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Student Satisfaction and Continuance Intention of E-learning System: University Student Perspective

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ABSTRACT

The continuous development of technology has also impacted the digitalization of education, which we know as online learning. Therefore, this study aims to examine the factors that influenced student satisfaction and continuance intention in using the LMS-type e-learning systems as learning support with the results intended to serve as evaluation material for university institutions to continue using and improving e-learning systems. This study used ECM as model and a quantitative approach by collecting questionnaires from 443 students in Batam City who came from different universities. After the questionnaires were collected, the study hypothesis and variables were tested using SEM-PLS. The results of this study found that interactivity, course content and design quality positively significantly influenced perceived usefulness, confirmation, and satisfaction, which in turn affected students continuance intention with the e-learning system. This study showed that students in Batam were satisfied and want to continue using the e-learning system as they felt it was useful in supporting their learning. Even so, the development of e-learning systems must continue in line with technological development. It must also align with students needs to maximize results, satisfaction, and their intention to continue using e-learning systems.

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1. Introduction

Since the COVID-19 pandemic started, there have been changes in various aspects of life, including education. The COVID-19 pandemic has significantly transformed how education system works [1]. This was followed by the rapid development of information technology, where previously, teaching and learning activities should have been carried out face-to-face. However, the COVID-19 pandemic caused educational institutions moving to online learning, even though no one was fully prepared for such a sudden transition [2]. With the implementation of online learning, learning has become completely digital, and every student needs a digital device to continue learning. Since then, e-learning (electronic learning) has become very popular at various levels of education and continues to be implemented today in various universities around the world. According to [3], E-learning is kind of system in education that uses digital tools and application to enhance the learning process, ensuring that the material being taught is effectively communicated to students. The implementation of e-learning methods provides students with the flexibility to access learning

materials, monitor their progress in achieving learning outcomes, engage in discussion forums, complete tests, and utilize various other resources, all without being restricted by time or physical location [4]. Furthermore, e-learning increases access to education via flexible and cost-effective approaches [5], as well as making learning activities to be more effective and better with wider access to learning even though learning is not carried out face-to-face.

Online learning, using e-learning, has become increasingly popular among various institutions and universities in Indonesia [6]. According to the World Economic Forum, Indonesia is one of the countries with more than 50% of the fastest online learning growth, with a total of 789.000 learners in 2021. Its usage has increased since the COVID-19 pandemic and is widely used in various universities nowadays. E-learning systems can be classified into various types based on their features and capabilities [7], but one of the most popular and used by many universities in Indonesia is LMS. Learning Management Systems (LMS) are software platforms, whether web or cloud based, or installed, that support the teaching and learning process by enhancing instruction delivery, management, and development [8]. LMS can be used to access learning materials, conduct discussions and work on questions that the lecturer has set for students. LMS can also make learning more interesting, realistic and modern so that learning is not rigid and is of interest to students. However, some students may find using an LMS from an e-learning system challenging, but it seems to be working successfully for everyone else. There might be a lot of factors affecting student satisfaction and their intention in continue using the systems, such as their interaction, course design qualities, and others. Therefore, these factors are essential to be studied further for the sustainability of the education of these students, as well as those in the future.

Previous research conducted by [9] discussing the relationship between interactivity, quality of course content, and course design, finding that these three factors significantly influence student satisfaction and their intention in continue using the cloud-based LMS-type e-learning platforms. However, this research was only limited to university students in Taiwan who used LMS-type e-learning. In addition, previous researchers made recommendations for future researchers to research this from students with different cultural backgrounds by expanding the scope of the research. In addition, research [10] recommends that future research examine specific types of e-learning more accurately. Therefore, this research will explore the factors that influence the level of satisfaction and sustainability of students in the city of Batam who use LMS-type e-learning.

This research is also based on research conducted by [11] regarding student interactions, lecture performance, and course content, which influence student satisfaction and their intention to continue. However, this research does not explain the mediation of the relationship between these third variables on satisfaction, which influences continuance intention. Therefore, this research will use mediating variables, namely perceived usefulness, confirmation, and student satisfaction, as well as course content and design quality, as independent variables based on the authors recommendation regarding adding variables that may influence the intention of students in continuing using e-learning.

This research was conducted because e-learning is becoming very popular nowadays and is widely used in various universities. In addition, this research aims to investigate whether interactivity, course content and design quality, mediated by perceived usefulness, confirmation and student satisfaction, influence the intention of university students at Batam to continue using the e-learning system based on their perspectives. Then, the results of this research can be used by university institutions as evaluation material to be able to continue online learning with e-learning by making improvements and developments so that learning can be even better in the future.

Furthermore, the hypotheses used in this research are explained as follows:

Several previous studies have indicated that confirmation significantly affects on perceived usefulness [12][13][14]. Confirmation refers to users expected or perception benefits and advantages when using a particular technology or systems. It involves the alignment between users initial expectations and their actual experience with the system. When this alignment is positive, users are more likely to perceive the system as useful. In the e-learning system context, when students expectations towards using E-learning are confirmed, it will influence their perceived usefulness. Therefore, a hypothesis can be formulated as follows:
H1: Confirmation has a significant positive effect on PU in the E-learning system.

The perceived of usefulness from e-learning products is a critical factor that significantly influences the intention of users to continue using a product, as it affects their satisfaction and overall experience with the system [15]. When users perceive a system as useful, it positively impacts their motivation to engage with and rely on the system for their educational needs. This perception is often shaped by extent to which the e-learning platform meets their expectations, provides efficient access to resources, and supports their academic goals. In the e-learning system context, when students perceive these systems as useful for

supporting their learning, their continued use will directly impact their intention to use them. Therefore, a hypothesis can be formulated as follows:
H2: PU has a significant positive effect on continuance intention in the E-learning system.

When users expectations are confirmed, users are more satisfied with the system usage [16]. This confirmation leads to a positive evaluation of the system, strengthening their belief in its effectiveness and reliability. As users see that the system meets their expectations, their trust in its capabilities grows, further enhancing their satisfaction. Some previous studies also showed that confirmation positively influences satisfaction level [17][18]. In the e-learning system context, when students expectations after the actual usage of e-learning are confirmed, it will influence their satisfaction level. Therefore, a hypothesis can be formulated as follows:
H3: Confirmation has a significant positive effect on satisfaction in the E-learning system.

A previous study confirmed that satisfaction significantly positively influences continuance intention [10][19]. When users feel satisfied with a system, they perceive it as beneficial and effective in meeting their needs, which increases their willingness to continue using it. Satisfaction reflects the positive emotional response users have after using the system, which is often linked to how well the system performs and the value it provides. In the e-learning system context, when students feel satisfied with an e-learning system, it will influence their intention to using it. Therefore, a hypothesis can be formulated as follows:
H4: Satisfaction has a significant positive effect on continuance intention in the E-learning system.

A better sense of interactivity will increase users evaluation of the usefulness of the website [20]. Interactivity, which refers users ability to actively engage with the system and influence its content or behavior, plays a key role in shaping user perceptions. The more interactive a system is, the more users feel involved and in control of their experience, which enhances their evaluation of the system value. In addition, Previous studies also indicate a significantly positive relationship between interactivity and perceived usefulness (PU) [21]. In the e-learning system context, students interaction towards the e-learning system can influence their perceived usefulness towards the system. Therefore, a hypothesis can be formulated as follows:
H5a: Interactivity has a significant positive effect on PU in the E-learning system.

A previous study found that interactivity is positively associated with confirmation [22]. Interactivity refers to the active engagement between users and a system, where users have the ability to navigate, control, and influence various aspects of the system. When users interact with a system and if they feel comfortable, then their usage expectation toward the system is confirmed. In the e-learning system context, students interaction towards the e-learning system can influence their usage confirmation towards the system. Therefore, a hypothesis can be formulated as follows:
H5b: Interactivity has a significant positive effect on confirmation in the E-learning system.

Perceived interactivity is important for improving user satisfaction in technology-based experiences, as it helps make communication and interaction more effective, creating a more engaging experience [23]. Interactive elements such as real-time feedback, responsive design, and user-driven navigation empower users, making them feel more involved and in control of their experience. This sense of control not only enhances user engagement but also fosters a positive emotional connection to the system, increasing overall satisfaction. The more users interact with a system, the more likely they are to see it as useful, efficient, and enjoyable. In addition, some previous studies also confirmed that interactivity positively impacts on satisfaction [24][25]. A high level of interactivity may also lead to user satisfaction with a system. In the e-learning system context, students interaction towards the system can influence their satisfaction towards the system. Therefore, a hypothesis can be formulated as follows:
H5c: Interactivity has a significant positive effect on satisfaction in the E-learning system.

Course content quality is a critical factor in determining students learning success and the sustainability of their educational experience. It directly influences how well students can engage with and comprehend the material, which in turn affects their overall academic performance. High-quality content that is relevant, well-organized, and presented in an engaging manner can make learning more effective and enjoyable. Therefore, e-learning systems are considered useful when they are regularly updated, offer high-quality and engaging course content, and are customizable to match each learners specific needs and preferences [26]. In the e-learning system context, an e-learning system with a good and updated quality of course content can influence students perceived usefulness of the system. Therefore, a hypothesis can be formulated as follows:
H6a: Course content quality has a significant positive effect on PU in the E-learning system.

When users expectations of the course content in an e-learning system are confirmed, the course content influences users expectations towards the system. This confirmation occurs when the course content meets or exceeds what users anticipated in terms of quality, relevance, and presentation. In the e-learning system context, an e-learning system with high-quality, well-organized, and engaging course content can

shape students expectations about the system's ability to support their learning needs. In the e-learning system context, an e-learning system with good quality of course content can influence students expectations, which leads to their confirmation towards the system. Therefore, a hypothesis can be formulated as follows:
H6b: Course content quality has a significant positive effect on confirmation in the E-learning system.

Previous studies showed that course content quality significantly affects on student satisfaction [27]. High-quality course content helps students feel satisfied towards e-learning system, which motivates students to actively participate in their learning and encourages them to continue using the system regularly [26]. Furthermore, [28] also found that being able to access course content at any time through the e-learning the improve student satisfaction, as it offers them greater flexibility and convenience in managing their learning. In the e-learning system context, e-learning with a good and updated quality of course content can influence students satisfaction towards the system. Therefore, a hypothesis can be formulated as follows:
H6c: Course content quality has a significant positive effect on satisfaction in the E-learning system.

Apart to the quality of course content, the quality of course design is also crucial in students desire to using an e-learning system. A well-designed course not only ensures that the content is organized and presented effectively, but also enhances the overall user experience by making navigation intuitive and the learning process more engaging. Additionally, if an e-learning course is well-designed, it becomes easy and intuitive for students to use, thereby enhancing their learning experience [29]. In the e-learning system context, an e-learning system with a good course design quality can influence students perceived usefulness towards the system. Therefore, a hypothesis can be formulated as follows:
H7a: Course design quality has a significant positive effect on PU in the E-learning system.

When users expectations towards the course design in an e-learning system are confirmed, that means the course design has influenced users expectations towards the system. A well-designed course meets or exceeds the user's anticipations, reinforcing their belief in the system's capabilities. In addition, according to [30], the course design is the most influential factor influencing students expectations; their study has also concluded that course design directly influences students expectations. In the e-learning system context, an e-learning system with a good course design quality can influence students expectations, which leads to their confirmation towards the system. Therefore, a hypothesis can be formulated as follows:
H7b: Course design quality has a significant positive effect on confirmation in the E-learning system.

A well-organized course design allows students to achieve learning outcomes more efficiently, leading to improved overall satisfaction with the learning experience [26]. This is because an intuitive and coherent course structure reduces confusion and helps students navigate the material more effectively. In addition, previous study also showed that course design quality influences students satisfaction [31]. In the e-learning system context, e-learning with a good course design quality can influence students satisfaction with the system. Therefore, a hypothesis can be formulated as follows:
H7c: Course design quality has a significant positive effect on satisfaction in the E-learning system.

2. Research Method

2.1. Method

This research adopts a quantitative method as research method by distributing questionnaires containing various questions regarding the use of e-learning. Furthermore, this method can help collect data easily in large quantities. Therefore, it is very suitable for supporting this research

2.2. Research model

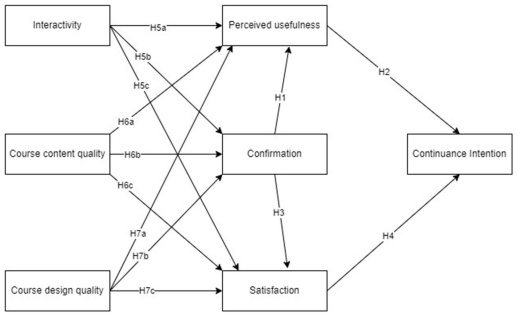

Figure 1. Research model

The used research model is ECM (Expectation Confirmation Model) based on previous research [9]. ECM is a framework designed to measure and understand users ongoing intentions toward new technologies or systems [32]. It focuses on how initial expectations are formed and adjusted based on actual experiences with the system. The model highlights the importance of confirmation, where meeting or exceeding expectations leads to satisfaction, which then influences users intention to continue use a system. According to the research model above, there are 7 variables used in this research, namely interactivity, course content quality, course design quality, perceived usefulness, confirmation, satisfaction and continuance intention.

2.3. Population and sampling

The population used are the university students located in Batam. There are currently more than 35.000 university students in Batam in 2020. The large student population in Batam makes it the right object for this research. Furthermore, the sample size was calculated using the formula proposed by Hair et al. can be used to determine samples for research. With 25 indicators in the research, the research sample ranges from 125 to 250 respondents. However, in this study, the sample that will be used is 443. Furthermore, the random sampling method is used to select participants.

2.4. Data collection

Data in this research were collected through questionnaires and distributed through the Google Form platform, which consisted of various questions regarding e-learning usage to 443 university students in Batam who use the LMS-type e-learning system. The questions are referenced from the previous study and have been adapted to the context of this research. Furthermore, these questions are separated into two parts, with first part collects demographic data from the student, and the second part of the questionnaire assesses their e-learning usage, using a scale from 1 to 5. The collected data will then be processed and analyzed for the purposes of this research.

2.5. Data analysis

After the data collection is finished, data analysis will be conducted to show the relationship between these hypotheses that have been proposed in this research. The analysis of the data will be conducted through the structural equation modelling partial least squares (SEM-PLS) method, and various tests will be conducted. The result will show whether the relation between these hypotheses is valid or not.

3. Result and Discussion

The questionnaires were distributed to a total of 443 university students in Batam. The students were categorized by various factors. In terms of university affiliation, 54.4% attended Universitas Internasional Batam, 11.3% Universitas Batam, 10.6% Universitas Universal, 9% Universitas Putera Batam, 7.9% Politeknik Negeri Batam, and 6.8% Institut Teknologi Batam. Regarding their academic majors, 32.1% were from Information Systems, 31.4% from Management, 11.5% from Accounting, 6.5% from Industrial Engineering, 5.2% from Informatics Engineering, 4.1% from Computer Engineering, 2.9% from Information Technology, 2% from Law, 1.4% from Chinese Language Education, 0.9% from Software Engineering, 0.7% from Architecture, 0.7% from Civil Engineering, and 0.7% from Tourism. In terms of generation, 14.4% were from the generation of 2024, 28.2% from the generation of 2023, 23.9% from the generation of 2022, and 33.4% from the generation of 2021. In terms of age, 2.7% of students were over 21, 54.6% were between 20-21, 39.5% were between 18-19, and 3.2% were under 18 years old. Finally, the student sample was also categorized by gender, with 62.3% male and 37.7% female.

Furthermore, testing was carried out on the data that had been collected. The first test is to test the measurement model, which consists of reliability and validity tests. According to the reliability tests results, all variables show a Cronbach's alpha more than 0.7, composite reliability (CR) values more than 0.7, and also average variance extracted (AVE) values more than 0.5, indicating that all model variables have good reliability. Furthermore, the result of the validity test shows the loading factor values for all model indicators is above 0.7, and the root value of the AVE in the discriminant validity test with Fornell-Larcker Criterion is higher than other constructs. Therefore, this indicates that all model indicators are valid for use in this research.

Table 1. Measurement Model Indicators

Construct/Indicator	Loading	Cronbach Alpha	A	CR	AVE
Interactivity (Int)		0.787	0.791	0.875	0.701

I have control over the pace of my learning through the e-learning system (INT1)	0.827				
The e-learning system can timely respond to my request and learning needs (INT2)	0.844				
The e-learning system can facilitate two-way concurrent communication between learners and the instructor and among learners (INT3)	0.839				
Course Content Quality (CCQ)		0.815	0.816	0.890	0.729
The e-learning system can provide me with sufficient learning content (CCQ1)	0.845				
The e-learning system often provides the updated information (CCQ2)	0.863				
The e-learning system can provide learning content that I need (CCQ3)	0.853				
Course Design Quality (CDQ)		0.795	0.798	0.867	0.619
The level of difficulty of the learning content provided by the e-learning system is appropriate (CDQ1)	0.759				
The delivery schedule of learning content provided by the e-learning system is flexible (CDQ2)	0.780				
The e-learning system can provide me with individualized learning management (CDQ3)	0.788				
I am satisfied with the course design quality of the e-learning system (CDQ4)	0.819				
Confirmation (C)		0.851	0.851	0.909	0.770
My experience with using the e-learning system was better than what I expected (C1)	0.880				
The service level provided by the e-learning system was better than what I expected (C2)	0.877				
My expectations from using the e-learning system were confirmed (C3)	0.875				
Perceived usefulness (PU)		0.848	0.857	0.898	0.689
Using the e-learning system enhances my learning effectiveness (PU1)	0.827				
Using the e-learning system can improve my learning performance (PU2)	0.863				
Using the e-learning system gives me greater control over my learning (PU3)	0.877				

I find the e-learning system to be useful in my learning (PU4)	0.748				
Satisfaction (S)		0.753	0.754	0.844	0.575
I am content with the performance of the e-learning system (S1)	0.766				
I am pleased with the experience of using the e-learning system (S2)	0.752				
I am happy with the functions provided by the e-learning system (S3)	0.783				
I am satisfied with the overall experience of using the e-learning system (S4)	0.730				
Continuance intention (CI)		0.763	0.764	0.849	0.584
I intend to continue using the e-learning system in the future (CI1)	0.785				
I will use the e-learning system on a regular basis in the future (CI2)	0.752				
I will frequently use the e-learning system in the future (CI3)	0.780				
My intentions are to continue using the e-learning system than use any alternative means (CI4)	0.738				

Table 2. Discriminant Validity with Fornell-Larcker Criterion

Fornell-Larcker Criterion							
	C	CI	CCQ	CDQ	INT	PU	S
C	0.877						
CI	0.667	0.764					
CCQ	0.494	0.545	0.854				
CDQ	0.509	0.670	0.501	0.787			
INT	0.463	0.548	0.467	0.513	0.837		
PU	0.502	0.694	0.614	0.571	0.559	0.830	
S	0.558	0.659	0.649	0.646	0.670	0.642	0.758

The second test was carried out by testing the structural model. This test was conducted to analyze the relationships between the variables in this research. It was performed using the bootstrapping method. The test results show that the path coefficient values for all indicators are positive, and the P value is below 0.05. Therefore, all hypotheses used in this research have a significant positive relationship, as can be seen in the table below.

Table 3. Structural Estimate Results

Path	ß	*T-stat*	P Values	Results
CI -> PU	0.113	2.502	0.006	Accepted
CI -> S	0.120	2.489	0.006	Accepted
CCQ -> C	0.264	4.717	0.000	Accepted
CCQ -> PU	0.336	7.537	0.000	Accepted
CCQ -> S	0.301	6.018	0.000	Accepted
CDQ -> C	0.274	4.516	0.000	Accepted
CDQ -> PU	0.225	4.260	0.000	Accepted
CDQ -> S	0.259	4.787	0.000	Accepted

INT -> C	0.199	3.136	0.001	Accepted
INT -> PU	0.234	4.677	0.000	Accepted
INT -> S	0.341	6.948	0.000	Accepted
PU -> CI	0.462	8.732	0.000	Accepted
S -> CI	0.362	6.734	0.000	Accepted

The final test, a specific indirect effect test, is used to check if there are any indirect relationships between the variables in this study, helping to understand how they influence each other. The test results show that all P values above 0.05, so interactivity, course content, and design quality indirectly influence continuance intention mediated by perceived usefulness, confirmation, and satisfaction. The results of this test show that interactivity significantly positively influences continuance intention through perceived usefulness (t=4.060). Interactivity significantly positively influences continuance intention through satisfaction (t=4.917). Interactivity significantly positively influences continuance intention through confirmation and perceived usefulness (t=1.941). Interactivity significantly positively influences continuance intention through confirmation and satisfaction (t=1.912). Interactivity significantly positively influences perceived usefulness through confirmation (t=2.152). Interactivity significantly positively influences satisfaction through confirmation (t=1.964). Course content quality significantly positively influences continuance intention through perceived usefulness (t=6.262). Course content quality significantly positively influences continuance intention through satisfaction (t=4.628). Course content quality significantly positively influences continuance intention through confirmation and perceived usefulness (t=1.186). Course content quality significantly positively influences continuance intention through confirmation and satisfaction (t=2.074). Course content quality significantly positively influences perceived usefulness through confirmation (t=2.083). Course content quality significantly positively influences satisfaction through confirmation (t=2.161). Course design quality significantly positively influences continuance intention through perceived usefulness (t=3.468). Course design quality significantly positively influences continuance intention through satisfaction (t=3.495). Course design quality significantly positively influences continuance intention through confirmation and perceived usefulness (t=1.979). Course design quality significantly positively influences continuance intention through confirmation and satisfaction (t=2.101). Course design quality significantly positively influences perceived usefulness through confirmation (t=2.133). Course design quality significantly positively influences satisfaction through confirmation (t=2.225). Confirmation significantly positively influences continuance intention through perceived usefulness (t=2.232). Confirmation significantly positively influences continuance intention through satisfaction (t=2.384).

Table 4. Specific Indirect Effect

Path	ß	*T-stat*	P Values	Results
CCQ -> C -> PU -> CI	0.014	1.186	0.030	Accepted
CDQ -> C -> PU -> CI	0.014	1.979	0.024	Accepted
C -> PU -> CI	0.052	2.232	0.013	Accepted
INT -> C -> PU -> CI	0.010	1.941	0.026	Accepted
CCQ -> PU -> CI	0.155	6.262	0.000	Accepted
CDQ -> PU -> CI	0.104	3.486	0.000	Accepted
INT -> PU -> CI	0.108	4.060	0.000	Accepted
CCQ -> C -> S -> CI	0.011	2.074	0.019	Accepted
CDQ -> C -> S -> CI	0.012	2.101	0.018	Accepted
C -> S -> CI	0.043	2.384	0.009	Accepted
INT -> C -> S -> CI	0.009	1.912	0.028	Accepted
CCQ -> S -> CI	0.109	4.628	0.000	Accepted
CDQ -> S -> CI	0.094	3.495	0.000	Accepted
INT -> S -> CI	0.124	4.917	0.000	Accepted
CCQ -> C -> PU	0.030	2.083	0.019	Accepted
CDQ -> C -> PU	0.031	2.133	0.017	Accepted

INT -> C -> PU	0.023	2.152	0.016	Accepted
CCQ -> C -> S	0.032	2.161	0.015	Accepted
CDQ -> C -> S	0.033	2.225	0.013	Accepted
INT -> C -> S	0.024	1.964	0.025	Accepted

Based on the results, this research found that interactivity directly influences perceived usefulness, confirmation, and satisfaction. This research proves that student interactivity with sustainable e-learning systems significantly influences their learning experience. When students believe that their interactions in the e-learning environment effectively support their learning activities, it leads to higher levels of perceived usefulness, enhanced usage expectations, and increased satisfaction level with the system. Therefore, this research supports the results of previous research [20][21][22][23][24][25].

In addition, this research also proves that course content quality directly influences perceived usefulness, confirmation and student satisfaction. Course content that continues to be updated regularly and is of high quality can increase their usefulness, confirmation expectations and also improve their satisfaction level with the system. Students will feel the e-learning as useful when the course content is useful and can educate and broaden their insight, which will also impact their expectations of use and their satisfaction while using it. Apart from that, the availability of course content that can be accessed at any time can also influence their level of expectations and satisfaction. Therefore, this research supports the results of previous research [26][27][28].

Furthermore, this research found that the quality of course design directly influences perceived usefulness, confirmation and student satisfaction. Course design is critical for creating a positive learning experience. A system must be designed to be simple and intuitive to keep learners engaged and motivated. This ease of use is important for encouraging consistent interaction with the system over time, ensuring that learners stay engaged and continue to use it effectively. A course design that is neatly arranged and easy to use can make students feel its usefulness, achieve expectations, and even increase their satisfaction with using e-learning so that it can support their learning. Therefore, this research supports the results of previous research [26][29][30][31].

Moreover, it was found that confirmation directly influences on students perceived usefulness and satisfaction. The findings supports the results of previous research [12][13][14][16][17][18]. This research also proves that when students expectations of the e-learning system are confirmed, they have felt the beneficial impact of using it. Students also consider that the system as highly useful for their learning experience and outcomes, which also influences their perception of its usefulness and the level of satisfaction from using it.

Additionally, this research also revealed that perceived usefulness and satisfaction directly influences on the intention to continue using e-learning systems. This finding supports the results of previous research [10][15][19]. When students feel the e-learning system as highly useful during their learning, they are more likely to feel at ease using it and continue using it in the future. Furthermore, their satisfaction with the system also influences their desire to keep using it as a tool to support their learning.

Finally, this research also found an indirect relationship between variables where interactivity, course content and design quality indirectly influence continuance intention, which is mediated by perceived usefulness, confirmation and satisfaction. This indicates that students intention in using the e-learning system and their desire to keep using it for their learning is indirectly influenced by various other factors namely perceived usefulness, confirmation of expectations, and the level of satisfaction, which needs to be considered because even though there is sufficient interactivity and adequate course content and design, several of these factors also influence their continuity in supporting their learning process.

4. Conclusion

This research uses a variety of variables with ECM models as indicators to study their influence on student satisfaction and continuance intention in using the e-learning system. The research is based on the perspectives of 443 students in Batam from different universities. This research also aims to measure the students current e-learning usage and the several factors that influencing their usage. The results of this research show that various indicators, namely interactivity, quality of course content and course design quality are critical factors that impacts the level of satisfaction and continuance intention of students in Batam in using e-learning systems. Students in Batam feel that the current interactivity, course content and design of the e-learning system are able to increase their interest in continuing learning. In addition, the various indicators also influence other factors, namely perceived usefulness, confirmation and satisfaction, which also play a role in influencing students desire to continue utilizing e-learning systems as tools for their

learning process. Therefore, the perspective of students in Batam demonstrates that e-learning system currently in use is highly useful for the sustainability of their current and future education. Even so, the e-learning system improvement must continue be made in line with technological developments, and this improvement must also be made by paying attention to the students who use it to maximize the outcomes, satisfaction and the intention to continue using it.

In addition, this study has several limitations that can be used as a reference to further researchers for further research. This study only focuses on students in Batam with a limited sample. Further researchers can make developments such as examining students in other areas as well with the addition of a larger sample. Furthermore, the indicators used in this study are also quite limited; further research could add more indicators to explore what other factors might affect how students use e-learning systems. This is because many external factors can be further investigated so as to get more accurate results. Finally, this study examines students who come from different majors, and further researchers can examine students based on specific faculties or majors to get more accurate results.

References

[1] L. Bismala and Y. H. Manurung, "Student satisfaction in e-learning along the covid-19 pandemic with importance performance analysis," *Int. J. Eval. Res. Educ.*, vol. 10, no. 3, pp. 753–759, 2021, doi: 10.11591/ijere.v10i3.21467.

[2] H. Baber, "Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID19," *J. Educ. e-Learning Res.*, vol. 7, no. 3, pp. 285–292, 2020, doi: 10.20448/JOURNAL.509.2020.73.285.292.

[3] M. Sholikah and S. Sutirman, "How technology acceptance model (TAM) factors of electronic learning influence education service quality through students' satisfaction," *TEM J.*, vol. 9, no. 3, pp. 1221–1226, 2020, doi: 10.18421/TEM93-50.

[4] Hamzah, A. A. Purwati, M. L. Hamzah, and M. M. Deli, "Measurement of Website Functionality and Perceived Usefulness in Increasing User Satisfaction through the Role of Technology Readiness for E-Learning Users," *J. Syst. Manag. Sci.*, vol. 12, no. 5, pp. 252–267, 2022, doi: 10.33168/JSMS.2022.0515.

[5] M. C. Maphalala and O. T. Adigun, "Academics' experience of implementing e-learning in a south african higher education institution," *Int. J. High. Educ.*, vol. 10, no. 1, pp. 1–13, 2020, doi: 10.5430/ijhe.v10n1p1.

[6] T. Nur Fitria, "Implementation of Institution's E-Learning Platform in Teaching Online at ITB AAS Indonesia," *EDUTEC J. Educ. Technol.*, vol. 4, no. 3, pp. 493–503, 2021, doi: 10.29062/edu.v4i3.157.

[7] M. N. Giannakos, P. Mikalef, and I. O. Pappas, "Systematic Literature Review of E-Learning Capabilities to Enhance Organizational Learning," *Inf. Syst. Front.*, vol. 24, no. 2, pp. 619–635, 2022, doi: 10.1007/s10796-020-10097-2.

[8] D. E. Yawson and F. A. Yamoah, "Understanding satisfaction essentials of E-learning in higher education: A multi-generational cohort perspective," *Heliyon*, vol. 6, no. 11, p. e05519, 2020, doi: 10.1016/j.heliyon.2020.e05519.

[9] Y. M. Cheng, "Students' satisfaction and continuance intention of the cloud-based e-learning system: roles of interactivity and course quality factors," *Educ. Train.*, vol. 62, no. 9, pp. 1037–1059, 2020, doi: 10.1108/ET-10-2019-0245.

[10] A. Suzianti and S. A. Paramadini, "Continuance intention of e-learning: The condition and its connection with open innovation," *J. Open Innov. Technol. Mark. Complex.*, vol. 7, no. 1, p. 97, 2021, doi: 10.3390/JOITMC7010097.

[11] S. N. Ab Hamid, H. Omar Zaki, and Z. Che Senik, "Students' satisfaction and intention to continue online learning during the Covid-19 pandemic," *Malaysian J. Soc. Sp.*, vol. 18, no. 3, 2022, doi: 10.17576/geo-2022-1803-09.

[12] T. Wang, C. L. Lin, and Y. S. Su, "Continuance intention of university students and online learning during the covid-19 pandemic: A modified expectation confirmation model perspective," *Sustain.*, vol. 13, no. 8, 2021, doi: 10.3390/su13084586.

[13] A. A. Rabaa'i, S. A. AlMaati, and X. Zhu, "Students' continuance intention to use moodle: An expectation-confirmation model approach," *Interdiscip. J. Information, Knowledge, Manag.*, vol. 16, no. August, pp. 397–434, 2021, doi: 10.28945/4842.

[14] N. E. Carissa, M. Erlangga, C. S. Evik, and P. W. Handayani, "The Influence of Perceived Usefulness, Satisfaction, and Personalization on Subscription Video on Demand Continuance Intentions," *CommIT J.*, vol. 17, no. 2, pp. 169–184, 2023, doi: 10.21512/commit.v17i2.8446.

[15] A. Ismail, R. Zaharudin, N. Hashim, and J. Ariffin, "The Impact of e-NPQEL on the Continuance Intention of Using e-Training among Aspired School Leaders in Malaysia," *Int. J. Interact. Mob. Technol.*, vol. 14, no. 19, pp. 109–123, 2020, doi: 10.3991/ijim.v14i19.15965.

[16] S. A. Nikou, "Web-based videoconferencing for teaching online: Continuance intention to use in the post-COVID-19 period," *Interact. Des. Archit.*, vol. 47, pp. 123–143, 2021, doi: 10.55612/s-5002-047-006.

[17] P. C. Muñoz-Carril, N. Hernández-Sellés, E. J. Fuentes-Abeledo, and M. González-Sanmamed, "Factors influencing students' perceived impact of learning and satisfaction in Computer Supported Collaborative

Learning," *Comput. Educ.*, vol. 174, no. August, 2021, doi: 10.1016/j.compedu.2021.104310.

[18] S. H. Alshammari and R. A. Alshammari, "An integration of expectation confirmation model and information systems success model to explore the factors affecting the continuous intention to utilise virtual classrooms," *Sci. Rep.*, vol. 14, no. 1, pp. 1–12, 2024, doi: 10.1038/s41598-024-69401-8.

[19] B. Li, "Assessing Factors Impacting Satisfaction and Continuance Intention of Middle School Art Teachers to Use E-Learning Systems in Chongqing, China," *ABAC ODI J. Vision. Action. Outcome*, vol. 11, no. 2, pp. 300–315, 2024, [Online]. Available: https://www.proquest.com/scholarly-journals/assessing-factors-impacting-satisfaction/docview/3053910439/se-2?accountid=15533.

[20] C. Xu, Z. Li, and J. Su, "Live Shopping Interactivity, Social Presence and Sustainable Consumer Purchase Intention: Based on TAM Model," *Int. J. Sustain. Dev. Plan.*, vol. 17, no. 8, pp. 2631–2639, 2022, doi: 10.18280/ijsdp.170832.

[21] N. Ejaz Chaudhry, W. Subhani, M. Azeem Naz, M. Umair Nazir, and M. Huzaifa Ameer, "The Mediating Role of Interactivity between Perceived Usefulness, Perceived Enjoyment and Intention to Use Augmented Reality Application for Shopping," *J. Manag. Pract. Humanit. Soc. Sci.*, vol. 7, no. 6, pp. 66–78, 2023, doi: 10.33152/jmphss-7.6.6.

[22] L. Li, K. Y. Lee, E. Emokpae, and S. B. Yang, "What makes you continuously use chatbot services? Evidence from chinese online travel agencies," *Electron. Mark.*, vol. 31, no. 3, pp. 575–599, 2021, doi: 10.1007/s12525-020-00454-z.

[23] S. Ibáñez-Sánchez, C. Orús, and C. Flavián, "Augmented reality filters on social media. Analyzing the drivers of playability based on uses and gratifications theory," *Psychol. Mark.*, vol. 39, no. 3, pp. 559–578, 2022, doi: 10.1002/mar.21639.

[24] Y. Y. Lee, C. L. Gan, and T. W. Liew, "Do E-wallets trigger impulse purchases? An analysis of Malaysian Gen-Y and Gen-Z consumers," *J. Mark. Anal.*, vol. 11, no. 2, pp. 244–261, 2023, doi: 10.1057/s41270-022-00164-9.

[25] Y. Chen, F. Lu, and S. Zheng, "A Study on the Influence of E-Commerce Live Streaming on Consumer Repurchase Intentions," *Int. J. Mark. Stud.*, vol. 12, no. 4, p. 48, 2020, doi: 10.5539/ijms.v12n4p48.

[26] A. S. Al-Adwan, N. A. Albelbisi, O. Hujran, W. M. Al-Rahmi, and A. Alkhalifah, "Developing a holistic success model for sustainable e-learning: A structural equation modeling approach," *Sustain.*, vol. 13, no. 16, pp. 1–25, 2021, doi: 10.3390/su13169453.

[27] A. Amka and J. Dalle, "The Satisfaction of the Special Need' Students with E-Learning Experience During COVID-19 Pandemic: A Case of Educational Institutions in Indonesia," *Contemp. Educ. Technol.*, vol. 14, no. 1, pp. 1–19, 2022, doi: 10.30935/cedtech/11371.

[28] A. AlMulhem, "Investigating the effects of quality factors and organizational factors on university students' satisfaction of e-learning system quality," *Cogent Educ.*, vol. 7, no. 1, 2020, doi: 10.1080/2331186X.2020.1787004.

[29] I. Nedeljković and D. Rejman-Petrović, "Investigating critical factors influencing the acceptance of e-learning during COVID-19," *Strateg. Manag.*, vol. 27, no. 4, pp. 30–40, 2022, doi: 10.5937/straman2200019n.

[30] J. Khan and J. Hemsley-Brown, "Student satisfaction: the role of expectations in mitigating the pain of paying fees," *J. Mark. High. Educ.*, vol. 34, no. 1, pp. 178–200, 2024, doi: 10.1080/08841241.2021.1973646.

[31] S. Nikou and I. Maslov, "Finnish university students' satisfaction with e-learning outcomes during the COVID-19 pandemic," *Int. J. Educ. Manag.*, vol. 37, no. 1, pp. 1–21, 2023, doi: 10.1108/IJEM-04-2022-0166.

[32] T. Hariguna, A. Ruangkanjanases, B. Bin Madon, and K. M. Alfawaz, "Assessing Determinants of Continuance Intention Toward Cryptocurrency Usage: Extending Expectation Confirmation Model With Technology Readiness," *SAGE Open*, vol. 13, no. 1, 2023, doi: 10.1177/21582440231160439.