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# Examining user acceptance and satisfaction of HE's E-learning platform

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**Abstract**

The purpose of this study is to determine the determinants of user satisfaction (USat) and continuance intention (CoIn) to use e-learning platforms in Indonesian universities. More specifically, this study examines the effects of system quality (SisQua), information quality (InfQua), confirmation, perceived usefulness (PU) and self-efficacy (SE) on USat and CoIn to use e-learning platforms. The expectation-confirmation model and technology acceptance model were used to test the hypotheses with 340 students. This research uses purposive sampling. Surveys were administered for 340 college students. To test the correlation among the variables, the structural equation model was used. This study showed that InfQua, PU, SE, service quality and SisQua positively affected USat. The data analysis indicates the positive effect between SE and USat and CoIn to use e-learning. However, InfQua had a negative effect with USat. This study has several implications for higher education (HE). First, to increase USat, universities should provide excellent services, technical support and user training and workshops for their e-learning platforms, including new features and functionalities so that students can take utmost advantage from them. Students who are contented with their e-learning platform are more likely to keep using it.

Keywords: self-efficacy; e-learning; satisfaction; continuance intention

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## 1. Introduction

Electronic learning (e-learning) has notoriously emerged as an innovative teaching approach in higher education. It serves as a teaching method in the classroom that provides unlimited access of information while allowing both students and lecturers to build interactive communication and express collaboration and idea-sharing. System information and service quality (SerQua) significantly influence the quality of e-learning delivery.

System quality (SisQua) refers to the quality of a website as a platform to access the learning materials. The growth of the internet has led to user-friendly e-learning models with advanced SisQua (Zheng et al., 2013). Some indicators to measure SisQua are ease of use, functionality, reliability, data quality and integration, all of which are associated with the measuring indicators of information quality (InfQua) (DeLone & McLean, 2003). Effective SisQua in e-learning supposedly incorporates easy-to-use approaches and fascinating features to allure the users (Wang et al., 2007). The components of SisQua consist of user-friendliness, reliability, maintenance, well-organised design, personalisation, the availability of help options, security, usability, ease of use, availability and interactivity (Ozkan & Koseler, 2009).

InfQua is commonly recognised as the quality of contents, which have been evaluated as a highly important dimension of e-learning (Chopra et al., 2019). Content quality includes the learning materials in the forms of PDFs, PPTs, audios and videos. Tasks are bound to facilitate the acquisition of skills and knowledge, should they be challenging enough for students (Waight & Stewart, 2005). Effective InfQua provides actual, relevant and adaptable information for learners (Wang et al., 2007). In this particular research, InfQua identifies several indicators such as content format, accuracy and relevance in order for the InfQua to fit according to the needs and to be fully accessible.

SerQua is remarked as the ability of e-learning to provide services for users, including convenient navigation features, well-organised contents, as well as a reliable and responsive system. It serves as a key factor in distinguishing service products and building a competitive advantage to increase customer satisfaction (Santos, 2003). Thus, customer-centric companies are most likely to lead the troupes once SerQua is put on a pedestal (Wang et al., 2007).

The benchmark of effective SerQua is determined by effective and clear instructions through online media. SerQua can also be enhanced by interaction and recurrent consultations with users through a feedback feature, as well as providing e-learning users with decent supporting apps.

User satisfaction (USat) to use e-learning in the context of higher education is influenced by five core factors comprising InfQua, task-technology fit, SisQua, utility value and usefulness (Al-Samarraie et al., 2018).

Analysis of the benefits of providing safety education training through e-learning found three dimensions to assess the level of USat, namely time reduction, cost reduction and performance improvement (also related to the level of concentration in completing e-learning) (Ho & Dzeng, 2010).

Self-efficacy (SE) highlights the belief in the individual's capacity to perform a task for a certain accomplishment (Bandura, 1982). It represents one's belief in his ability to take control of his motivation, behaviour and social environment. The concept originates from social cognitive theory referring to the degree of one's belief regarding his ability to accomplish given tasks and objectives in particular circumstances (Susanto et al., 2016).

The study about computer SE and successful learning experience suggested that computer SE and academic SE had a positive correlation with online learning satisfaction (Jan, 2015).

SE plays a pivotal role in incorporating information system and web-based information system (YIlmaz, 2016), giving access to resources and entrepreneurial well-being (Marshall et al., 2020), the optimism of a leader in work engagement (Lu et al., 2018), employees' creativity in innovative entrepreneurial behaviour (Newman et al., 2018), as well as predicting the motivational outcomes in social entrepreneurship (To et al., 2020).

## 2. Methods and Hypothesis

The study aims to expand the Internet banking-based expectation-confirmation model (ECM) in the e-learning system. The original ECM model uses variable continuance intention (CoIn), confirmation, perceived usefulness (PU), USat to use e-learning. Meanwhile, the proposed model improves the components by adding other important key factors to determine the system sustainability, such as SisQua, InfQua and SerQua. On the other hand, SE is also reckoned in the incorporation of information system (YIlmaz, 2016) and proposes a positive influence on USat and actual usage (Aldholay et al., 2018). It becomes a significant determinant of CoIn to use the smartphone banking service (Aldholay et al., 2018). The proposed model is described below.

Combined SisQua, InfQua and SerQua in e-learning have revealed the positive impacts on USat (Aldholay et al., 2018). Three dimensions (SisQua, InfQua and SerQua) from the e-learning system contribute to the USat and CoIn to adopt e-learning system as it helps the students in career growth and making them employable (Chopra et al., 2019).

The perception of system and InfQua is generally defined as the degree of USat towards the system performance and usage (DeLone & McLean, 1992), whereas Park (2020) verified the roles of service and SisQua in manufacturing smart wearable devices and discovered that when user' expectations on service and SisQua are confirmed, their sense of satisfaction can be easily formed, determining that the overall quality (system, information and SerQua) has a positive impact on USat (Aldholay et al., 2018).

Once a product gains the trust of its users on the great overall quality, the tendency of USat and system usage is also verified (Chen & Chang, 2018). Great overall quality leads to higher USat and confirmation in adopting e-learning. Thus, the research composes several hypotheses as follows:

H1. SisQua has a positive effect with USat.

H2. InfQua has a positive effect with USat.

H3. SerQua has a positive effect with USat.

The concept of confirmation as a key determinant to perceived USat, ease of use and enjoyment stated the significances of user confirmation in mobile services on USat and system usage (Susanto et al., 2016; Thong et al., 2006). Essential factors are PU, ease of use and enjoyment, all of which are heavily influenced by user confirmation (Thong et al., 2006). User confirmation has significant impacts on PU, trust, and USat. SE also has a positive impact on USat (Aldholay et al., 2018). That being said, the same tendency is also applicable for e-learning users. Thus, the study suggests the following hypotheses:

H4. Confirmation has a positive effect to perceived satisfaction of e-learning system.

H5. Confirmation has a positive effect to PU of e-learning system.

As part of the key factors of TAM , PU is defined as the degree of USat to boost work performance and efficiency (Davis, 1989). In an information system, PU is set as a determinant of USat and CoIn (Kim

et al., 2016). The correlation among PU and USat was also applied to examine the use of augmented reality applications during the teaching delivery and tested positive. In terms of e-learning, PU is adopted to boost studying behaviour. Therefore, the following hypotheses are formulated:

H6. PU has a positive effect to the perceived satisfaction of e-learning.

USat has been implemented in several researches for various goals over the years. It is proven to contribute to the success of e-commerce and lead to the continued system usage in smartphone banking services (Bhattacherjee, 2011; Wang, 2008). The degree of USat is influenced by the level of trust as a consequence of post-adoption beliefs (Venkatesh et al., 2003). Given that increased USat leads to continuance use intention (Balasubramanian et al., 2003), the study proposes hypotheses as follows:

H7. USat has a positive effect to influence continuance use intention.

The variables of PU from TAM (Davis, 1989) provide support to numerous researches including the topic of e-learning. PU is positively related to CoIn as a dependent variable (Wang et al., 2019). Therefore, the following hypotheses are formulated:

H8. PU has a positive effect to influence continuance use intention.

On the other hand, SE is used in creating effective virtual learning communities for students to share their ideas and knowledge (YIlmaz, 2016). In the context of e-commerce and Internet, SE refers to the ability of an individual to perform given tasks using electronic media like smartphones with subsequent continued usage (Hsu & Chiu, 2004). SE generates the perception of an individual in completing Internet-based tasks, in the sense that SE influences USat (Aldholay et al., 2018) and continuance use intention (Susanto et al., 2016). The following hypotheses are submitted:

H9. SE has a positive effect to USat.

H10. SE has a positive effect to influence continuance use intention.

Based on the hypotheses shown in Figure 1, this study proposes an ECM model.

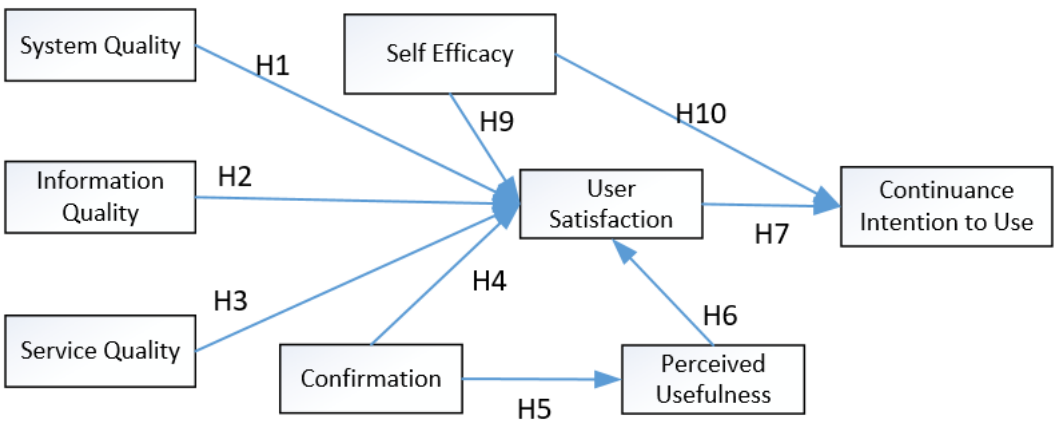


Figure 1. Propose Model

Data collection was conducted through distributing questionnaires to 340 university students who have been using purposive sampling method. The modification integrates the original module with

video conferencing tools from Vicon (Video Conference) service providers, gamification, plagiarism scanner and module tests.

Hypotheses in this study were tested using the structural equation model (SEM-PLS) and Statistical Package for the Social Sciences. The first step was processing the data using Harman's one-factor test for common method bias, in which all variables are loaded into one common factor. Should the total variance for a single factor is less than 50%, the data are deemed valid. This particular research came up with a total variance of 43%, thus confirming the data validity. The next step was testing the measurement model using SmartPLS comprising validity test, reliability test and multicollinearity test. Thenceforth, the study performed the structural model test which consists of path coefficients, coefficient of determination and statistical hypothesis testing. The model encompasses InfQua, SerQua, SisQua, Conf (Confirmation), PU, SE, USat and CoIn (CoIn to use).

## 3. Result

### 3.1. Convergent Validity

3.1. Convergent validity

After the proposed model had been examined with PLS, it was found that each indicator in the outer loading scores above 0.7, as shown in Table 1.

Table 1. Convergent Validity

| | Conf | CoIn | InfQua | PU | SE | SerQua | SisQua | USat |
|---|---|---|---|---|---|---|---|---|
| Conf1 | 0.859 | | | | | | | |
| Conf2 | 0.824 | | | | | | | |
| Conf3 | 0.800 | | | | | | | |
| Conf4 | 0.799 | | | | | | | |
| Conf5 | 0.870 | | | | | | | |
| CUI1 | | 0.844 | | | | | | |
| CUI2 | | 0.873 | | | | | | |
| CUI3 | | 0.903 | | | | | | |
| InfQua2 | | | 0.862 | | | | | |
| InfQua3 | | | 0.857 | | | | | |
| InfQua4 | | | 0.830 | | | | | |
| PUS1 | | | | 0.974 | | | | |
| PUS2 | | | | 0.972 | | | | |
| Self-Eff2 | | | | | 0.822 | | | |
| Self-Eff3 | | | | | 0.828 | | | |
| Self-Eff4 | | | | | 0.841 | | | |
| SerQua1 | | | | | | 0.760 | | |
| SerQua2 | | | | | | 0.769 | | |
| SerQua3 | | | | | | 0.864 | | |
| SerQua4 | | | | | | 0.760 | | |
| Squa1 | | | | | | | 0.764 | |
| Squa2 | | | | | | | 0.832 | |
| Squa3 | | | | | | | 0.818 | |
| Squa4 | | | | | | | 0.702 | |

| | |
|---|---|
| USat1 | 0.879 |
| USat2 | 0.892 |
| USat3 | 0.883 |
| USat4 | 0.874 |

Average variance extract testing was carried out to assess the convergent validity, whose average variance extracted supposedly exceeds the minimum threshold of 0.5. This particular research attained relatively high variance scores with the results as follows: 0.690 for confirmation (Conf), 0.763 for CoIn to use, 0.722 for InfQua, 0.947 for SE, 0.623 for SerQua, 0.609 for SisQua and 0.778 for USat.

### *3.2.* Discriminant Validity

Discriminant validity testing aims to ensure that a reflective construct holds the strongest correlation with its own indicator. Using Fornell–Larcker criterion, it analyses the correlation between all latent variables. Table 2 comprises InfQua, SerQua, SisQua, Conf, PU, SE, USat and CoIn and signifies the highest score attained of 0.8, as shown in Table 2.

Table 2. Discriminant validity

| | Conf | CuIn | InfQua | PU | SE | SerQua | SisQua | USat |
|---|---|---|---|---|---|---|---|---|
| Conf | 0.831 | | | | | | | |
| CoIn | 0.654 | 0.874 | | | | | | |
| InfQua | 0.685 | 0.544 | 0.850 | | | | | |
| PU | 0.406 | 0.514 | 0.339 | 0.973 | | | | |
| SE | 0.610 | 0.743 | 0.525 | 0.491 | 0.831 | | | |
| SerQua | 0.753 | 0.671 | 0.763 | 0.473 | 0.674 | 0.789 | | |
| SisQua | 0.699 | 0.650 | 0.748 | 0.547 | 0.642 | 0.771 | 0.781 | |
| USat | 0.778 | 0.744 | 0.591 | 0.571 | 0.775 | 0.749 | 0.730 | 0.882 |

### *3.3.* Reliability Test

Reliability testing measures the minimum composite reliability (CR) value of 0.7 to determine the reliability of a variable, which refers to an indicator's consistency or stability. The degree of reliability was measured through the CR value and the Cronbach's alpha (CA), as shown in Table 3.

Table 3. reliability test

| | Cronbach's Alpha | Composite Reliability |
|---|---|---|
| Conf | 0.888 | 0.917 |
| CuIn | 0.845 | 0.906 |
| InfQua | 0.809 | 0.886 |
| PU | 0.944 | 0.973 |
| SE | 0.776 | 0.870 |
| SerQua | 0.800 | 0.868 |
| SisQua | 0.786 | 0.861 |
| USat | 0.905 | 0.933 |

### 3.4. Structural Model Test

After the data passed the measurement model testing, the structural model test was conducted on the data. The structural model test analyses the correlation between measured variables and latent variables. The tests include path coefficients and coefficient of determination.

#### *3.4.2. Path coefficients*

Path coefficients are designated as the basis to assess whether a hypothesis shall be accepted or not. The results are shown in Table 4.

Table 4. Path Coefficients

| | CoIn | Conf | InfQua | PU | SE | SerQua | SisQua | USat |
|---|---|---|---|---|---|---|---|---|
| CoIn | | | | | | | | |
| Conf | | | | 0.406 | | | | 0.386 |
| InfQua | | | | | | | | -0.108 |
| PU | 0.104 | | | | | | | 0.141 |
| SE | 0.403 | | | | | | | 0.350 |
| SerQua | | | | | | | | 0.131 |
| SisQua | | | | | | | | 0.139 |
| USat | 0.373 | | | | | | | |

#### *3.4.3. Coefficient of determination*

This test aims to assess the predictive accuracy of the model proposed in this study. Coefficient of determination examines how differences in independent variables are explained by latent variables and can be interpreted in three classified categories of results, such as low, moderate and high effects. According to Table 4, InfQua, SerQua, SisQua, Conf, SE and PU are generally confirmed as substantial models to interpret USat with an R2 value of 0.788. The ability of USat and SE variables to interpret CoIn are classified as moderate with an R2 value of 0.630, while the ability of Conf variable to interpret PU is classified as low with an R2 value of 0.165.

#### *3.4.4. Statistical hypothesis testing*

Hypotheses were closely scrutinised using a two-sided hypothesis test by comparing p-values with the level of significance. Hypothesis testing in the context of SmartPLS develops mean (SM), standard of deviation (STDEV), t-statistic (|O/STDEV|) and p-values. The test aims to evaluate the validity of the structural model test and determine which hypothesis shall be accepted based on the comparison between p values and the level of significance. Should the p values (PV) score less than 5%, the hypothesis shall be accepted. In Table 5, all variables are accepted for scoring less than 5%.

Table 5. hypothesis testing

| | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (\|O/STDEV\|) | P Values |
|---|---|---|---|---|---|
| Conf -> PU | 0.406 | 0.407 | 0.051 | 7.946 | 0.000 |
| Conf -> USat | 0.386 | 0.383 | 0.049 | 7.902 | 0.000 |
| InfQua -> USat | -0.109 | -0.107 | 0.053 | 2.045 | 0.041 |
| PU -> USat | 0.141 | 0.141 | 0.039 | 3.647 | 0.000 |

| | | | | | |
|---|---|---|---|---|---|
| SE -> CoIn | 0.414 | 0.418 | 0.061 | 6.830 | 0.000 |
| SE -> USat | 0.350 | 0.348 | 0.049 | 7.072 | 0.000 |
| SerQua -> USat | 0.131 | 0.131 | 0.058 | 2.265 | 0.024 |
| SisQua -> USat | 0.139 | 0.141 | 0.060 | 2.322 | 0.020 |
| USat -> CoIn | 0.424 | 0.421 | 0.062 | 6.832 | 0.000 |

## 4. Discussion

The research aims to validate PU to predict the CoIn to use e-learning platforms in the context of higher education. Eight determining key factors consist of SisQua, InfQua, SerQua, confirmation, PU, SE, USat and CoIn to use, all of which have been identified from other journal articles such as continuance satisfaction, SE, USat, SerQua dimension and an ECM, as shown in Figure 2.

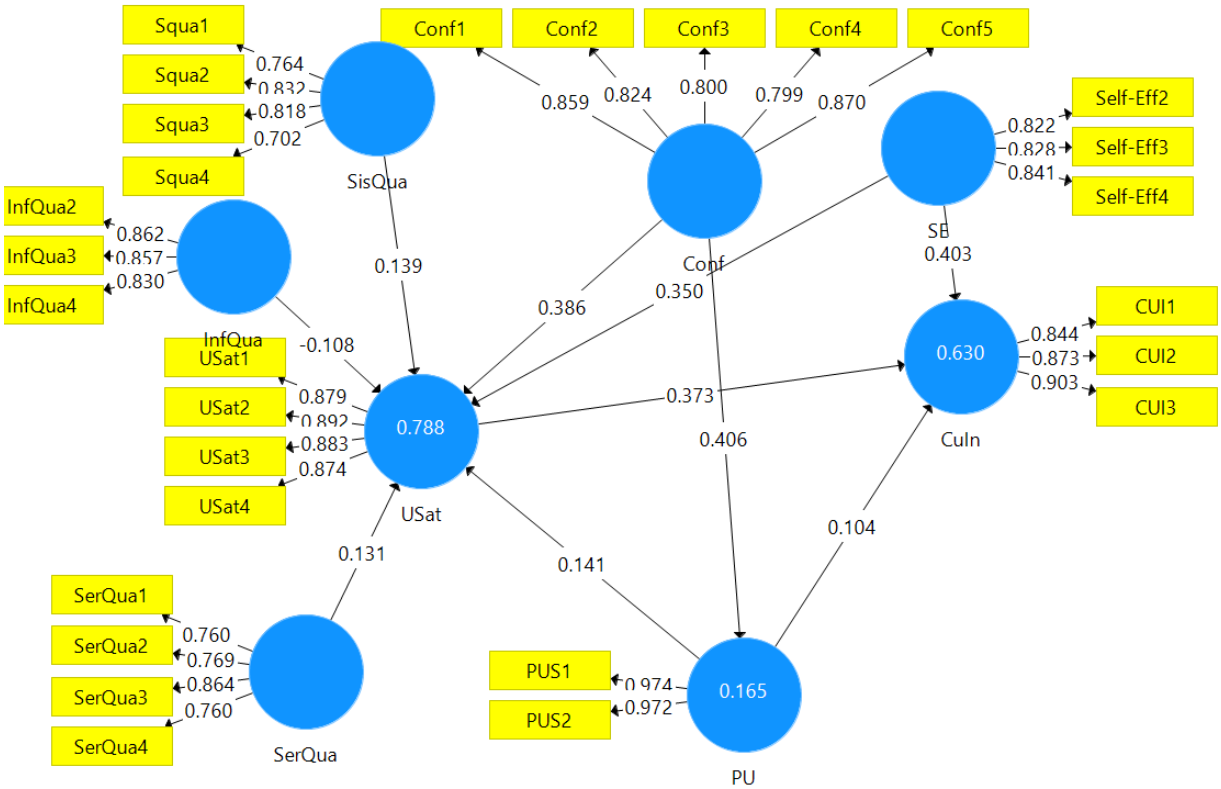


Figure 2. Result model

According to the data, it was found that e-learning service in SisQua is positively related to USat with the score of 0.1139 (H1) and SerQua is positively related to USat with the score of 0.131 (H2) as explained by Park (2020) in developing service and SisQua of smart wearable devices. Aldholay et al. (2018) and Chen and Chang (2018) also shared the same thoughts about the positive impacts on the overall quality (system, information and SerQua). Nonetheless, the findings of this study concluded a negative effect between InfQua and USat (H3), suggesting the possibility that the InfQua of campus e-learning is still not on par with the needs of students as the ultimate users. On another note, confirmation is positively related to perceived satisfaction of e-learning system (H4) with the score of 0.386 as stated by Thong et al. (2006) and Susanto et al. (2016).

Confirmation is positively related to PU of e-learning system (H5) with a strong score of 0.406, adhering to the study of Thong et al. (2006) regarding the significant correlation between PU and confirmation. It also conforms to the study of Aldholay et al. (2018) that users' confirmation has significant impacts on USat.

PU is positively related to perceived satisfaction of e-learning with a score of 0.141 (H6), which is in line with the findings of Davis (1989) and Kim et al. (2016) that PU directly affects USat.

USat is positively related to influence CoIn to use with the score of 0.424 (H7) as concluded by Balasubramanian et al. (2003), Bhattacherjee (2011), Venkatesh et al. (2003) and Wang (2008) in their respective studies.

PU positively correlates with influence CoIn to use with the score of 0.104 (H8), pursuant to the study of Wang et al. (2019), that PU becomes a key determining factor in maintaining sustainable relationships.

Lastly, SE is positively related to USat with the score of 0.350 (H9) as implied by Aldholay et al. (2018). It positively correlates with CoIn to use with a score of 0.414 (H10) and conforms to the findings of Susanto et al. (2016) regarding the effect of SE on CoIn to use.

Quality system and SerQua also positively affect USat even though the score is weak. This means that universities (as an education provider) should be able to improve these services so that students are satisfied with the system service.

## 5. Conclusion

Technology has been innovatively advancing itself without ceasing to answer the current and upcoming demands within society. It specifically shapes future education for the next generation. E-learning has been depicted as an important tool to educate students with a simpler method. Thus, the CoIn to use e-learning from the perspective of students as end-users is essential to be investigated.

The study validates the theoretical model proposed to predict the CoIn of Indonesian students who enrol in local private universities to use e-learning platforms.

Eight key determining factors in this study are InfQua, SerQua, SisQua, Confirmation, PU, SE, USat and CoIn to use.

The overall quality (InfQua, SerQua and SisQua) generates different responses when being tested, in that InfQua does not affect USat, whereas SerQua and SisQua support the hypotheses through positive effect with USat. The variable of PU showcases a positive effect with USat, while confirmation and SE prove otherwise.

Additionally, USat is positively related to intent to continue use, with a score of 0.373, reflecting student satisfaction with e-learning system. SE is positively correlated with continued intention to use with a score of 0.403, indicating the importance of students' independent learning for continued intention to use. InfQua is not positively related to USat, while SerQua and SisQua support the hypotheses through a positive effect with USat.

Additional facilities are needed to improve the quality of information to satisfy students, for example, e-books, paper and videos. Even though the research subjects already involved students from different majors, be it computer science majors or not, the investigation was still limited to students from only one university. Different outcomes might present had the scope of the subjects been widened to

students from different campuses. Future studies can further the research scope to investigating the use of e-learning platforms from the perspective of lectures.

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