main factors: the perception of convenience and usability (see Figure 1). E-learning

is a learning system using computer technology. This reason is the basis for researchers using TAM to evaluate the success of e-learning. Al-Fraihat et al. (2020) state that students will not obtain the benefits of e-learning if they do not use the system. Several researchers, such as Prasojo et al. (2020), Abdullah et al. (2016), and Yuen and Ma (2008) have used TAM in evaluating the accomplishments of e-learning.

### *Student Satisfaction Model*

The college provides services to students to meet their needs and satisfaction. The COVID-19 pandemic has caused HEI to replace policy from learning in the classroom to e-learning. This policy caused HEI to try to use various e-learning methods to increase the satisfaction of their students. Previous researchers then used this concept using student satisfaction as a measuring tool to evaluate e-learning. Chao et al. (2021) use student satisfaction to measure e-learning success. In this approach, e-learning effectiveness, teacher performance, and system characteristics affect user e-learning satisfaction (Ramírez-Hurtado et al., 2021). We use lecturer quality, system characteristics (perceived ease to use and perceived usefulness) as a factor that affects student satisfaction (see Figure 1).

### *UTAUT Model*

Researchers have developed many theories to explain the acceptance behavior of technology. UTAUT is used to report user use of the computerized and usage behavior. UTAUT is a fabricated model devised based on the shortcomings and strong aspects of frequently used models and theories, such as Reasoned Behavior Theory, TAM, Unified Theory of Acceptance of Technology, Planned Behavior Model, Spreading Theory, and Social Cognitive Theory (Bower et al., 2020; Durak, 2019). UTAUT uses four factors in system acceptance. These factors are performance expectations, effort, social, and facilitation. Raza et al. (2020) used UTAUT to evaluate the success of e-learning. Meanwhile, Durak (2019) used UTAUT to assess the use of social network sites (SNSs) as learning media for teachers and students at HEI. Based on UTAUT model, we use social influence and culture as a factor that affects use of E-learning and student satisfaction (see Figure 1).

### *Development of a Comprehensive E-learning Evaluation Model*

The previous discussion has explained that different approaches spell out the achievement of e-learning. Based on the opinion of Al-Fraihat et al. (2020), there is a need to produce a more comprehensive discussion. Previous researchers who used TAM and UTAUT emphasize the quality of the system and its impact on user behavior in making decisions to use the system information. The DM model systems are better than the TAM and UTAUT models because they have considered the user benefits of using technology. However, the DM model only considers system and information quality factors. In this study, we assess that the achievement of e-learning is not purely based on the quality of the technology used. This study also related to the teacher's ability to deliver material teaching and the teacher's ability to use technology. In addition, measuring the achievement of e-learning is not only proxied by the intention or behavior of using technology, and this proxy tends to focus on evaluating technology. We consider that the achievement of e-learning is the achievement of the benefits of learning, regarding the effectiveness of e-learning and improving the performance of teachers and students. Our proxy was developed to add to the e-learning success measurement that previous researchers have developed. Reached from the argument, we set the e-learning evaluation model in Figure 1.

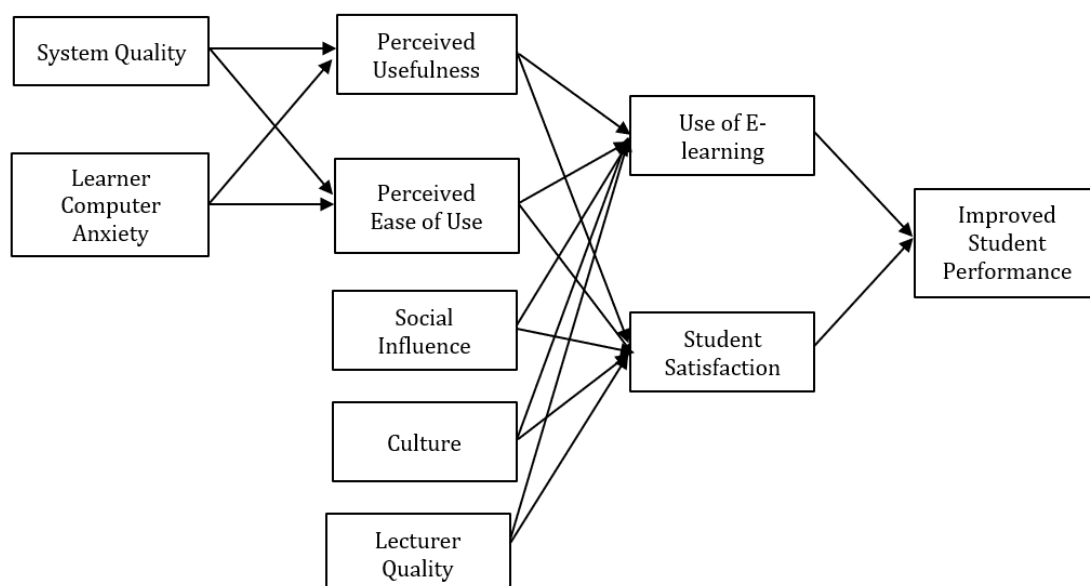


Figure 1. E-learning Evaluation Model Development

*Hypothesis*

The COVID-19 pandemic has caused the government to control direct contact between people and replace it with information technology virtual contacts. Information technology has a vital role during this pandemic (Raza et al., 2020), including learning at school. Currently, many platforms are available as e-learning media, such as Zoom, Google Meet, Skype, Microsoft Meet, Cisco, and WebEx. These provide virtual face-to-face meetings between teachers and students. Other platforms such as Google Classroom, Signal, WhatsApp, and Telegram can also be used as e-learning media. However, many HEIs have developed their e-learning platforms.

The number of available platforms causes teachers and students to choose a venue that matches the reference to be used as an e-learning medium. One of the indicators used in selecting a platform is the system's quality (SQ). The SQ concerns the suitability of the system features with the wishes of the teacher or student and the flexibility of the system to be used according to the wishes of the teacher/student. The system's quality corresponds to the system's technology, performance, and usability characteristics (W. A. Cidral et al., 2018). A quality system is a system that meets user requirements and has adequate features to achieve e-learning objectives. Thus, the SQ will improve users' performance using it (W. A. Cidral et al., 2018). The system's quality is also related to the ease of use of the e-learning system in carrying out the teacher's duty in learning. Thus, the system's quality influences its perceived usefulness (Alsabawy et al., 2016) and ease of use (Al Mulhem, 2020; Chaw & Tang, 2018; DeLone & McLean, 2003).

H1: The quality of the system has a positive influence on the perceived usefulness

H2: The quality of the system has a positive influence on the perceived ease of use

The TAM model explains that the user's Computer Anxiety influences the use of the system by the user (Dönmez-Turan & Kir, 2019). Computer Anxiety is a strong and negative emotion, such as the fear that arises when a user interacts with a computer (Abdullah & Ward, 2016; Rizun & Strzelecki, 2020). This anxiety arises because the user feels the system is not safe, afraid of making mistakes that the user might think the error could be fatal, or the individual's feeling that they are not proficient in using computers. Hence, computer anxiety is an external factor in the system (Dönmez-Turan & Kir, 2019). The teacher's anxiety about using computers will negatively influence teachers in using computers as e-learning media. Thus, computer anxiety hurts perceived usefulness and ease of use (Dönmez-Turan & Kir, 2019; Fianu et al., 2018; Safsouf et al., 2020).

H3: Learner Computer Anxiety has a negative influence on the perceived usefulness

H4: Learner Computer Anxiety has a negative influence on the perceived ease of use

E-learning is conducted by teachers and students using information systems, and many platforms with various features are provided. Teachers can choose platforms that can be used as e-learning media according to their preferences. One of the factors to be considered is perceived usefulness. So, PU positively impacts e-learning (Al-Marroof & Salloum, 2021; Ansong-Gyimah, 2020; Ching-Ter et al., 2017; Rizun & Strzelecki, 2020).

H5: Perceived usefulness has a positive effect on the implementation of e-learning

PU measures the user's belief that using the system can help them complete their tasks and improve performance. In the use of e-learning, PU measures the level of teacher belief that using e-learning can enhance their performance in carrying out learning during a pandemic. In addition to positively impacting behavior using e-learning, it also influences increasing satisfaction with e-learning. Al-Fraihat et al. (2020) examined student satisfaction using Moodle LMS (an e-learning system developed by Universitas Warwick) and found that PU positively affects student satisfaction using e-learning. The finding of the relationship between PU and satisfaction is also corroborated by Al-Marroof and Salloum (2021), Arbaugh (2000), and Limayem and Cheung (2008).

H6: Perceived usefulness has a positive effect on the satisfaction of e-learning

In addition to PU, the ease to use factor is also considered by teachers in choosing the platform used in e-learning. Perceived ease of use (PEU) is the teacher's perception of the ease of using available features and reduces the user's occasions of making mistakes. PEU is the user's perception that using the system will be effortless or easy (He et al., 2018). For teachers, PEU is the teacher's belief that e-learning is easy. Thus, the PEU influences the implementation of e-learning (Abdullah et al., 2016; Ching-Ter et al., 2017; Lee, 2010; Rizun & Strzelecki, 2020).

H7: Perceived ease of use has a positive effect on the use of e-learning

Besides affecting the system's implementation, the convenience's usability also increases user satisfaction. An easy-to-use system is a system that does not require significant effort to run the system. Al-Marroof and Salloum (2021) used the ISECM model, arguing that ease of e-learning implementation increases users' satisfaction. DeLone and McLean (2003) have updated the D&M IS Success model using information quality (regarding ease of use) as a variable that describes user satisfaction. The updated model of D&M IS Success has been used by Pham et al. (2019) and Ramadiani et al. (2017), who found that the quality of information influences student satisfaction. Research by Al-Marroof and Salloum (2021) and Lee (2010) has also proven that PEU positively influences satisfaction using e-learning.

H8: Perceived ease of use positively affects satisfaction with e-learning.

The UTAUT model explains that the determination to use the system is influenced by social influences (SI) (Fianu et al., 2018; Raza et al., 2020; Siron et al., 2020). UTAUT assumes that the social environment will encourage someone to use a system. The SI is the extent to which an individual discerns that others suspect they should use a new system (Venkatesh et al., 2003). The SI represents subjective norms in the theory of reasoned action (TRA) (Fianu et al., 2020; Venkatesh et al., 2003). Dečman (2015), Pynoo et al. (2011) and Rokhman et al. (2022) has proven that SI influences the use of e-learning and satisfaction with e-learning.

H9: Social Influence has positive influences on the implementation of e-learning

H10: Social Influence has a positive influence on the satisfaction of e-learning

Culture is a way of life in a society and can be used as a way of life for a community. Because of its function as a way of life, culture can become people's beliefs in their behavior and relationship with the reality they live in (Aparicio et al., 2016). The user's cultural profile shapes his perception of using any system component (Garfield & Watson, 1997), so culture influences the achievement of implementation of information technology (Leidner & Kayworth, 2006). Based on these facts, it is essential to include cultural characteristics that directly bear the problems of system design and customer behavior in information systems (Tam & Oliveira, 2017).

The role of culture in the system's success can also occur in the implementation of e-learning. We suspect that this culture will also affect people's attitudes towards the new system used by the community, including the government's e-learning policy due to the pandemic. Cultural factors influence learning and how people interrelate with educational material and peers (W. Cidral et al., 2020). Mutambik et al. (2020) assessed that students' readiness to do e-learning depends on individual student factors. The unique characteristics of these students can be influenced by the culture of the surrounding community where the students socialize. Thus, culture is a student's external factor that influences students' readiness to implement e-learning (Mutambik et al., 2020). Student cultural differences affect the use and satisfaction of e-learning (Aparicio et al., 2016). W. Cidral et al. (2020) and Aparicio et al. (2016) found that culture is essential in implementing e-learning.

H11: Culture has positive influences on the use of e-learning

H12: Culture has a positive effect on the satisfaction of e-learning

E-learning is a teaching model that uses information systems. Success is influenced by student interaction with information systems and the teacher's ability to use and provide teaching through the system. Direct and distance learning requires different teaching methods. The teacher's ability to conduct e-learning affects the success of e-learning. The quality of the instructor is an essential component of the system's quality that affects the quality of e-learning. Instructors encourage students to continue their studies because they can handle e-learning activities and respond appropriately to student needs and problems, increasing learning satisfaction.

The quality of e-learning instructors is the main attribute that shapes the quality of e-learning services. Pham et al. (2019) found that instructor quality is a constructor of e-learning quality and further increases student satisfaction and loyalty to the implemented e-learning. W. A. Cidral et al. (2018) found that the instructor's attitude towards e-learning affects student satisfaction using e-learning. The quality of the instructor is a vital factor in using e-learning (Romi, 2017). In addition, the teacher's quality positively influences the decision to implement e-learning (Lwoga, 2012). Lecturers apply the implementation of e-learning on HEI, so we use the quality of lecturers as a factor that can affect the success of e-learning

H13: Lecturer Quality has a positive influence on the implementation of e-learning

H14: Lecturer Quality has a positive influence on the satisfaction of e-learning

The DM model explains that the success of information systems is measured by usability, user satisfaction, and the impact on individual users and organizations (DeLone & McLean, 2003). The use of e-learning during the pandemic is expected to replace learning in the classroom, which the government currently does not allow. So, e-learning should provide benefits for students and teachers. The use of e-learning can increase knowledge, save time, and systematically manage student learning processes (Al-Fraihat et al., 2020). Previous research has investigated the impact of using e-learning on individual student benefits and found that implementing e-learning enhances student learning benefits (W. A. Cidral et al., 2018; W. Cidral et al., 2020).

H15: The implemented e-learning has a positive influence on student performance

The excellent experience of students using e-learning will have a beneficial impact on students. Student satisfaction will be obtained if they use e-learning and benefit from e-learning. Thus, there is a positive influence between student satisfaction and student benefits. Aparicio et al. (2017), W. Cidral et al. (2020), and W. A. Cidral et al. (2018) have provided evidence that the satisfaction of using e-learning will increase student benefits. We refer to previous research to construct student benefits as increased student performance. So, the following hypothesis can be developed:

H16: E-learning satisfaction has a positive influence on student performance

## Methodology

### *Research Design*

This study uses a correlational approach that explains the relationship of the independent variable to the dependent. Figure 1 has described all the variables that we will test for correlation. The approach used is a survey by distributing questionnaires to respondents.

### *Sample and Data Collection*

University students enrolled at Universitas Negeri Semarang participated in this study. This university has developed an e-learning information system and intends to use e-learning as an alternative to lectures after the end of the COVID-19 pandemic. Our sampling criteria included students who had participated in face-to-face courses and e-learning for at least one year. We chose this criterion so that our respondents have fully followed the learning process and can distinguish the learning process and outcome with face-to-face and e-learning methods. The total population was 33,470 students. We distributed questionnaires to 1,673 students (5% of the population). We randomly mailed online questionnaires to students for two months. Students, in full, returned a total of 427 questionnaires. The validity of the instrument with the composite reliability test was assessed. The construct had internal consistency as its Cronbach's alpha value was greater than 0.7 (Hair et al., 2019).

Four indicators were used to measure system quality (SQ): ease of navigation, provision of information, structure, and ease of use (Aparicio et al., 2017; W. A. Cidral et al., 2018; W. Cidral et al., 2020). Three indicators measured the variable of learners' computer anxiety (LCA): Nervousness, Comfort, and Confusion when using a computer (W. A. Cidral et al., 2018). Perceived usefulness (PU) is measured by three indicators: Usefulness to the user regarding knowledge enhancement, tasks, and learning effectiveness (Al-Fraihat et al., 2020). Two indicators were used to measure perceived Ease of Use (PEU): Frequency of Use and Dependence on E-learning (Al-Fraihat et al., 2020). The four indicators were measured, including social influence (SI), with encouragement to use e-learning from friends, teachers, parents, and family (Dečman, 2015; Mutambik et al., 2020; Venkatesh et al., 2003). Three indicators measured culture (CU): Group acceptance, success, and loyalty to group (Aparicio et al., 2016; Srite & Karahanna, 2015). Four indicators measured the variable lecturer quality (LQ): lecturer's ability to stimulate, desire to encourage, attitude to motivate students to learn, and ability to deliver the material (Alam et al., 2021; Al-Fraihat et al., 2020). The use of e-learning (UE) was measured by one indicator: the frequency of using e-learning (Alam et al., 2021). The variable student satisfaction (SS) was measured by two indicators: Satisfaction and enjoyment of using e-learning (W. A. Cidral et al., 2018). Four indicators assessing student performance (SP) are the use of e-learning in facilitation, task completion, and productivity (Aparicio et al., 2016). We developed each indicator with one or more questions based on previous literature.

All variables were measured using a Likert scale with seven categories and scales 1= strongly disagree, and 7=strongly agree.

### *Analyzing of Data*

The data were analyzed using structural equation model (SEM) with partial least square (PLS). Testing was done through the outer model test and hypothesis testing. The outer test consisted of a loading test (valid score > .70, or between scores .40 to .70 must be maintained), AVE (valid score .50), and composite reliability (valid score > .70). The acceptable loading value was between .40 and .70. The next step was conducting a hypothesis test.

## Results

Table 1 shows the description of all indicators used in this research. System quality has an average of 5.66. This value indicates that the response to assess e-learning is fairly good. Variable LCA averages 2.75, concluding that the answer is quite comfortable using a computer as an e-learning tool. PU and PEU have an average score of 5.30 and 5.21. This score shows that students respond slightly to the benefits of e-learning. SI and CU as external factors of students have a low average of 4.71 and 4.52. This score shows that the social encouragement of students is low, and students' culture tends to be individual.

Table 1. Variables Descriptive Analysis

Question Items	Mean	Min	Max	St. Dev.
System Quality	5.66	1.25	7.00	1.27
1. Navigation of the system is easy to implement.	5.48	1.00	7.00	1.36
2. The system makes me find the information.	6.05	2.00	7.00	1.09
3. The e-learning system is well structured.	5.28	1.00	7.00	1.41
4. The e-learning system is easy to use.	5.83	1.00	7.00	1.21
Learner Computer Anxiety	2.75	1.00	6.67	1.62
1. Studying with a computer makes me very nervous.	3.06	1.00	7.00	1.68
2. Computers make me feel uncomfortable.	2.56	1.00	6.00	1.58
3. Computers make me feel anxious and confused.	2.63	1.00	7.00	1.60
Perceived Usefulness	5.30	1.00	7.00	1.50
1. Using e-learning allows me to complete my assignments faster.	5.66	1.00	7.00	1.32
2. Using e-learning allows me to increase my knowledge.	5.57	1.00	7.00	1.50
3. E-learning helps me to learn effectively and improve learning performance.	5.01	1.00	7.00	1.59
4. In general, e-learning is useful.	4.94	1.00	7.00	1.60
Perceived Ease of Use	5.21	1.00	7.00	1.37
1. I will use e-learning.	5.43	1.00	7.00	1.29
2. I often use e-learning.	5.88	1.00	7.00	1.16
3. I depend on e-learning in my study.	4.32	1.00	7.00	1.66
4. I use e-learning regularly.	5.20	1.00	7.00	1.38
Social influence	4.71	1.00	7.00	1.62
1. My friend encourages me to use e-learning.	4.25	1.00	7.00	1.69
2. My teacher helps me to use e-learning.	5.31	1.00	7.00	1.41
3. My parents, or people I respect, encourage me to use e-learning.	4.72	1.00	7.00	1.70
4. My family sees that e-learning can improve my study performance.	4.54	1.00	7.00	1.66
Culture	4.52	1.00	7.00	1.68
1. Prefers being a group member over having autonomy and independence.	4.11	1.00	7.00	1.70
2. It is more important to be accepted as a group member than to be independent.	4.15	1.00	7.00	1.74
3. Group success is more important than individual success.	4.80	1.00	7.00	1.67
4. Loyalty to the group is more important than individual interests.	5.00	1.00	7.00	1.60
Lecturer Quality	5.41	1.00	7.00	1.31
1. Lecturers trigger my desire to learn.	5.32	1.00	7.00	1.29
2. Lecturers have a positive attitude towards e-learning.	5.62	1.00	7.00	1.22
3. Lecturers are reliable for material content.	5.29	1.00	7.00	1.40
4. Lecturers are experienced in delivering material content.	5.62	1.00	7.00	1.27
5. Lecturers understand the individual needs of their students.	4.96	1.00	7.00	1.48
6. Lecturers encourage and motivate students to use e-learning.	5.45	1.00	7.00	1.25
7. Lecturers respond efficiently to each student. Lecturers welcome student questions and comments.	5.61	1.00	7.00	1.23
Use of e-learning	6.20	3.00	7.00	1.13
E-learning System Usage Frequency				
1. Retrieve information	6.31	3.00	7.00	1.10
2. Save and share documents	6.10	3.00	7.00	1.24
3. Completing college assignments	6.20	3.00	7.00	1.05
Student Satisfaction	5.16	1.00	7.00	1.50
1. Satisfied with this e-learning	5.15	1.00	7.00	1.47
2. This course meets my needs well.	4.91	1.00	7.00	1.57
3. I enjoy e-learning.	5.16	1.00	7.00	1.55
4. I am happy using e-learning.	5.43	1.00	7.00	1.39
Student Performance	5.49	1.00	7.00	1.29
1. The task completion faster	5.55	1.00	7.00	1.29
2. Increasing my productivity	5.14	1.00	7.00	1.45
3. The easy-to-complete tasks	5.60	1.00	7.00	1.23
4. The usefulness of work	5.66	1.00	7.00	1.17

Table 1 also shows that lecturers encourage students to use e-learning in the learning process, as reflected in an average score of 5.41. Student satisfaction with e-learning is also quite good (average 5.16). Students admitted that

they often used e-learning (average score of 6.20), and it had a fairly good impact on improving students' academics (score 5.49).

The outer model test consists of loading, AVE, and composite reliability tests. The results of this outer test are presented in table 2. The composite reliability of all variables shows a score  $>.70$ . Cronbach's Alpha score of all variables also has a value of  $>.70$ . Table 2 also shows that there is an AVE value  $<.70$ . The minimum AVE value is  $.70$ . However, (Hair et al., 2019) believes that the AVE value of  $.40$  to  $.70$  is maintained. So, from this outer test result, it can be concluded that the data is valid and can be continued with hypothesis testing.

Table 2. Outer Model Test

	PU	PEU	SI	CU	LQ	SS	SP	EU	SQ	LCA
Composite Reliability	.912	.873	.867	.866	.934	.936	.919	.746	.878	.913
Cronbach's Alpha	.869	.805	.794	.794	.918	.908	.882	.749	.814	.855
AVE	.722	.634	.621	.620	.671	.785	.738	.495	.644	.777

Sources: Output from SEM-PLS

Table 3. Hypothesis Test Results Using SEM-PLS

Hypothesis	Path coef.	p-value	Std. Error	Results
H1: SQ → PU	.686***	<.001	.044	Accepted
H2: SQ → PEU	.55***	<.001	.045	Accepted
H3: LCA → PU	-.064*	.091	.048	Accepted
H4: LCA → PEU	-.121***	.006	.048	Accepted
H5: PU → UE	.142***	.001	.047	Accepted
H6: PU → SS	.299***	<.001	.047	Accepted
H7: PEU → UE	.025	.302	.048	Rejected
H8: PEU → SS	.211***	<.001	.047	Accepted
H9: SI → UE	.007	.444	.048	Rejected
H10: SI → SS	.119***	.006	.048	Accepted
H11: CU → UE	-.117***	.007	.048	Accepted
H12: CU → SS	.002	.48	.048	Rejected
H13: LQ → UE	-.011	.408	.048	Rejected
H14: LQ → SS	.335***	<.001	.046	Accepted
H15: UE → SP	-.027	.29	.048	Rejected
H16: SS → SP	.732***	<.001	.044	Accepted

Sources: Output from SEM-PLS

### Discussion

Our study shows that SQ has a positive effect on PU and PEU. A high-quality system will lead to more users using it because it is easy to use, and the system's function, or usability, is easy to grasp. These results support the findings of DeLone and McLean (2003) and Al Mulhem (2020) that system quality increases perceived usefulness and perceived ease of use (Alsabawy et al., 2016). Many systems offered by developers, including those developed by each HEI, have different characteristics (Ebner et al., 2020). Users will choose a quality system based on the users' needs, flexibly based on the features and usability of the system itself (W. A. Cidral et al., 2018). Users' requirements are also related to the availability and conditions of the system functions. Thus, an e-learning system that provides functions that meet users' needs will impact perceived usefulness. The quality of e-learning functions will make it easier for users to use the system (W. A. Cidral et al., 2018). This study confirms the research findings.

This study also proves that LCA has a negative impact on PU and PEU. The attitude of computer anxiety will make it difficult for users to use computers and will further discourage users from taking advantage of the benefits and advantages of e-learning. Our study is consistent with Rizun and Strzelecki (2020), Safsouf et al. (2020), and Fianu et al. (2018). LCA is an emotional reaction that usually results from the fear of negative outcomes after using a computer (Ching-Ter et al., 2017). Russell and Bradley (1997) call it computer anxiety with "cyberphobia". Computer anxiety manifests itself in restlessness, fear, and worry about using the computer. These feelings undoubtedly affect the reduction of e-learning use and become a significant problem in e-learning adoption (Alenezi et al., 2010).

Table 3 shows that perceived usefulness positively impacts UE and SS. PU has been shown to improve the implementation of e-learning because users benefit from e-learning and are satisfied with e-learning. The different platforms in the e-learning system provided by the developer are selected according to the user's usage. The users will choose an e-learning system that provides user-friendly features, so the usability of the e-learning will increase the benefits for the users (Abdullah et al., 2016; Ansong-Gyimah, 2020; Ching-Ter et al., 2017; Rizun & Strzelecki, 2020).



E-learning system usability has been shown to increase user satisfaction (Rokhman et al., 2022). This study result is consistent with the findings of Al-Marroof and Salloum (2021), Arbaugh (2000), and Limayem and Cheung (2008). The system makes it easier for users to complete tasks and subsequently affects improved performance. In e-learning during a pandemic, the system is used by lecturers and students to complete learning tasks, as classroom learning is not allowed. Although there are restrictions on community activities, instructors and students can still complete learning tasks, which subsequently affects instructor, student, or user satisfaction.

The results show that PEU has no impact on UE. A system that is easy to implement and does not require much effort increases users' use of the system (Lee, 2010; Rizun & Strzelecki, 2020). However, systems that are easy to use tend to neglect security are prone to errors/corruption, and are difficult to access, reducing the system's usage. Security is also an important factor in e-learning (C.-L. Lin et al., 2021). One e-learning activity that requires security is the review and sending of documents (Alsabawy et al., 2016; Khlifi & El-Sabagh, 2017). However, the simplicity of the system will increase student satisfaction. Features that are useful and meet students' needs in implementing e-learning will lead students to be satisfied and use the system again (Al-Marroof & Salloum, 2021; Lee, 2010).

Table 3 shows that social influences did not affect learning usage. This result poses a major challenge in the implementation of e-learning because social factors are critical to the success of e-learning (Mutambik et al., 2020). Social factors refer to how other people encourage students to use e-learning (Venkatesh et al., 2003). This result suggests that students' social environment (lecturers, friends, family) is less supportive of students' use of e-learning. This result may be because e-learning during a pandemic is an action forced by circumstances and has not been adequately prepared (Scherer et al., 2021). The student environment does not understand the benefits of e-learning. However, social factors have a positive impact on student satisfaction. Evidence shows that a student environment that supports e-learning promotes student satisfaction. The environment encourages students to accept the benefits of e-learning easily (Dečman, 2015; Pynoo et al., 2011).

This study shows that cultural factors negatively affect the use of e-learning. Following Aparicio et al. (2016) and Srite and Karahanna (2015), we measure culture by group loyalty, with high scores indicating that users have a culture of togetherness and less independence. Conversely, a low culture score suggests that users are more individualistic. The results of this study indicate that fewer independent students will not support e-learning. Individual students will support e-learning conducted to avoid physical contact between fellow students. Independent students will find it easier to complete assignments and search for literature sources. This type of support will have an impact on the use of e-learning. However, the results of this study show that group or individuals' culture does not affect student satisfaction. Students' satisfaction with e-learning is more influenced by the quality and ease of the system. (Al-Marroof & Salloum, 2021; Lee, 2010). Moreover, there is evidence that this culture is not a barrier for them in evaluating the quality and simplicity of the system.

The findings about the quality factor of instructors in influencing students' use and satisfaction in using e-learning were confirmed in this study. This result strengthens the previous hypothesis that lecturers who are part of students' social environment can encourage students to use an e-learning by providing interesting material, explaining material in an easy-to-understand way, and using teaching methods other than classroom learning. In addition, e-learning is not accessible for instructors to understand students' needs and difficulties, so the attention and teaching methods must be different from classroom learning (Kim, 2020). These results confirm that the quality of lecturers is an essential factor in e-learning (Lwoga, 2012; Rokhman et al., 2022; Romi, 2017).

Our study showed that the use of e-learning did not affect student performance. This result differs from W. Cidral et al. (2020) findings. The difference in the results of this study is due to differences in the implementation of e-learning. E-learning was used in all courses (internships and non-internships) and at all levels of education during the pandemic. The e-learning system is challenging to operate effectively in internship courses (Kim, 2020). In addition, instructors are not limited to assessing student performance using e-learning. Academic and non-academic performance measure the assessment system for student achievement. Non-academic assessments are difficult to capture in exams that use e-learning (Hamid et al., 2020). However, evidence shows that student satisfaction with e-learning improves student performance. Students who are satisfied with e-learning will quickly benefit from e-learning, for example, in the understanding lecture material (Al-Fraihat et al., 2020). Therefore, it will have a positive impact on improving student performance (Aparicio et al., 2017; W. A. Cidral et al., 2018).

### Conclusion

This study shows that improvement in student performance is related to higher student satisfaction with e-learning. However, the performance improvement is not related to the use of e-learning. Student achievement is measured by students' skills in academic and non-academic areas. Academic skills can be measured by tests using e-learning. However, non-academic performance is difficult to assess using e-learning. Social and cultural factors influence the use of e-learning. An individualized culture increases the use of e-learning. E-learning requires students to be independent in learning, completing assignments, and looking up sources, so students with their own culture feel comfortable with

e-learning. Moreover, the urgent adoption of e-learning due to the pandemic requires encouragement from students' social environment to make them use e-learning.

It has been proven that the ability of instructors to implement e-learning affects student satisfaction. The implementation of different e-learning methods and classroom learning requires other teaching methods. Lecturers must be able to provide exciting teaching materials and techniques to increase student attraction to implementing e-learning. This study explains the factors that influence the success of e-learning by looking at the system's characteristics, the students' social environment, and the instructors' skills. E-learning is a learning system that uses a system. Thus, the success of e-learning is influenced not only by the system's characteristics but also by students' social factors and instructors' abilities to use e-learning. This study contributes to the literature on evaluating the success of e-learning in that three main factors (system characteristics, students' social factors, and instructors' social factors) influence the success of e-learning.

### Recommendations

This research explains that the benefits of using e-learning are not only influenced by the unique characteristics of the system used for e-learning media. The success of e-learning is also influenced by external system factors such as the ability of instructors to teach, culture, and social influences. Another external factor that affects the success of e-learning is student attitudes toward computer anxiety, or "cyberphobia". Based on the results of this study, we recommend that HEI use an e-learning system that is easy to use and meets the needs of the students. In addition, HEI also needs to pay attention to the social environment, culture, the ability of instructors to implement e-learning, and the ability of students to use computers. Even though the implementation of e-learning is urgent during the pandemic, HEI must prepare students and faculty to use e-learning through training. Classroom learning and e-learning require different teaching systems. Students must also be trained in computers and information systems to avoid computer anxiety and cyberphobia. The attitude of computer anxiety will encourage students not to use computers, and this attitude is contrary to e-learning.

More researchers can add the type of study subject as a factor that can influence the success of e-learning. The pandemic has led to the introduction of e-learning in all courses. The types of courses: practical and theory, exact and social, have different difficulties and require different strategies to deliver them to students.

### Limitations

This study was conducted during the pandemic when all faculty and students were required to deliver their lectures online. The results of the study may be different if e-learning is voluntary. In addition, we used a university with great cultural heterogeneity as the research subject. Future researchers may use other research designs to add to the literature review on the effectiveness of e-learning.

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### Authorship Contribution Statement

Nuryatin: Conceptualization, design, and supervision. Mukhibad: Collecting data, analysis, and writing. Tusyanah: Collecting data and editing/reviewing.

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