



## Continued Usage of E-Learning: A Systematic Literature Review

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### Abstract

During the COVID-19 pandemic, the usage of e-learning systems became the main challenge for many universities. E-learning has risen as cutting-edge method for promoting learning delivery. To ensure productive use, it is important to continue using e-learning. Numerous studies have shown that continued usage by the user is the indicator of success in e-learning, and in recent years, research on continued use of e-learning is being explored at a higher level than before. However, to date, there have been no attempts to systematically analyse these studies in order to provide researchers and practitioners with a picture of the current state of continued usage of e-learning.

The aim of this research is to provide an in-depth look at the theory of continued use information systems in e-learning context. In this study, we used a systematic review approach to collect, evaluate, and synthesize data on the accuracy and value of previous articles published in digital databases between 2009 and 2019 that were based on this research area.

To include all relevant research papers that were written during this period time, we used a Systematic Literature Review (SLR) approach to collect and review studies by following a predefined review process that included both automated and manual search strategies.

We listed 87 primary studies from the review study that presented research on the continued use of e-learning. These studies were analysed using a comprehensive mapping method that collected relevant information to address a series of research questions. We summarized and analysed the published articles, which covered a wide range of research subjects, including the majority of factors that affect e-learning use.

While research on the continued use of e-learning is growing and providing a promising new field of research, the systematic review found that a clearer understanding of the environment and path is not well reported. This research will contribute to a better understanding of the factors that affect e-learning use over time.

**Keywords:** Continued Usage; E-learning; Systematic Literature Review (SLR).

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## Introduction

The usage of the e-learning system during the COVID-19 pandemic is becoming the main challenge for many universities. In recent years, science and technology development, particularly in the area of information technology, has enabled the educational world to keep growing. There is also an increasing use of internet facilities in the education industry, which makes it easy for users to access, at any time, data that offers teaching material (Al-Samarraie et al., 2018; Chang, 2013; Guo et al., 2016; A. K. M. N. Islam & Azad, 2015). Educational institutes use the online learning scheme, frequently called e-learning. E-learning has emerged as an innovative strategy to promote learning delivery in universities (Al-Fraihat et al., 2020; Rodrigues et al., 2018). Teaching and learning using e-learning have become a normal phenomenon in universities (Al-Busaidi, 2013; A. K. M. N. Islam & Azad, 2015). Challenges, transitions, and ability requirements all occur as a result of e-learning implementation. Teachers and students must be extremely adaptable to modern ways of teaching and learning, creating major shifts in typical academic environments (Rodrigues et al., 2018). When it chooses to introduce creative teaching techniques such as e-learning, the university faces many obstacles. Due to the new learning habits required, introducing the tool of technology in the universities can frequently fail (Persico et al., 2014). E-learning differs from general Information Systems (IS) in that it is a user-centric framework that emphasizes content and how it is viewed, according to Shee & Wang (2008). E-essence learnings is such that it provides teachers and students with potentials, instead of conventional learning (Sørenbø et al.,

2009). Although common information systems elicit individual user output, e-learning relies on collaboration between teachers and students. In addition, the results of using e-learning may take more time to achieve, making this type of learning more appropriate for continuing studies.

In recent years, the study of the ongoing use of e-learning has gotten a lot of attention. However, no attempt has been made to systematically study these studies in order to provide researchers with a comprehensive picture of the present condition of e-learning use. This research used a four-phase approach for extracting, codifying, evaluating, and interpreting the current continued use of e-learning studies, as recommended by (Bandara et al., 2011). This covers the stages of article extraction, pre-analysis, actual coding, and report writing. Each level is explained in detail in the sub-sections that follow. The aim of the research is to find answers to the following questions:

- RQ1: What are different terms used for e-learning?
- RQ2: What are the conceptualizations of continued usage of e-learning?
- RQ3: What are the theories adopted in the previous studies of continued usage of e-learning?
- RQ4: What are the important factors that influence the continuous use of e-learning?

The answers to these questions should direct the reader and increase their knowledge of the current state of the continued usage of e-learning. There will be a more detailed overview of different emerging topics, methods, and theories. In addition, this analysis aims to contribute to the increasing body of knowledge on the continued usage of e-learning studies. The research group and its practitioners will benefit from this review's concise methodological summary. Practitioners will use the findings to further their continued use of e-learning.

### **E-learning Definitions**

E-learning (electronic learning) is defined as a wider approach to learning that opens up new possibilities for teaching and learning in many areas of education. E-learning can be used at any time and from any place, and information sharing and learning through the Internet can help users become more inspired to learn (Hong, 2016). Definitions of e-learning have been discussed extensively and the terms of e-learning are often interchanged without having significant meanings, the immaturity of e-learning as a comparatively recent phenomenon is reflected in (Ali, 2018).

E-learning is described by the European Commission (2001) as technologies that improve learning quality by enabling access to facilities and resources, as well as remote exchanges and collaboration. However, as learning technology advances and more researchers use these new tools, it is becoming more difficult to agree on a standard description and terminology for the e-learning structure. Since the various terminologies differ depending on the researcher's specialty and interest, the words e-learning, distance education, online learning, online

interactive learning, virtual learning, and web-based education all refer to the same thing. Different scholars have different meanings and explanations, each reflecting their understanding and meaning.

Table 1. Definition of E-learning

No	Definition	Author(s)
1	E-learning is characterized as the transfer of information and skills via electronic media such as the Internet, intranets, and extranets in a well-designed course content with reputable accreditations.	(Choudhury & Pattnaik, 2020)
2	E-learning is a web-based framework that uses digital technology and other types of instructional materials to provide learners with a customized, student-centered, accessible, pleasurable, and interactive learning experience that supports and enhances learning processes.	(Rodrigues et al., 2018)
3	E-learning is an important tool to counter the demand for highly qualified specialists in the modern technological world.	(Vershetskaya et al., 2020)

### Continued Usage of E-learning

E-learning has been a strategic innovation in many higher education institutions (Guo et al., 2016). E-learning has also become a major part of education and has been widely adopted (Al-Fraihat et al., 2020; Al-Samarraie et al., 2018). Therefore, using e-learning continuously is crucial to ensuring effective use, and to provide positive impacts on students. In spite of this, various studies (Limayem & Cheung, 2011), (Alharthi, Spichkova, & Hamilton, 2018), (Choudhury & Pattnaik, 2019) have highlighted that continued usage by the learner is the indicator for success in e-learning.

The acceptance and continued use of e-learning are critical to the success of e-learning. Although e-learning has been promoted to a wide range of consumers, it is frequently phased out of use (Wu & Zhang, 2014). The implementation of e-learning is part of a complex change process. A higher education provider may college face some obstacles when it wants to incorporate new teaching techniques such as e-learning. The implementation of technical technologies in education can often fail because of the new learning habits required (Persico et al., 2014). Users' intentions of not only adopting but also using e-learning applications are persistently becoming a new challenge as the number of different e-learning applications increases (Al-samarrie, Teng, Alzahrani, & T., 2017), (Daghan & Akkoyunlu, 2016), (Ji, Yang, Liu, & Yu, 2019), (Pereira, Ramos, Gouvea, & Costa, 2015). Despite the widespread recognition over the past decade of the value of e-learning, many learners discontinue e-learning after a period of initial acceptance (Lee, 2010), (Daghan & Akkoyunlu, 2016). Understanding the factors that influence learners' willingness to continue using e-learning will help system developers and vendors in developing the most effective strategies for increasing use (Hung, Chang, & Hwang, 2011), (Tawafak, Romli, Arshah, & Malik, 2019). Therefore the main challenge in e-learning is to increase efforts to achieve continuance use (Al-samarrie, Teng, Alzahrani, & T., 2017), (Chang, 2012), (Cheng & Yuen, 2018), (Daghan & Akkoyunlu, 2016), (Guo, Xiao, Toorn, Lai, & Seo, 2015), (Ji, Yang, Liu, & Yu, 2019), (Pereira, Ramos, Gouvea, & Costa, 2015) (Tan & Shao) (Wu & Zhang, 2014).

## The Review Method

This analysis is, as previously mentioned, a Systematic Literature Review (SLR) - a process that includes all existing research literature on a specific topic or research question in a repeatable procedure (Kitchenham B. C., 2007) (Kitchenham B. , 2004).

The primary objective of this form of investigation is to gather, analyse, and evaluate evidence in a specified field. This is carried out to recognize any study gaps in current researches so that more analysis can be proposed and the subject can be better understood. The authors based their observations on Kitchenham's recommendations Kitchenham (Kitchenham B. , 2004).

The analysis should be carried out in three phases, according to these guidelines: preparation, performing, and reporting. There are sub-elements in each process, such as (1) determining research questions; (2) formulating a review protocol; (3) determining criteria for inclusion and exclusion; (4) reviewing selection procedures and strategy; (5) examining quality assessment; and (6) extracting data and synthesizing evidence to respond to RQ1 to RQ4 research question. Each step is described in the following sections. Table 2 shows the inclusion and exclusion criteria used in this study.

### Review protocol

A detailed review protocol was described in this process to guide the research and provide a clear direction for its success in carrying out this systematic literature review. This stage is a crucial phase in the implementation of SLR, minimizing the likelihood of researcher bias on the approach that will be used to achieve the objectives of the analysis. The study setting, the search strategy, the review issues, the review selection process criteria, the components of quality evaluation, the data extraction procedure, and the synthesis of the extracted data are all phases of the review protocol process (Kitchenham B. C., 2007) (Kitchenham B. , 2004).

### Inclusion and exclusion criteria

The inclusion and exclusion requirements are used to ensure that all primary studies included in the SLR are valid and study-related. The aim of this systematic review is to obtain a deeper understanding of the issues surrounding the continued use of e-learning. Between 2009 and 2019, relevant data was obtained from journal articles written in English and published in digital databases.

Table 2. Inclusion and exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Full-text Published within selected period (2009-2019) Published in the above-selected database Study manuscript written in English. In the domain of continued usage of e-learning	Uncompleted studies Non-English Outside the selected time period Conceptual or non-empirical studies

### **Search Strategy**

Figure 1 indicates that automated search and a manual search were used in the search strategy for the report. In order to explore material for the study, both of these search approaches were used, including further research, which may provide a broader perspective. The manual search for primary research sources was conducted after an automated search, following Kitchenham's approach (2007). The keyword-based automatic search for analysis was carried out as an electronic search to answer the research question of this study. The online databases included ScienceDirect, Scopus, Springer, and Web of Science.

In this study, in both research titles and research questions, the keywords of interest were looked up. Keywords were used to search through the selected databases to align identified keywords with published research and related literature. The aim of this research was to find as many important articles in the domain as possible. These terms included: 'e-learning continued use', 'use continuously and e-learning', 'continuous use AND e-learning', 'continuance use AND e-learning', 'continue and e-learning'. This research utilized a manual search for the second round after the first search stage. A forward and backward search technique, as developed by Webster and Watson (2002), was used to track the collected references for primary studies, for example by additional reference scanning. This ensured that the study fulfilled its purpose and addressed the research questions asked.

This second manual search ensured a reasonably detailed systematic search, as well as for deciding if the study had omitted something (Webster & Watson, 2002). Through the use of the Mendeley program, it was used to organize and sort all primary studies. It also handled and processed all of the studies obtained at both stages, making it simple to distinguish duplicates.

### **Study Selection Process**

This study found 540 articles after conducting search processes using the identified keywords, 273 papers based on the title and abstract of each article out of this total. A full-text review of current studies was included in the next phase, leaving out results from 80 studies.

In this selection study of the processes' final phase, the snowballing' technique (Budgen et al., 2008) was used to search the references of primary studies. The authors used a manual search method in this stage, using the references from each horizontal and vertical search to ensure the consistency of the review process. To ensure the consistency of the review process, the authors used a manual search method that used the sources of each horizontal and vertical search, as well as Google Scholar to obtain more accurate results. Therefore, each of the 80 primary research reference lists was screened, and 22 other studies were identified. There were 102 primary studies included in the outcome of the systematic analysis. Finally, the total number of primary studies found in both the automated and manual searches subsequently met the requirements for quality evaluation, resulting in the exclusion of 15. Accordingly, the authors of this paper chose 87 primary studies for the study, which, as tabulated in Appendix, in this SLR stage, future steps were formed.

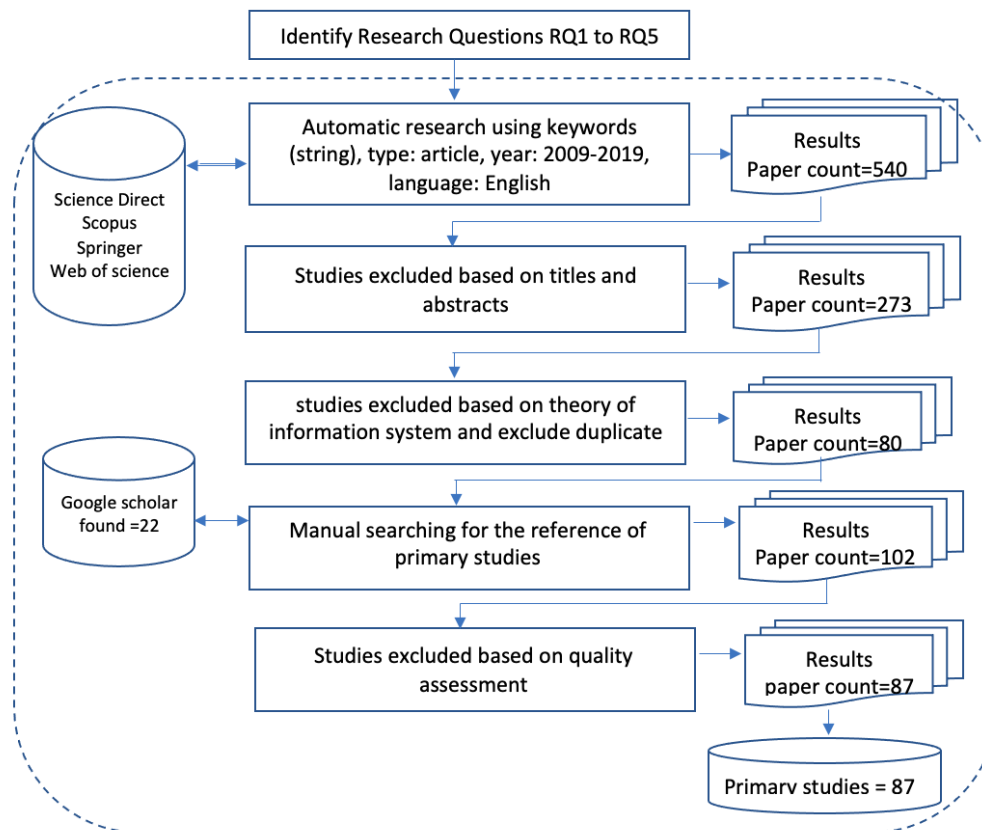


Figure 1. Study Selection Process

### Quality Assessment (QA)

To evaluate a set of criteria to assess the quality of each review paper selected, and to decide on the interpretation and results of the primary studies (Nidhra, 2013). Therefore, the authors performed a quality evaluation of this paper in order to determine the quality and accuracy of the primary studies chosen. For this analysis, five QA criteria were established, as detailed below:

- QA1. Is the topic addressed in the paper related to continued usage of e-learning?
- QA2. Is it clear in which context the research was carried out?
- QA3. Is the research methodology adequately described?
- QA4. Is the process of the data collection methodology clearly explained in the paper?
- QA5. Is the data analysis approach accurately evaluated in the paper?

The five quality assessment questions listed above were used to evaluate the 87 selected research papers in order to increase researchers' confidence in the accuracy of their findings. Three quality rankings, 'high', 'medium', and 'poor', were used to rate quality levels through each criterion (Nidhra, 2013). As a consequence, the load score can be used to determine the consistency of each study. Based on the quality level criterion, the results were divided into three groups. To begin, if a study absolutely met a quality criterion, it was given a 2 rating for that criterion. Second, if a study partially met a quality criterion, a rating of 1 for that criterion

has been given. Finally, if a study did not satisfy a quality criterion, a ranking of 0 for that criterion was given. As a result, a study's highest possible score for the five quality metrics is 10 (or 5 2), while its lowest possible score is 0 (or 5 0). Each paper was considered to be of high quality in this study if it earned a score of 6 or higher. A paper with a score of 5 was considered to be of medium quality, whereas one with a score of less than 5 was considered to be of low quality. It was discovered that 15 studies did not follow the criterion. As a result, they were left out of the final quality evaluation.

## Data extraction and synthesis for SLR

### Chronological view

The e-learning continuance of use topic has a very limited research background. The distribution of all studies from 2009 to 2019 is represented in Figure 2. There were 87 publications found. From 2010 to 2011, 2014 to 2015, and 2018 to 2019, the number of publications related to continued use of e-learning steadily grew, as shown in Figure 2. The number of studies focusing on the continued usage of e-learning has steadily increased.

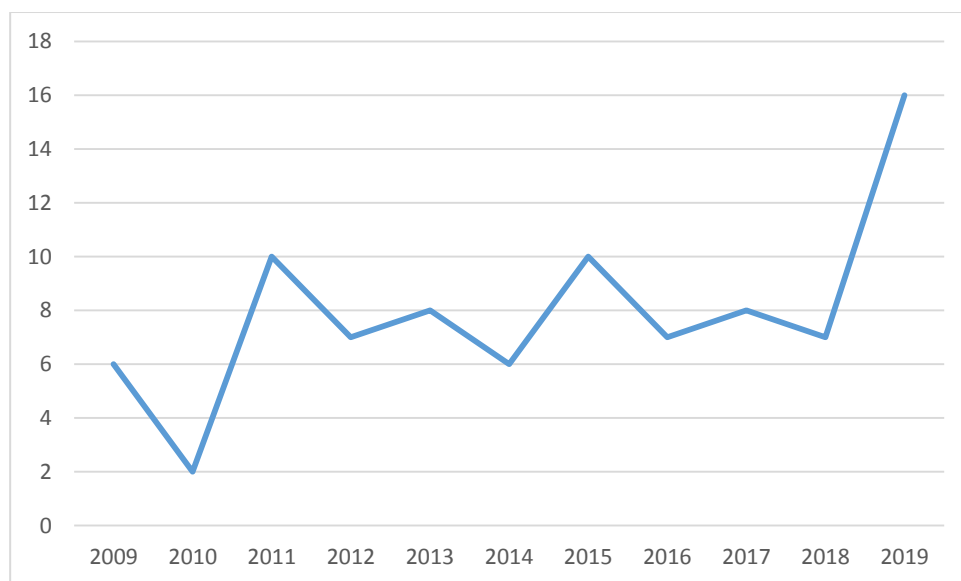


Fig. 2. Publication numbers by year (2009-2019)

### Coverage of Research Region

The primary studies in this systematic review were conducted in at least 21 different countries. As shown in Fig. 3, the Asia-Pacific region contributed the most papers with 57, followed by the Middle East with 9, Europe with 10, North and South America with 5, and Africa with 4. As shown in the graph below, the vast number of research papers concentrating on continued use of e-learning that met the study's inclusion criteria were published in the Asia-Pacific region.



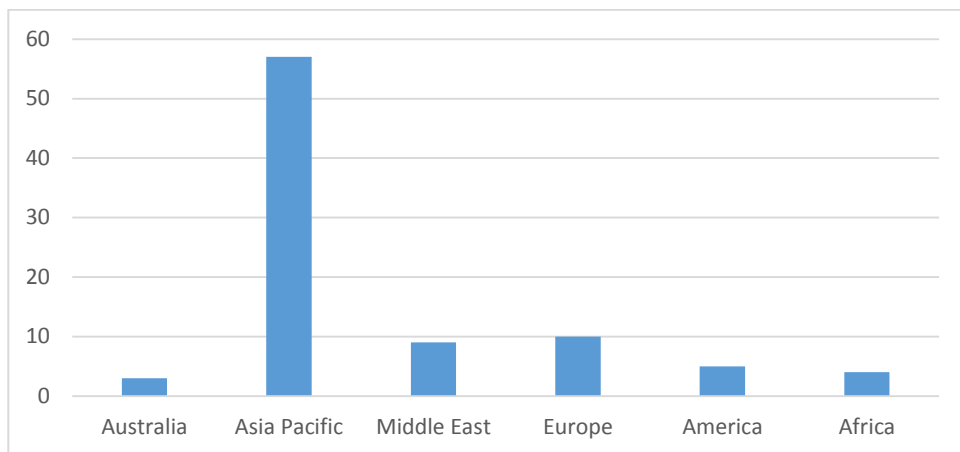


Fig. 3. Papers published by region

### Research question results

#### What term e-learning

In recent years, all sectors have made substantial investments in digital learning technologies. Despite such investments, learners can fail to adopt, abandon, or reject learning technology, therefore continued usage of e-learning remains a topic of interest for researchers (Mehta et al., 2019). E-learning has various definitions depending on how and where it is being implemented (Aqilah, 2018). E-learning has many terms to describe it such as online learning, web-based learning, mobile learning, cloud learning, massive open online course, virtual learning. The terms are interchanged without meaningful definitions (Moore et al., 2011).

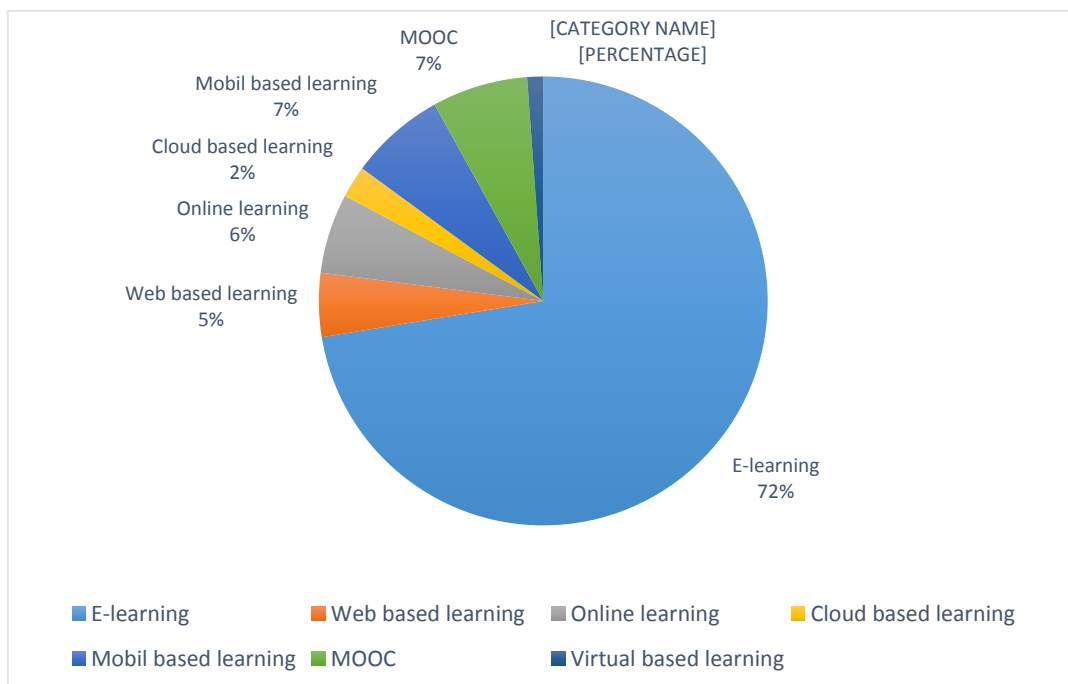


Fig. 4. Papers published by term

## **Online Learning**

With the support of particular designs and activities of the learning platform, the ongoing growth of online learning has contributed to changes in learning processes for students. Under these contexts, contact and communication patterns are different from the traditional learning environments. In this area, numerous literature studies emphasize the participation of active learners (Bourelle, Bourelle, Knutson, & Spong, 2016). However, learner must spend enough time in the classroom, actively engage, and communicate with both the instructor and the other learner to ensure effective participation in online learning. Bad online learners, according to You and Kang (2014), do not devote enough time and attention to these learning systems. Online participation of learners needs to be improved to boost online learning (Hrastinski, 2009). According to Oncü and Çakır (2011), one of the measures of effective online learning systems is enhancing online learner collaboration and communication.

## **Web Based Learning**

Bagci and Celik proposed a continuance intention model for web-based distance learning system (Bagci & Celik, 2018). A brief definition of distance learning is the learning process where teachers and students do not have to share the same environment. E-learning has acquired many new and distinct meanings since it first appeared, according to the models and understandings developed, and advanced technology (Moore, 2012).

## **Mobile Learning**

Mobile learning, which combines e-learning and mobile computing, provides a distinct possibility to improve students' learning experiences in either a formal or informal educational environment. Because of the portability and spontaneity of mobile devices, students may find a meaningful environment in which to participate in more personalized learning. Educational researchers and practitioners have been involved in many parts of the world over the last decade of the ICT industry's rapid growth.

Mobile learning helps students may use their mobile device to take online courses, at anytime and anywhere. To watch video lectures on the internet we do not have to remain at home or in the office with a wired internet connection (Berge, 2013) (Chen, 2013). However, there is still a problem concerning why the use of mobile learning does not always continue. Firstly, it is still unusual for students to use mobile devices in class. Second, the use of mobile devices by students in the classroom is not extensive. We tend to use a mobile device to access easy information about meetings, community events, and course grades over instructional materials. Eventually, without a learning management system (LMS), students rarely make full use of their mobile devices for educational purposes. A mobile learning platform's availability does not guarantee the use of it by students for academic purposes; they must recognize its benefits and incorporate it into their lives (Kinash, 2012). However, there is little empirical analysis on how mobile learning is currently used in an online university to

facilitate mobile learning with little explanation of how factors affect their actual use (Joo et al., 2016). Yang (2019) mentioned that retaining learners and facilitating their continued usage are critical for the mobile learning providers and educators (S. Yang et al., 2019)

### **Cloud based Learning**

Cloud computing has recently been the subject of growth in the field of education, as it can be used to empower teachers to interact with students synchronously and to give learners with the ability to communicate and engage with teachers from anywhere, at any time, even if they are not in a conventional classroom. The main problem with traditional e-learning is that there is an insufficient storage room for online learning sites, while cloud-based e-learning can improve the ability to scale (Hew & Kadir, 2016). Thus, the introduction of cloud-based e-learning platforms will become a more versatile and scalable choice for businesses without high costs of computer, low network transfer speeds and restricted storage space related to conventional e-learning systems. As a result, many educational institutions have adopted cloud-based e-learning to allow their learners to learn from any location and at any time. (Y. M. Cheng, 2019; Jou & Wang, 2013; Y. T. Lin et al., 2014; Shiau & Chau, 2016; Stantchev et al., 2014)

### **Massive Open Online Course**

The Massive Open Online Course (MOOC) has played an important role in the recent campaign for e-learning and has become widely popular in many universities (Daneji et al., 2019). In an online setting where participation is limitless, MOOCs are lessons given (Alraimi et al., 2015; Marques, 2013). While MOOCs have become very common and are used worldwide, the low student graduation rate is the key problem that cannot be ignored (Ouyang, 2017) (National Context In N. Law, W. J. Pelgrum, & T. Plomp (Eds.), *Pedagogy and ICT in schools around the world: Findings from the SITES 2006 study* (pp. 38–66), 2008) (Anderson R., 2008). There is high enrolment but only a few learners complete their enrolled MOOC courses, in fact, no more than 10 percent will complete a MOOC course, as stated in many studies, so it is important to study the factors that influence students to continuously use the MOOC platform

### **Perspective**

In this study, we find that the majority of the reviewed articles (86%) have involved student perspective, and 14% have involved instructor perspective.

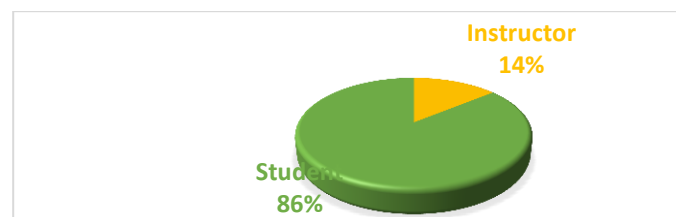


Fig. 5. Papers published by perspective

## **Instructor Perspective**

Higher education institutions have made significant investments in the implementation of learning management systems in order to improve teaching and learning processes (A. K. M. N. Islam & Azad, 2015). The continued use of e-learning by instructors and students is critical to the return on these investments. Instructors play a critical role in ensuring that technology is effectively integrated into teaching and learning. In terms of curriculum planning and implementation, they have, instructors choose the form, frequency, and quantity of technology resources they will use. According to previous research (Al-Busaidi & Al-Shihi, 2012), the effectiveness of e-learning is largely dependent on teacher satisfaction. As a result, identifying the primary determinants affecting instructors' satisfaction with using e-learning is critical in ensuring that e-learning are used in the future (Sharma et al., 2017).

A significant part of the profile, professional development and practice of the teacher is knowing and using ICT in pedagogy (Anderson R., 2008). Innovative teaching and learning methods in education can be encouraged by using ICT, and ICT skills can be seen as a vital skill for everyone to be used in both work and social life. Therefore, the use of ICT and e-learning by instructors in their teaching processes should be seen as a significant factor in education. The success of e-learning management systems such as MOODLE depends on student usage as well as acceptance of the instructor of an e-learning environment. Loogma (2012) proposed a model for the acceptance of e-learning by teachers of vocational secondary and professional higher education institutions in Estonia (Loogma, 2012). Among teachers, there tends to be a statistically important gap between innovators and the rest of the adopter groups. A multifaceted innovation gap appears in the working environment of instructors, encompassing differences in the real usage of e-learning resources, various forms of skills and competencies, access and support metrics, and so on. The competencies are measures of inventiveness, according to the model of innovativeness constructed. Innovativeness and the growth of e-learning competencies. It could be argued that, although providing teachers with appropriate continuous training and making efforts to improve established support systems is one of the challenges for e-learning developers, we may assume that various schemas and support programs should be used for different adopter categories among teachers, as the values and attitudes of different groups vary (Loogma et al., 2012).

Sharma 2017 developed a model to understand and forecast the impact of individual characteristics (technology experience, personal innovativeness), e-learning quality determinants (system quality, information quality, and service quality) on the continued usage of e-learning by teachers, which is crucial to its success (Sharma, 2017). Albusaidi (2012) mentioned that teachers' satisfaction of e-learning is critical and should be extensively investigated in order to make sure a good e-learning implementation (Al-Busaidi K. A.-S., 2012). E-learning survive through instructors' continued usage, which may largely be related to their satisfaction with the LMS (Al-Busaidi, 2013). Other researchers found identifying the key factors that influence teachers' satisfaction with e-learning systems will reveal valuable

information on how to stimulate teachers' cognitive expectations of technology usage in the classroom (Al-samarrie, Teng, Alzahrani, & T., 2017).

### **Student Perspective**

Efficient e-learning, according to some experts, involves the student and the e-learning technology being in harmony (Alexander, 2012; Cheng & Yuen, 2018; Guo, Xiao, Toorn, Lai, & Seo, 2015). In e-learning, the student is a key element because they interact with e-learning (Limayem & Cheung, 2011; Zhang, Fang, Wei, & Wang, 2012), therefore, participation of learner is necessary to the effectiveness of e-learning's implementation (Bourelle, Bourelle, Knutson, & Spong, 2016; Yang, Zhou, & Chen, 2018). Therefore, without student engagement, e-learning programs would not be able to accomplish their goal of promoting learning. When implementing any new technology, the most common barriers and challenges that a faculty encounters are resistance to change, and rather strong unwillingness to learn (Lewis, Cidon, Seto, Chen, & Mahan, 2014). Hew and Cheung encountered a lack of student participation in e-learning (Hew & Cheung, 2014). Some studies identify lack of learner motivation to be the major concern of the instructors across eras of e-learning (Choudhury & Pattnaik, 2019). Teachers often have a hard time detecting psychological obstacles that are impeding student engagement and attitudes toward learning (Versitkaya, Mikhaylova, Gilmanshina, Dorozhkin, & Epaneshnikov, 2019). Other studies found problems in e-learning self-motivation, self-driven learning capacity, and cultural awareness (Muresan & Gogu, 2013). The lack of motivation could be reported by many students having the low motivation to continue their e-learning (Kang, Liew, Kim, & Jung, 2014). Students rate the e-learning's ease of use, utility, accessibility, reliability, and usability higher than educators, according to Islam and Azad (2015). The sum of variation explained by predictors of student satisfaction was 9 percentage points lower than that of educators (A. K. M. N. Islam & Azad, 2015).

### **Information System Theory used in Continued Usage of E-learning Research**

Table 3 describes information system theory or information system model used in continued usage of e-learning. Theories such as the Technology Acceptance Model (TAM), and the Expectation confirmation Model (ECM) have most frequently been previously used in continued usage of e-learning. The adoption and use of e-learning by teenagers were investigated using an integrated model, TAM, TRA, and ECM (M. Cheng & Yuen, 2019). To explain and forecast young school students' continued use of a learning management system, Cheng and Yuen (2018) suggested a model based on the TAM and ECM (M. Cheng & Yuen, 2018). Even when the effects of user satisfaction and perceived usefulness on continued intention are reduced, the updated ECM has more power to clarify the continued intention of web-based learning system use, according to Hung et al (2011) (Hung et al., 2011). **In Mobile learning**, the theory most frequently used is TAM (Al-Shihi et al., 2018; Hamidi & Chavoshi, 2018; Joo et al., 2016). Other researchers have used UTAUT (Al-Shihi et al., 2018; García Botero et al., 2018), ECM (Joo et al., 2016), SDT (S. Yang et al., 2019) or Diffusion

Innovation Theory (Almaiah & Al Mulhem, 2019). **In a web-based** distance learning system, the theory or model that is used TAM (Bagci & Celik, 2018; Lee, 2010; W. S. Lin, 2012). Bagci and Celik (2018) used other theories such as EDT, TRA (Bagci & Celik, 2018). Lee (2010) used other theories such as ECM, TPB, and flow theory(Lee, 2010). Lin (2012) also used TTF in web-based learning (W. S. Lin, 2012). **In cloud-based learning**, the theory most often used is TAM (Y. M. Cheng, 2019; L. Y. K. Wang et al., 2019). Cheng (2019) used other theories such as ECM and TTF (Y. M. Cheng, 2019). Wang (2019) also used another theory in cloud based learning including SCT (L. Y. K. Wang et al., 2019). **In MOOC**, Daneji (2019) used ECM (Daneji et al., 2019) while another researcher, Joo (2018) used TTF and ISCM (Jo, 2018) for MOOC.

Table 3. Theories and Models used in Continued Usage of E-learning Research

Theory	References
Technology Acceptance Model (TAM)	(S. I. Cheng et al., 2015),(B. Cheng et al., 2012; M. Cheng & Yuen, (Bagci & Celik, 2018) 2019), (Cho, Cheng, & Lai, 2009; W. S. Chow & Shi, 2014; Hamidi & Chavoshi, 2018; A. K. M. N. Islam & Azad, 2015; Ismail et al., 2012; Ji et al., 2019)(Joo et al., 2016; Lee, 2010; K. M. Lin et al., 2011; T. C. Lin & Chen, 2012; W. S. Lin, 2012; Orehovački et al., 2019; Rodríguez-Ardura & Meseguer-Artola, 2016b; Saba, 2012; Y. Sun & Gao, 2019; L. Y. K. Wang et al., 2019; B. Wu & Zhang, 2014; C. H. Wu & Liu, 2015; M. Yang et al., 2017; Yim et al., 2019)
Expectation Confirmation Model (ECM)	(Chang, 2013; M. Cheng & Yuen, 2018, 2019; Y. M. Cheng, 2019; Chou et al., 2012; W. S. Chow & Shi, 2014; Daneji et al., 2019; Daħan & Akkoyunlu, 2016; Hung et al., 2011; Ifinedo, 2018; Joo et al., 2016; Lee, 2010; K. M. Lin, 2011; K. M. Lin et al., 2011; Mouakket & Bettayeb, 2015; Tan & Shao, 2015; Tawafak et al., 2020; R.-B. Wang & Du, 2014)
Unified Theory of Acceptance and Use of technology (UTAUT)	(A. K. M. N. Islam & Azad, 2015; Kumar & Bervell, 2019; P. C. Lin et al., 2013; E. T. Lwoga & Komba, 2015; Maldonado et al., 2011; Medina Molina et al., 2013; Mehta et al., 2019; Mohammadyari & Singh, 2015; Orehovački et al., 2019; Saba, 2012)
Information System Conceptual Model (ISCM)	(Bagui & Mwapwele, 2019; Bøe et al., 2015; Chang, 2013; Daħan & Akkoyunlu, 2016; A. K. M. N. Islam & Azad, 2015; Jo, 2018; J. W. Lin, 2019; T. C. Lin & Chen, 2012; W. S. Lin & Wang, 2012; Shahijan et al., 2016; Sørenbø et al., 2009; B. Wu & Zhang, 2014)
Diffusion of Innovation Theory	(Almaiah & Al Mulhem, 2019; Loogma et al., 2012; Woodward et al., 2014; C. H. Wu & Liu, 2015)
Expectancy Disconfirmation Theory (EDT)	(Bagci & Celik, 2018; Cho, Cheng, & Hung, 2009; Cho, Cheng, & Lai, 2009; Shahijan et al., 2016)
Theory Reasoned Action (TRA)	(Bagci & Celik, 2018; M. Cheng & Yuen, 2019; K. M. Lin, 2011)
Task Technology Fit (TTF)	(Y. M. Cheng, 2019; Jo, 2018; W. S. Lin, 2012; W. S. Lin & Wang, 2012; Y. Sun & Gao, 2019; Yu et al., 2012)
Flow theory	(Costley & Lange, 2017; Guo et al., 2016; Hong et al., 2019; Liu et al., 2009)
Social Identify Theory	(Hernandez et al., 2011)
Social Cognitive Theory	(J. W. Lin & Tsai, 2016; Mohamad et al., 2018; L. Y. K. Wang et al., 2019; Zhang et al., 2012)
Cognitive Load Theory	(Hong et al., 2019)
Theory of Planned Behavior (TPB)	(R. Cheung & Vogel, 2013; Chong et al., 2016; Hernandez et al., 2011; Lee, 2010; Moghavvemi et al., 2017; P. chen Sun et al., 2009)
Social Exchange Theory	(Luo et al., 2017)
Delone Mclean IS Success Model	(Al-Busaidi & Al-Shihi, 2012; Chang, 2013; C. M. K. Cheung & Lee, 2011; E. Lwoga, 2014; Ramayah et al., 2010; Sharma et al., 2017)
Servqual	(Udo et al., 2011)
Self Determination Theory (SDT)	(Larsen et al., 2009; Shahzad et al., 2020; S. Yang et al., 2019)

### **The Factor that Influenced in Continued Usage of E-learning Research**

The factors that most influenced continued usage of e-learning are **Satisfaction, Perceive usefulness, Perceived ease of use, and Attitude**. The **Attitude** is the factor that affects continuance intention of using e-learning (Chong et al., 2016; Hernandez et al., 2011; Rodríguez-Ardura & Meseguer-Artola, 2016b). Social motivations have a significant positive impact on attitudes toward and use of ICT interactive resources, according to Hernandez et al (2011). It increases the probability of the potential use of e-learning in the coming years. Wu and Zhang (2014) found that attitude was crucial to the continued usage of e-learning. Another researcher (Chong, 2016), found most nurses have a positive attitude toward e-learning. Rodriguez (2016) first looked at how users' feelings of presence and flow, as well as their impressions of two main aspects of the virtual education environment (instructor attitude and didactic resource quality), affect their motivation to continue e-learning (Rodríguez-Ardura & Meseguer-Artola, 2016a).

The Satisfaction is the factor that affects continuance intention towards using e-learning (Al-Busaidi, 2013; Bagci & Celik, 2018; Y. M. Cheng, 2013, 2019; Cho, Cheng, & Lai, 2009; Daneji et al., 2019; Dahan & Akkoyunlu, 2016; Hong et al., 2017; Hung et al., 2011; A. K. M. N. Islam & Azad, 2015; Joo et al., 2016; Lee, 2010; W. S. Lin, 2012; W. S. Lin & Wang, 2012; Mouakket & Bettayeb, 2015; Pereira et al., 2015; Udo et al., 2011; Yuen et al., 2019). Cho (2009) found that user satisfaction is an essential predictor of continuance use intention (Cho, Cheng, & Lai, 2009). Lee (2010) demonstrated that satisfaction has the most important factor on users' continuance intention (Lee, 2010). Lin and Chen (2012) indicated that system quality, platform information, and course information significantly related to users' satisfaction and their intention to use ELS continuously (T. C. Lin & Chen, 2012). According to Ismail et al. (2012), the satisfaction level of e-learning users is calculated by the combination of knowledge quality, service quality, device quality, perceived utility, perceived ease of use, confirmation, and cognitive absorption (Ismail et al., 2012). According to Al-Busaidi (2013), learners' intention to participate in complete e-learning is affected by their personal innovativeness, PU, and satisfaction with the e-learning. As a result, students' use of e-learning increases their willingness to complete maximum e-learning (Al-Busaidi, 2013). The perceived utility (PU) of The Blackboard method was found to affect satisfaction by Mouakket and Bettayeb (2015). Instructors' intentions to continue using the Blackboard method were motivated by both PU and satisfaction (Mouakket & Bettayeb, 2015). According to Pereira (2015), both consistency and value disconfirmation have a significant influence on satisfaction. Satisfaction was found to be crucial in assessing the intention to use e-learning in public institutions on a long-term basis (Pereira et al., 2015). Perceived usefulness and expectation-confirmation predicted satisfaction, and perceived usefulness and satisfaction predicted m-LMS use continuance intention, but perceived ease of use was not linked to continuance intention, according to Joo (2016). Knowledge quality, system quality, service quality, confirmation, utilitarian value, result expectations, and perceived value clarified 63 percent of the variance in satisfaction, according to Dahan and Akkoyunlu (2016). Bagci and

Celik (2018) discovered that satisfaction was indirectly influenced by perceived quality, perceived power, and perceived usability, and that satisfaction was specifically influenced by perceived quality, perceived control, and perceived usability (Bagci & Celik, 2018). According to Daneji (2019), affirmation has a huge impact on students' perceptions of usefulness and satisfaction (Daneji et al., 2019). Perceived usefulness and satisfaction have major effects on student's intention to continue using MOOCs, but perceived usefulness does not affect on students' satisfaction. Chen (2019) found that both task and technology characteristics influenced students' perceived TTF, which in turn influenced their perceived usefulness, validation, and satisfaction with the cloud-based e-learning system, which in turn influenced their intention to use the system in the future and their perception of its effect on learning (Y. M. Cheng, 2019).

The **Perceived usefulness (PU)** factor is another factor that significantly influences continuance of use in e-learning (B. Cheng et al., 2012; Y. M. Cheng, 2019; Cho, Cheng, & Lai, 2009; Daneji et al., 2019; Hung et al., 2011; A. K. M. N. Islam & Azad, 2015; Joo et al., 2016; W. S. Lin & Wang, 2012; Mouakket & Bettayeb, 2015; B. Wu & Zhang, 2014). Cho et al (2009) found that PU and user satisfaction are two essential predictors of CUI. (Cho, Cheng, & Lai, 2009). More experienced users' behaviours and behavioural intentions are found to be more highly affected by PU (K. M. Lin, 2011). Even when the effects of user satisfaction and PU on continued intention are reduced, Hung et al (2011) found that the updated ECM has greater power to explain the continued intention of WLS usage (Hung et al., 2011). PU and system satisfaction have a huge effect on whether or not people want to keep doing what they're doing (W. S. Lin & Wang, 2012). Wu and Zhang (2014) discovered that PU mediated the effects of perceived ease of use, knowledge quality, and social impact on continuation intention. (B. Wu & Zhang, 2014). Students have higher positive views of the LMS's perceived ease of use, PU, access, reliability, and usability than educators, according to Najmul (A. K. M. N. Islam & Azad, 2015). Mouakket and Bettayeb (2015) discovered that PU affected on Blackboard system satisfaction (Mouakket, 2015). Instructors' intentions to use the Blackboard system were influenced by both PU and satisfaction. The nature of the user interface affected on both PU and satisfaction. Training affected on perceived utility, but not on satisfaction (Mouakket & Bettayeb, 2015). Joo et al (2016) found that perceived ease of use predicted PU. PU predicted satisfaction. PU and satisfaction predicted continuance intention (Joo et al., 2016). Chen (2019) found that both task and technology characteristics influenced students' perceived TTF, which in turn influenced their PU, affirmation, and satisfaction with the cloud-based e-learning system, which in turn influenced their intention to continue using the system and perceived effect on learning; essentially, the findings backed up the research model that combined the ECM and TTF models by placing main constructs as drivers, with all hypothesized connections being important (Y. M. Cheng, 2019). Confirmation has a huge impact on students' PU and happiness, according to Daneji et al (2019). Perceived usefulness and satisfaction have a substantial impact on students' intention to proceed, while PU has no impact on students' satisfaction (Daneji et al., 2019).



The **Perceived ease of use** factor (PEU) is another factor that significantly influences continuance use in e-learning (Chang, 2012), (Yuen, 2019), (Cheng M. Y., 2019), (Cheng M. Y., 2018), (Cheng B. W., 2012), (Cheng Y. M., Exploring the roles of interaction and flow in explaining nurses' e-learning acceptance, 2013), (Cho V. C., 2009), (Daneji, 2019), (Ji, Yang, Liu, & Yu, 2019), (Jo, 2018), (Lin K. M., 2011), (Lin T. C., 2012), (Lin W. S., 2012), (Medina Molina, 2013), Rodrigues (2014), (Sun, 2020), (Wang R.-B. D.-T., 2014), (Ho, 2015), (Kanwal, 2017), (Lee, 2010). Lin (2011) discovered that PEU has a greater influence on the attitude and intent to continue of users without much experience, while PU is a greater influence of the attitude and intent to continue of users with more experience (K. M. Lin, 2011). PEU is not substantially linked to the intention to use an e-learning at the beginning of usage, according to Cheng (2019), but its associations with the intention to use an e-learning and satisfaction with e-learning usage become greater as use progresses. This research on school students' adoption of LMS provides practitioners of scientific proof to further support e-learning in education system, despite the fact that PU has the most influential factor with purpose and satisfaction (Y. M. Cheng, 2019)

Table 4. The Factors that Most Influenced in Continued Usage of E-learning Research

Factors	References	N
Satisfaction	(Al-Busaidi & Al-Shihi, 2012; Al-Samarraie et al., 2018; Arain et al., 2019; Calli et al., 2013; Chang, 2013; M. Cheng & Yuen, 2018, 2019; Y. M. Cheng, 2019; C. M. K. Cheung & Lee, 2011; Cho, Cheng, & Lai, 2009; Chou et al., 2012; W. S. Chow & Shi, 2014; Cidral et al., 2018; Daneji et al., 2019; Da'han & Akkoyunlu, 2016; Hong et al., 2017; A. K. M. N. Islam & Azad, 2015; N. Islam, 2011; Joo et al., 2016; Lee, 2010; K. M. Lin, 2011; K. M. Lin et al., 2011; T. C. Lin & Chen, 2012; W. S. Lin, 2012; W. S. Lin & Wang, 2012; E. Lwoga, 2014; Mouakket & Bettayeb, 2015; Shahijan et al., 2016; R.-B. Wang & Du, 2014; Yuen et al., 2019)	30
Perceived usefulness (PU)	(Chang, 2013; B. Cheng et al., 2012; M. Cheng & Yuen, 2018; Y. M. Cheng, 2013, 2019; Cho, Cheng, & Lai, 2009; Daneji et al., 2019; Ho et al., 2015; Ji et al., 2019; Joo et al., 2016; Kanwal & Rehman, 2017; Lee, 2010; K. M. Lin et al., 2011; T. C. Lin & Chen, 2012; W. S. Lin & Wang, 2012; Medina Molina et al., 2013; Mouakket & Bettayeb, 2015; Rodríguez-Ardura & Meseguer-Artola, 2016b; Y. Sun & Gao, 2019; L. Y. K. Wang et al., 2019; Yuen et al., 2019)	21
Perceived ease of use (PEU)	(Chang, 2013; M. Cheng & Yuen, 2019, 2018; Y. M. Cheng, 2013; Cho, Cheng, & Lai, 2009; M. Chow et al., 2013; Ho et al., 2015; Ji et al., 2019; Joo et al., 2016; Kanwal & Rehman, 2017; K. M. Lin et al., 2011; T. C. Lin & Chen, 2012; Rodríguez-Ardura & Meseguer-Artola, 2016b; L. Y. K. Wang et al., 2019; B. Wu & Zhang, 2014; Yuen et al., 2019)	15
Attitude	(Chong et al., 2016; M. Chow et al., 2013; Hernandez et al., 2011; Lee, 2010; Rodríguez-Ardura & Meseguer-Artola, 2016a, 2016b; Shahzad et al., (T. C. Lin & Chen, 2012), (K. M. al., 2020; B. Wu & Zhang, 2014) Lin et al., 2011)	10
Self-efficacy	(Bagci & Celik, 2018; M. Chow et al., 2013; E. T. Lwoga & Komba,	7

	2015; Revyathi & Tselios, 2019; Saba, 2012; L. Y. K. Wang et al., 2019; Zhang et al., 2012)	
System quality	(Almaiah & Al Mulhem, 2019; Bagci & Celik, 2018; Ramayah et al., 2010; Saba, 2012; Sharma et al., 2017; M. Yang et al., 2017)	6
Confirmation	(Y. M. Cheng, 2019; Chou et al., 2012; Daneji et al., 2019; Dalhan & Akkoyunlu, 2016; Joo et al., 2016; W. S. Lin & Wang, 2012)	6
Service quality	(Almaiah & Al Mulhem, 2019; Bagci & Celik, 2018; Ramayah et al., 2010; Sharma et al., 2017; M. Yang et al., 2017)	5
Information quality	(Bagci & Celik, 2018; Ramayah et al., 2010; Saba, 2012; Sharma et al., 2017; B. Wu & Zhang, 2014)	5
Flow	(Y. M. Cheng, 2013; Guo et al., 2016; Hong et al., 2017; Rodríguez-Ardura & Meseguer-Artola, 2016a, 2016b)	5
Trust	(Almaiah & Al Mulhem, 2019; Bøe, 2018; Hamidi & Chavoshi, 2018; Medina Molina et al., 2013)	4
Task Technology Fit (Task or technology characteristic)	(M. Cheng & Yuen, 2019; Joo et al., 2016; W. S. Lin & Wang, 2012; Y. Sun & Gao, 2019)	4
Social influence	(E. T. Lwoga & Komba, 2015; Maldonado et al., 2011; Tan & Shao, 2015; B. Wu & Zhang, 2014)	4
Performance expectancy	(E. T. Lwoga & Komba, 2015; Mehta et al., 2019; Moghavvemi et al., 2017)	3
Personal innovative	(Al-Busaidi & Al-Shihi, 2012; Loogma et al., 2012; Sharma et al., 2017)	3
Habit	(Kumar & Bervell, 2019; Mehta et al., 2019)	2
Technological construct	(Shahzad et al., 2020; Sharma et al., 2017)	2

The factors that most influenced continued usage of e-learning are **Satisfaction, Perceive usefulness, Perceived ease of use, and Attitude**. The **Attitude** is the factor that affects continuance intention of using e-learning (Chong et al., 2016; Hernandez et al., 2011; Rodríguez-Ardura & Meseguer-Artola, 2016b). Social motivations have a significant positive impact on attitudes toward and use of ICT interactive resources, according to Hernandez et al (2011). It increases the probability of the potential use of e-learning in the coming years. Wu and Zhang (2014) found that attitude was crucial to the continued usage of e-learning. Another researcher (Chong, 2016), found most nurses have a positive attitude toward e-learning. Rodriguez (2016) first looked at how users' feelings of presence and flow, as well as their impressions of two main aspects of the virtual education environment (instructor attitude and didactic resource quality), affect their motivation to continue e-learning (Rodríguez-Ardura & Meseguer-Artola, 2016a).

The **Satisfaction** is the factor that affects continuance intention towards using e-learning (Al-Busaidi, 2013; Bagci & Celik, 2018; Y. M. Cheng, 2013, 2019; Cho, Cheng, & Lai, 2009; Daneji et al., 2019; Dalhan & Akkoyunlu, 2016; Hong et al., 2017; Hung et al., 2011; A. K. M. N. Islam & Azad, 2015; Joo et al., 2016; Lee, 2010; W. S. Lin, 2012; W. S. Lin & Wang, 2012; Mouakket & Bettayeb, 2015; Pereira et al., 2015; Udo et al., 2011; Yuen et al., 2019). Cho (2009) found that user satisfaction is an essential predictor of continuance use intention. Lee (2010) demonstrated that satisfaction has the most important factor on users' continuance intention (Lee, 2010). Lin and Chen (2012) indicated that system quality, platform information, and course information significantly related to users' satisfaction and their

intention to use ELS continuously (T. C. Lin & Chen, 2012). According to Ismail et al. (2012), the satisfaction level of e-learning users is calculated by the combination of knowledge quality, service quality, device quality, perceived utility, perceived ease of use, confirmation, and cognitive absorption (Ismail et al., 2012). According to Al-Busaidi (2013), learners' intention to participate in complete e-learning is affected by their personal innovativeness, PU, and satisfaction with the e-learning. As a result, students' use of e-learning increases their willingness to complete maximum e-learning (Al-Busaidi, 2013). The perceived utility (PU) of The Blackboard method was found to affect satisfaction by Mouakket and Bettayeb (2015). Instructors' intentions to continue using the Blackboard method were motivated by both PU and satisfaction (Mouakket & Bettayeb, 2015). According to Pereira (2015), both consistency and value disconfirmation have a significant influence on satisfaction. Satisfaction was found to be crucial in assessing the intention to use e-learning in public institutions on a long-term basis (Pereira et al., 2015). Perceived usefulness and expectation-confirmation predicted satisfaction, and perceived usefulness and satisfaction predicted m-LMS use continuance intention, but perceived ease of use was not linked to continuance intention, according to Joo (2016). Knowledge quality, system quality, service quality, confirmation, utilitarian value, result expectations, and perceived value clarified 63 percent of the variance in satisfaction, according to Dahan and Akkoyunlu (2016). Bagci and Celik (2018) discovered that satisfaction was indirectly influenced by perceived quality, perceived power, and perceived usability, and that satisfaction was specifically influenced by perceived quality, perceived control, and perceived usability (Bagci & Celik, 2018). According to Daneji (2019), affirmation has a huge impact on students' perceptions of usefulness and satisfaction (Daneji et al., 2019). Perceived usefulness and satisfaction have major effects on student's intention to continue using MOOCs, but perceived usefulness does not affect on students' satisfaction. Chen (2019) found that both task and technology characteristics influenced students' perceived TTF, which in turn influenced their perceived usefulness, validation, and satisfaction with the cloud-based e-learning system, which in turn influenced their intention to use the system in the future and their perception of its effect on learning (Y. M. Cheng, 2019).

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that PU mediated the effects of perceived ease of use, knowledge quality, and social impact on continuation intention. (B. Wu & Zhang, 2014). Students have higher positive views of the LMS's perceived ease of use, PU, access, reliability, and usability than educators, according to Najmul (A. K. M. N. Islam & Azad, 2015). Mouakket and Bettayeb (2015) discovered that PU affected on Blackboard system satisfaction (Mouakket, 2015). Instructors' intentions to use the Blackboard system were influenced by both PU and satisfaction. The nature of the user interface affected on both PU and satisfaction. Training affected on perceived utility, but not on satisfaction (Mouakket & Bettayeb, 2015). Joo et al (2016) found that perceived ease of use predicted PU. PU predicted satisfaction. PU and satisfaction predicted continuance intention (Joo et al., 2016). Chen (2019) found that both task and technology characteristics influenced students' perceived TTF, which in turn influenced their PU, affirmation, and satisfaction with the cloud-based e-learning system, which in turn influenced their intention to continue using the system and perceived effect on learning; essentially, the findings backed up the research model that combined the ECM and TTF models by placing main constructs as drivers, with all hypothesized connections being important (Y. M. Cheng, 2019). Confirmation has a huge impact on students' PU and happiness, according to Daneji et al (2019). Perceived usefulness and satisfaction have a substantial impact on students' intention to proceed, while PU has no impact on students' satisfaction (Daneji et al., 2019).

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## Discussion and Conclusion

This study depends on a systematic literature review that offers a summary of current e-learning studies. After going through a few stages of the SLR, 87 articles were chosen that focused on e-learning continuance of the use. The outcomes of the primary studies that were chosen provided a straightforward, systematic summary of the present study, that concentrates on continued usage of e-learning, following the data analysis process. The findings of this

study revealed that online learning, web-based learning, mobile learning, cloud learning, and massive open online courses are all important contributors to continued e-learning use.

The primary studies that were chosen have been classified from a research perspective of studies as applied to continued use of e-learning. These included instructor and student perspective. As a result of this finding, a large number of studies have concentrated on the student perspective on the continued usage of e-learning. Furthermore, theories such as the Technology Acceptance Model (TAM), and the Expectation Confirmation Model (ECM) have previously been most frequently used in the continued usage of e-learning. Whereas, factors such as satisfaction, perceived usefulness, perceived ease of use, attitude have also most frequently been significantly influenced in e-learning.

This indicates that experts and academics have sought to figure out what factors affect intentions while using e-learning in the future. The authors have addressed the differences and shortcomings in research based on a detailed review of 87 articles. As a result, it could be concluded that this report offers a useful description, helping academics to comprehend and gain an analysis of present studies on the continued use of e-learning. Since research into the continued use of e-learning is still in its early stages, the findings of this analysis can be used as a resource for other researchers in this area. It will help them in finding related topics when looking for study continued usage of e-learning.

Nonetheless, this researcher has a number of flaws that open up new research avenues. First, the literature search for this review was originally limited to papers published between 2009 and 2019. However, research into the continued use of e-learning is still growing, and there will be further publications in the future. As a consequence, future research should be considered in studies on the continued use of e-learning that have recently been published. This will help professionals and researchers find a valuable comprehension of the area, particularly through the use of e-learning applications. Second, despite the fact that this study looked at a number of hypotheses and models, it does not adequately count the key factors that affect e-learning use. This will necessitate further investigation in future studies to determine how these variables influence user behaviour. The generalizable results of this study, on the other hand, provide academics with a viewpoint on the present study situation as well as a solid foundation for future research in this field.

### **Conflict of interest**

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors

## APPENDIX

References	Q1	Q2	Q3	Q4	Q5	Total score
(Al-Samarraie et al., 2018)	2	1	1	2	2	8
(Al-Busaidi, 2013)	2	1	1	2	2	8
(Almaiah & Al Mulhem, 2019)	1	2	2	2	2	9
(Bagci & Celik, 2018)	2	2	1	2	0	7
(Bøe, 2018)	2	1	1	2	2	8
(E. T. Lwoga & Komba, 2015)	2	1	1	2	2	8
(M. Cheng & Yuen, 2019)	2	1	2	2	2	9
(Y. M. Cheng, 2019)	2	2	2	2	2	10
(M. Cheng & Yuen, 2018)	2	1	2	2	2	9
(Y. M. Cheng, 2013)	1	1	1	2	2	7
(Cho, Cheng, & Lai, 2009)	2	1	1	2	2	8
(Cho, Cheng, & Hung, 2009)	2	1	2	2	2	9
(Chong et al., 2016)	2	1	1	2	2	8
(Chou et al., 2012)	2	2	1	2	2	9
(W. S. Chow & Shi, 2014)	2	1	1	2	1	7
(M. Chow et al., 2013)	2	1	1	2	2	8
(Daňhan & Akkoyunlu, 2016)	2	2	1	2	2	9
(Daneji et al., 2019)	2	2	1	2	2	9
(Guo et al., 2016)	2	2	1	2	2	9
(Hernandez et al., 2011)	1	1	1	2	2	7
(Hong et al., 2017)	2	1	1	2	2	8
(Hong et al., 2019)	1	1	1	2	2	7
(Hung et al., 2011)	2	2	1	2	2	9
(Ismail et al., 2012)	2	1	1	2	2	8
(Ji et al., 2019)	2	2	2	2	2	10
(Joo et al., 2016)	2	2	2	2	2	10
(Jo, 2018)	2	2	1	2	2	9
(Kumar & Bervell, 2019)	1	1	2	2	2	8
(Lee, 2010)	2	2	1	2	2	9
(J. W. Lin & Tsai, 2016)	1	2	0	2	2	7
(K. M. Lin, 2011)	2	2	1	2	2	9
(K. M. Lin et al., 2011)	2	1	1	2	2	8
(T. C. Lin & Chen, 2012)	2	1	1	2	2	8
(C. M. K. Cheung & Lee, 2011)	2	1	2	2	2	9
(W. S. Lin, 2012)	2	2	1	2	2	9
(J. W. Lin, 2019)	2	2	2	2	2	10
(Loogma et al., 2012)	2	1	1	2	2	8
(Luo et al., 2017)	2	1	1	2	2	8
(Mehta et al., 2019)	1	1	1	2	1	6
(Mohamad & Abdul Rahim, 2018)	2	2	1	2	2	9
(Mohammadyari & Singh, 2015)	2	1	1	2	2	8
(Medina Molina et al., 2013)	2	2	1	2	2	9
(Mouakket & Bettayeb, 2015)	2	1	1	2	2	8
(A. K. M. N. Islam & Azad, 2015)	2	2	2	2	2	10
(Orehovački et al., 2019)	1	1	1	2	2	7
(Pereira et al., 2015)	2	1	1	2	2	8
(Ramayah et al., 2010)	2	1	1	2	2	8
(Rodríguez-Ardura & Meseguer-Artola, 2016b)	2	1	1	2	2	8
(Rodríguez-Ardura & Meseguer-Artola, 2016a)	2	1	1	2	2	8
(Saba, 2012)	2	2	1	2	2	9
(Shahijan et al., 2016)	2	2	2	2	2	10
(Shahzad et al., 2020)	2	2	1	2	2	9
(Sharma et al., 2017)	2	1	1	2	2	8
(Sørenbø et al., 2009)	2	1	1	2	2	8
(P. chen Sun et al., 2009)	2	2	1	1	2	8
(Y. Sun & Gao, 2019)	2	2	2	2	2	10

(Tan & Shao, 2015)	2	1	1	2	2	8
(Tawafak et al., 2020)	2	2	1	2	2	9
(Udo et al., 2011)	1	1	1	2	2	7
(R.-B. Wang & Du, 2014)	2	2	2	2	2	10
(L. Y. K. Wang et al., 2019)	2	2	2	2	2	10
(Woodward et al., 2014)	1	2	2	2	2	9
(B. Wu & Zhang, 2014)	2	1	2	2	2	9
(C. H. Wu & Liu, 2015)	1	2	2	2	2	9
(Yamin & Ishak, 2015)	1	1	1	2	1	6
(S. Yang et al., 2019)	2	2	1	2	2	9
(M. Yang et al., 2017)	2	2	2	2	2	10
(Yim et al., 2019)	2	2	2	2	2	10
(Yuen et al., 2019)	2	1	1	2	2	8
(Zhang et al., 2012)	2	1	1	2	2	8
(Calli et al., 2013)	1	2	1	2	2	8
(C. M. K. Cheung & Lee, 2011)	1	2	1	2	2	8
(R. Cheung & Vogel, 2013)	1	2	1	2	2	8
(Cidral et al., 2018)	2	2	2	2	2	10
(Costley & Lange, 2017)	1	1	1	2	2	7
(Duan et al., 2010)	1	1	1	2	2	7
(Fleming et al., 2017)	2	1	1	2	2	8
(Ho et al., 2015)	1	1	1	2	2	7
(Hsieh & Cho, 2011)	1	2	2	2	2	9
(N. Islam, 2011)	2	2	2	2	2	10
(Kanwal & Rehman, 2017)	1	1	1	2	2	7
(P. C. Lin et al., 2013)	1	1	1	2	2	7
(Liu et al., 2009)	1	1	1	2	2	7
(E. Lwoga, 2014)	1	2	2	2	2	9
(E. T. Lwoga & Komba, 2015)	2	2	1	2	2	9
(S87(Maldonado et al., 2011)	1	1	1	2	2	7
(Moghavvemi et al., 2017)	1	1	2	2	2	8

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