

# Elissa Dwi Lestari

## Unveiling key factors for the continuation of E-learning adoption in blended learning environments within Indonesian ...

 Quick Submit Quick Submit Universitas Multimedia Nusantara

---

### Document Details

**Submission ID**

trn:oid:::1:3126274770

**Submission Date**

Jan 9, 2025, 8:52 AM GMT+7

**Download Date**

May 5, 2025, 1:21 PM GMT+7

**File Name**

ronments\_within\_Indonesian\_higher\_education\_during\_the\_era\_o.pdf

**File Size**

1.9 MB

**18 Pages****11,439 Words****65,601 Characters**

# 18% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

## Filtered from the Report

- Bibliography
- Quoted Text
- Cited Text
- Small Matches (less than 8 words)

## Exclusions

- 1 Excluded Source

## Match Groups

-  **104** Not Cited or Quoted 18%  
Matches with neither in-text citation nor quotation marks
-  **0** Missing Quotations 0%  
Matches that are still very similar to source material
-  **0** Missing Citation 0%  
Matches that have quotation marks, but no in-text citation
-  **0** Cited and Quoted 0%  
Matches with in-text citation present, but no quotation marks

## Top Sources

- 15%  Internet sources
- 13%  Publications
- 8%  Submitted works (Student Papers)

## Integrity Flags

### 0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

## Match Groups

- 104** Not Cited or Quoted 18%  
Matches with neither in-text citation nor quotation marks
- 0** Missing Quotations 0%  
Matches that are still very similar to source material
- 0** Missing Citation 0%  
Matches that have quotation marks, but no in-text citation
- 0** Cited and Quoted 0%  
Matches with in-text citation present, but no quotation marks

## Top Sources

- 15% Internet sources
- 13% Publications
- 8% Submitted works (Student Papers)

## Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

|    |                |                                                                                  |     |
|----|----------------|----------------------------------------------------------------------------------|-----|
| 1  | Internet       | oro.open.ac.uk                                                                   | 1%  |
| 2  | Internet       | repository.iainponorogo.ac.id                                                    | 1%  |
| 3  | Student papers | Monash University                                                                | <1% |
| 4  | Internet       | www.umn.ac.id                                                                    | <1% |
| 5  | Internet       | journal.formosapublisher.org                                                     | <1% |
| 6  | Internet       | repository.unhas.ac.id                                                           | <1% |
| 7  | Student papers | KDU College Sdn Bhd                                                              | <1% |
| 8  | Internet       | docplayer.net                                                                    | <1% |
| 9  | Internet       | kc.umn.ac.id                                                                     | <1% |
| 10 | Publication    | "Proceedings of the International Conference on Advancing and Redesigning Edu... | <1% |

|    |                |                                                                                        |     |
|----|----------------|----------------------------------------------------------------------------------------|-----|
| 11 | Student papers | Assumption University                                                                  | <1% |
| 12 | Internet       | www.tandfonline.com                                                                    | <1% |
| 13 | Student papers | Auckland University of Technology                                                      | <1% |
| 14 | Publication    | Information Technology & People, Volume 27, Issue 3 (2014-09-16)                       | <1% |
| 15 | Student papers | Universiti Putra Malaysia                                                              | <1% |
| 16 | Internet       | academic-publishing.org                                                                | <1% |
| 17 | Internet       | edupij.com                                                                             | <1% |
| 18 | Publication    | Abed Alkarim M Ayyoub, Belal Ahmad Abu Eidah, Zuheir N. Khlaif, Mahmoud Ahm...         | <1% |
| 19 | Publication    | Pallavi Tyagi, Neha Zaidi, Balamurgan Balusamy, Celestine Iwendi. "Advanced Le...      | <1% |
| 20 | Publication    | "Innovative and Intelligent Digital Technologies; Towards an Increased Efficiency...   | <1% |
| 21 | Internet       | link.springer.com                                                                      | <1% |
| 22 | Internet       | www.researchgate.net                                                                   | <1% |
| 23 | Publication    | Vladislav Ilin. "The role of user preferences in engagement with online learning", ... | <1% |
| 24 | Internet       | re.public.polimi.it                                                                    | <1% |

|    |                |                                                                                      |     |
|----|----------------|--------------------------------------------------------------------------------------|-----|
| 25 | Internet       | www-emerald-com-443.webvpn.sxu.edu.cn                                                | <1% |
| 26 | Internet       | moam.info                                                                            | <1% |
| 27 | Internet       | flowclass.io                                                                         | <1% |
| 28 | Internet       | researchmgt.monash.edu                                                               | <1% |
| 29 | Internet       | www.econstor.eu                                                                      | <1% |
| 30 | Publication    | Xuyang Dong, Nan Fang, Jiaxin Lin, Long Ye. "College Students' Disciplinary Exper... | <1% |
| 31 | Publication    | Arief Ramadhan, Achmad Nizar Hidayanto, Ghina Almira Salsabila, Intan Wuland...      | <1% |
| 32 | Student papers | Girne American University                                                            | <1% |
| 33 | Publication    | Richard Ouma. "Perceptions of the nature of university learner support practices:... | <1% |
| 34 | Internet       | www.icommercecentral.com                                                             | <1% |
| 35 | Student papers | Academic Library Consortium                                                          | <1% |
| 36 | Publication    | Ersöz, Anil. "The Mediating Role of Teacher Agency on the Relationship Between J...  | <1% |
| 37 | Publication    | Li, Hongxiu, and Yong Liu. "Understanding post-adoption behaviors of e-service u...  | <1% |
| 38 | Student papers | Universiti Teknologi Malaysia                                                        | <1% |

|    |                |                                                                                      |     |
|----|----------------|--------------------------------------------------------------------------------------|-----|
| 39 | Student papers | University of Salford                                                                | <1% |
| 40 | Internet       | socialspacejournal.eu                                                                | <1% |
| 41 | Publication    | Carpenter, Michelle. "How Do Teachers' Pedagogical Beliefs on Blended Learning ...   | <1% |
| 42 | Publication    | Irianna Futri, Chavis Ketkaew, Phaninee Naruetharadhol. "Influential Factors Affe... | <1% |
| 43 | Internet       | eprints.usm.my                                                                       | <1% |
| 44 | Internet       | hightechjournal.org                                                                  | <1% |
| 45 | Internet       | researchspace.ukzn.ac.za                                                             | <1% |
| 46 | Publication    | Delgado, Edgard A.. "Exploring Technology Inertia and the Continued Use of Lega...   | <1% |
| 47 | Publication    | Hsiu-Fen Lin, Gwo-Guang Lee. "Determinants of success for online communities: ...    | <1% |
| 48 | Publication    | Ibrahim Youssef Alyoussef. "Acceptance of e-learning in higher education: The rol... | <1% |
| 49 | Publication    | Wen-Lung Shiau, Ye Yuan, Xiaodie Pu, Soumya Ray, Charlie C. Chen. "Understandi...    | <1% |
| 50 | Internet       | china-cart.com                                                                       | <1% |
| 51 | Internet       | napier-surface.worktribe.com                                                         | <1% |
| 52 | Internet       | www.frontiersin.org                                                                  | <1% |

|    |                |                                                                                       |     |
|----|----------------|---------------------------------------------------------------------------------------|-----|
| 53 | Publication    | Hyeon-Cheol Kim, Martin Yongho Hyun. "Predicting the use of smartphone-based...       | <1% |
| 54 | Publication    | Prashant Raman. "Fear of Coronavirus on Continuance Intention to Use Food Deli...     | <1% |
| 55 | Internet       | gtg.webhost.uoradea.ro                                                                | <1% |
| 56 | Internet       | iceb.johogo.com                                                                       | <1% |
| 57 | Internet       | pubsonline.informs.org                                                                | <1% |
| 58 | Internet       | repository.uin-suska.ac.id                                                            | <1% |
| 59 | Internet       | www.innovationarabia.ae                                                               | <1% |
| 60 | Internet       | www.open-access.bcu.ac.uk                                                             | <1% |
| 61 | Publication    | Badri Munir Sukoco, Rahmat Heru Setianto, Nidya Ayu Arina, Ade Gafar Abdullah,...     | <1% |
| 62 | Publication    | Badriah Alkhannani. "The impact of blended learning on undergraduate english l...     | <1% |
| 63 | Publication    | Ejuchegahi Anthony Angwaomadoko. "A Review of Blended Learning after the C...         | <1% |
| 64 | Publication    | Elissa Dwi Lestari, Florentina Kurniasari, D. Wim Prihanto, Angely Maylin. "A fram... | <1% |
| 65 | Publication    | J. Borondo, R.M. Benito, J.C. Losada. "Adapting physics courses in an engineering ... | <1% |
| 66 | Student papers | Nottingham Trent University                                                           | <1% |

|    |             |                                                                                 |     |
|----|-------------|---------------------------------------------------------------------------------|-----|
| 67 | Publication | Salleh Mohd Radzi, Mohd Hafiz Mohd Hanafiah, Norzuwana Sumarjan, Zurinawati...  | <1% |
| 68 | Publication | Yung-Ming Cheng. "Can tasks and learning be balanced? A dual-pathway model o... | <1% |
| 69 | Internet    | doi.org                                                                         | <1% |
| 70 | Internet    | eprints.usq.edu.au                                                              | <1% |
| 71 | Internet    | etd.uum.edu.my                                                                  | <1% |
| 72 | Internet    | fe.unj.ac.id                                                                    | <1% |
| 73 | Internet    | telsoc.org                                                                      | <1% |
| 74 | Internet    | www.ceocongress.org                                                             | <1% |
| 75 | Internet    | www.jite.org                                                                    | <1% |
| 76 | Internet    | www.mdpi.com                                                                    | <1% |
| 77 | Internet    | www.scribd.com                                                                  | <1% |

# Unveiling key factors for the continuation of E-learning adoption in blended learning environments within Indonesian higher education during the era of the 'new normal'

Elissa Dwi Lestari & Riatun Riatun

To cite this article: Elissa Dwi Lestari & Riatun Riatun (2024) Unveiling key factors for the continuation of E-learning adoption in blended learning environments within Indonesian higher education during the era of the 'new normal', Cogent Education, 11:1, 2428871, DOI: 10.1080/2331186X.2024.2428871

To link to this article: <https://doi.org/10.1080/2331186X.2024.2428871>



© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 23 Nov 2024.



[Submit your article to this journal](#)



Article views: 196



[View related articles](#)



[View Crossmark data](#)

# Unveiling key factors for the continuation of E-learning adoption in blended learning environments within Indonesian higher education during the era of the 'new normal'

Elissa Dwi Lestari<sup>a</sup> and Riatun Riatun<sup>b</sup>

<sup>a</sup>Faculty of Business, Universitas Multimedia Nusantara, Tangerang, Indonesia; <sup>b</sup>Communication Science Online Learning Program, Universitas Multimedia Nusantara, Tangerang, Indonesia

## ABSTRACT

Indonesian higher education rarely employed e-learning until COVID-19. Many students tried online learning for the first time during the pandemic. After the pandemic ended in 2022, universities switched to blended learning, but student adaptation, system integration, and learning effectiveness remain challenges. This study examines these challenges and proposes strategies to enhance e-learning post-pandemic. Using the updated DeLone and McLean IS Success Model and the Expectation-Confirmation Model, it explores factors influencing students' continued use of e-learning in blended learning. Data were gathered from 297 university students, surveyed electronically, who first experienced e-learning during the pandemic. Analysis was conducted using PLS-SEM. The findings indicate that satisfaction serves as the most significant predictor of ongoing e-learning utilization, with flow as the subsequent factor. Perceived usefulness does not directly influence continued use; however, it significantly contributes to system satisfaction. The quality of information is essential for enhancing the utility of systems. The findings corroborate previous studies, highlighting the significance of technology and service quality in improving user experience and engagement. The study provides actionable insights for universities to improve blended learning by emphasizing system reliability, utility, user support, information quality, and content. These factors are essential for enhancing student satisfaction and maintaining the sustainability of e-learning practices.

## ARTICLE HISTORY

Received 21 March 2024  
Revised 25 October 2024  
Accepted 8 November 2024

## KEYWORDS

Blended-learning; e-learning system; continuance intention to use; new normal; information system success models

## SUBJECTS

Adult Education and Lifelong Learning; Higher Education; Open & Distance Education and eLearning

## 1. Introduction

The Internet is the most influential media in 21st-century living. ICT is needed to build human capital in a knowledge-based economy, especially in developing nations. Many people utilize computers for chores (Larson & DeChurch, 2020). Higher education students are examples (Jääskelä et al., 2017; Selviandro et al., 2014). Most universities understand that technology improves student learning experience and output (Bouilheres et al., 2020; Jääskelä et al., 2017; Ramakrisnan et al., 2012). Student social spaces are available through e-learning, one of higher education's most popular online instructional platforms (Tan, 2013). E-learning is a multifaceted, dynamic, and evolving approach to education that utilizes technological advances to facilitate flexible, accessible, and interactive learning experiences tailored to the needs of the learning process and engagement of the learners (Rodrigues et al., 2019; Zhang & Nunamaker, 2003). While blended e-learning is hybrid online learning. Hybrid online learning is blended. Mixing synchronous and asynchronous online learning with educational technology allows students to communicate both ways online (Graham, 2006). Blended learning provides class materials, coursework, and other disciplines via e-learning (Lin & Wang, 2012).

**CONTACT** Elissa Dwi Lestari [elissa.lestari@umn.ac.id](mailto:elissa.lestari@umn.ac.id) Faculty of Business, Universitas Multimedia Nusantara, Tangerang, Indonesia.

© 2024 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

Many higher education institutions, particularly those in Indonesia, are progressively embracing blended learning strategies. However, although the usage level and adoption of e-learning and blended learning are universally accepted, industrialized and developing nations use it differently. With 25% usage, Indonesia ranks eighth in online education (Luckyardi & Rahman, 2021; Saputra et al., 2020). India's 55% adoption rate highlights the gap (Saputra et al., 2020). It reveals that Indonesian schools prefer traditional ways over e-learning. Before the pandemic, Indonesian higher education used little e-learning (Hidayati & Saputra, 2020). This is because e-learning systems are expensive to adopt (Kuntoro & Al-Hawamdeh, 2003; Selviandro et al., 2014), and digital content production is still expensive (Berliyanto & Santoso, 2016). This is worsened by unequal technology infrastructure penetration in cities and rural regions (Prasetio et al., 2020).

E-learning has increased in Indonesia since the Directorate General of Higher Education recommended universities employ IT-based remote learning during the pandemic. The 2020 COVID-19 pandemic forced Indonesian students to study from home due to social mobilization issues, which boosted education technology (Hidayati & Saputra, 2020; Kumalawati et al., 2021; Riatun & Lestari, 2022). However, online perception, information delivery, Q&A, and testing are complex. Schools, instructors, students, and parents must plan implementation. In the pandemic, Indonesia's full internet-based education system faces significant challenges, leading to widespread learning failures. According to Adi et al. (2021), the main obstacles to Indonesia's pandemic-era internet schooling include pedagogical problems, uneven infrastructure, and external also internal factors of students' learning behavior, such as students' deficiency in self-regulated learning skills (Churiyah et al., 2020). Teachers grapple with online platforms, students with psychological distance learning, and parents with virtual activities. Poor internet, technical, and student infrastructure worsen rural areas' problems (Churiyah et al., 2020; Sukirman et al., 2022). This happened because Indonesian e-learning consumers' digital literacy was inadequate and inconsistent before the COVID-19 outbreak. In Indonesia, post-COVID 19 study on blended learning showed that college students still want to undertake it. However, internal variables like self-discipline in assigning study time and external factors like family settings and challenges separating roles as students and children in the household limit blended learning implementation. Due to this external issue, students must still travel to cafés for blended learning. Post-COVID, blended learning that substitutes university travel is insignificant.

The pandemic education plan has made most Indonesian students new to e-learning. Many higher education students are starting with blended learning after the epidemic, a significant change from present instructional methods. Following the pandemic, users may utilize e-learning tools in blended learning as their primary course model (Ghazal et al., 2018; Yang et al., 2023).

Blended learning requires instructors and students to attend class using an eLearning platform. This strategy allows students more flexibility in time, place, and learning pace (Sahni, 2019). Several studies show that this strategy improves training, accessibility, flexibility, and affordability (Sakina et al., 2020; Yang et al., 2023).

Indonesian higher education institutions use blended learning by integrating face-to-face lectures with e-learning systems as learning technology (Riatun & Lestari, 2022). Mixing online and classroom training increases accessibility without extending program completion. This technique promotes student-centered learning by making the instructor a facilitator, companion, mentor, and collaborator in students' skill and knowledge growth (Sukirman et al., 2022).

Blended e-learning has numerous advantages but faces many obstacles, including human interaction limits, administrative difficulties, academic and technical abilities, time, enthusiasm, technology issues, and restricted material availability (Ghazal et al., 2018). Blended learning, which involves more synchronous classroom activities, delivers course information online like the fully online version. However, students' Internet use is an issue (Asarta & Schmidt, 2020).

Previous blended-learning research in Indonesia has yielded contrasting results. Although several research have revealed that Indonesians were happy with blended learning during and after the epidemic (Riatun & Lestari, 2022; Sakina et al., 2020; Sukirman et al., 2022), However, some studies about the implementation of blended learning in Indonesia say the opposite (Kholishotul & Sahiruddin, 2020; Trisyani et al., 2019). This is due to inadequate planning, unforeseen implementation, and low-quality technology and information systems. Given Indonesia's limited usage of e-learning technologies, research on their uptake and sustainability in blended learning in the new average period still needs to be completed. As new e-learning system users, will students continue to utilize it in blended learning?

Thus, beginners' success depends on knowing the aspects that impact their purpose in continuing with blended learning courses. Despite substantial research on blended learning adoption, novice users' retention has yet to be discovered (Yang et al., 2023). Thus, this study analyzed new college students' willingness to continue learning after their first blended learning course and found key elements impacting their intention to continue learning in blended learning (Loan et al., 2021).

## 2. Literature review

The modified DeLone & McLean Information System (IS) success model (D&M IS) and also the ECM-ISC or Expectation-Confirmation Model of Information System Continuance underpin this study. First, The modified DeLone & McLean Information System (IS) success model includes system, information, and service quality. Some information systems' user satisfaction depends on these variables. These intermediate structures influence the system user and the organization (Delone & Mclean, 2003). The D&M IS success model has been widely used in many studies related to the use of technology in education, such as e-learning (AlMulhem, 2020; Hermita et al., 2019), mobile learning management systems (Lee & Jeon, 2020), student academic information system (Normelindasari & Solichin, 2020), and virtual classrooms (Huang & Zhi, 2023).

Second, the ECM-ISC determines whether an individual will maintain using system information (Bhattacharjee, 2001b). This model is derived from the Technology Acceptance framework or TAM and the Expectation Confirmation Theory or ECT. The TAM model is an information-systems theory that describes how users adopt and utilize information systems. TAM suggests that information system acceptance behavior is linked to the perceived usefulness and ease of use (Davis, 1989). Bagozzi et al. (1992) state that the Technology Acceptability paradigm (TAM) is an established paradigm for information system acceptability. ECT is a conceptual framework employed in consumer behavior studies to evaluate customer contentment and the likelihood of future purchases (Oliver, 1977, 1980). The ECM-ISC research evaluates users' desires and behavior after adopting information systems (ISs). This concept applies to several IS scenarios (Hsieh & Wang, 2007; Liu et al., 2020). The ECM-ISC, similar to the D&M IS success model, has been extensively applied in technology-related educational research, such as studies on the continued use of MOOCs (Wan et al., 2020), virtual learning community (Liu et al., 2020) and blended learning (Yang et al., 2023). Finally, the Flow Experience Theory (Csikszentmihalyi, 1975) is utilised to evaluate the influence of a student's engagement and enjoyment in learning on their continued utilisation of blended learning platforms.

### 2.1. The influence of system quality, information quality, service quality, and conformity on students' perceived usefulness on blended learning

The ECM states that an information system's perceived usefulness affects its utilization (Daneji et al., 2019; Goh & Yang, 2021). Research by Ghazal et al. (2018), Cheng (2012), and Mahande et al. (2019) found that system quality, information quality, and service quality positively influenced students' perception of the usefulness of e-learning. It is easy to believe learners adopt LMS for blended learning when the system matches their expectations. LMS for blended learning is likely adopted when it meets expectations. If students believe the e-learning system has reliable, accurate, legible, up-to-date, and well-formatted course information, they will find LMS courses more beneficial (Al-Fraihat et al., 2020).

Confirmation increases students' perceived usefulness of MOOCs and virtual classes (Daneji et al., 2019; Huang & Zhi, 2023). Students may have liked their institutions' e-learning services more if they knew they might improve their learning and academic achievement (Al-Adwan et al., 2021). Their desire to learn may endure until they have confirmed the e-learning platform's efficacy (Kim et al., 2022). According to the literature review, this research's hypotheses are:

**H1:** The system's quality positively impacts how users perceive the usefulness of blended learning.

**H2:** The quality of information positively impacts users' perceived usefulness when engaging in blended learning.

**H3:** Service quality positively affects the user's perceived usefulness in using blended learning.

**H4:** Confirmation positively affects the user's perceived usefulness in using blended learning.

## 2.2. The impact of system quality, information quality, service quality, perceived utility, and confirmation on student satisfaction in blended learning

The Delone and Mclean (2003) model highlights the importance of user satisfaction for technological success. The E-learning systems are ISs in learning settings. Hence, satisfaction with learning is vital (AlMulhem, 2020). Research by Ghazal et al. (2018), Daneji et al. (2019), Al-Fraihat et al. (2020), AlMulhem (2020), and also Lee and Jeon (2020) have observed that e-learning satisfaction is influenced by the quality of information, system, and service provided. A sound blended learning system and features that help students finish tasks and collaborate will affect user satisfaction (Riatun & Lestari, 2022).

Students are more likely to be satisfied with the blended e-learning system if they receive assistance when they encounter technological issues that prevent them from using the online platform (Riatun & Lestari, 2022). Regarding system quality, if students find the e-learning system adaptive, straightforward, and easy to use, it will improve its efficiency and increase their overall satisfaction (AlMulhem, 2020).

Moreover, fulfilling students' anticipated outcomes from blended learning is closely linked to their satisfaction following the current e-learning system (Yang et al., 2023). According to ECT, post-adoption satisfaction with an IT system depends on confirming expectations and system performance after its use (Yang et al., 2023). The study's results on MOOC user satisfaction (Gu et al., 2021) and digital English learning platform satisfaction found that confirmation directly affects contentment and pleasure feelings when using an e-learning platform. Based on the literature review, the hypotheses for this research are:

**H5:** System quality positively affects user satisfaction in using blended learning.

**H6:** Information quality positively affects user satisfaction in using blended learning.

**H7:** Service quality positively affects user satisfaction in using blended learning.

**H8:** Perceived usefulness positively affects user satisfaction in using blended learning.

**H9:** Confirmation positively affects user satisfaction with blended learning.

## 2.3. The influence of system quality, information quality, and service quality on students' confirmation of blended learning

According to Bhattacharjee (2001b), confirmation occurs when users' expectations for using an information system align with its actual performance. Bhattacharjee (2001b) and (2001a) stated that users develop preliminary expectations before engaging with an information system and then verify these expectations through their practical experiences. In this research, confirmation pertains to the individual advantages of blended learning perceived by students when participating in blended learning. Positive online learning encounters and a wealth of information enhance students' confirmation, leading to heightened perceptions of usefulness and satisfaction throughout their academic journey (Li et al., 2022). Lee and Jeon (2020) found that the quality of the information system, system performance, and service quality play a role in shaping students' anticipated acceptance of MOOCs. High-quality content, systems, and services on a MOOC platform shape the initial expectations of its users. According to the literature review, this research's hypotheses are:

**H10:** System quality positively affects users' confirmation in using blended learning.

**H11:** Information quality positively affects users' confirmation of using blended learning.

**H12:** Service quality positively affects users' confirmation of using blended learning.

## 2.4. The effect of confirmation on flow

In a virtual environment, as students utilize the features available in e-learning platforms during engaging online interactions, they may encounter a state of flow due to the immersive nature of these tools in their educational pursuits (Chen, 2014). Engaging in e-learning activities in a blended learning

environment can enhance students' internal drive to keep using the learning management system, due to experiences of satisfaction, virtual presence, sense of authority, and attention (Goh & Yang, 2021). Wang and Lin (2021) found a strong connection between students' satisfaction with blended learning effectiveness and their flow experience while using e-learning systems. Wang and Lin (2021) also found that evaluating users of mobile learning apps by directly comparing their expectations before using the app with their performance after use can improve students' experience of flow during mobile application learning. According to the literature review, this research's hypotheses are:

**H13:** Confirmation positively affects the user's flow in using blended learning.

## 2.5. The impact of perceived utility, satisfaction, and the state of flow on the intention to continue blended learning

The technology acceptance framework posits that the perceived usefulness and ease of use influence user behavior. Davis defines perceived usefulness as the extent to which an individual believes a system will enhance their job performance (Davis, 1989). According to Goh and Yang (2021), perceived usefulness affects LMS use (Goh & Yang, 2021). Lin and Wang (2012) demonstrated that perceived usefulness increases system satisfaction and blended learning intention.

Moreover, the most significant factor in predicting students' intention to continue using online learning is their high satisfaction (Li et al., 2022). Yang et al. (2023) and Riatun and Lestari (2022) found that the satisfaction of students with blended learning significantly influenced their intention to persist in using this mode of education.

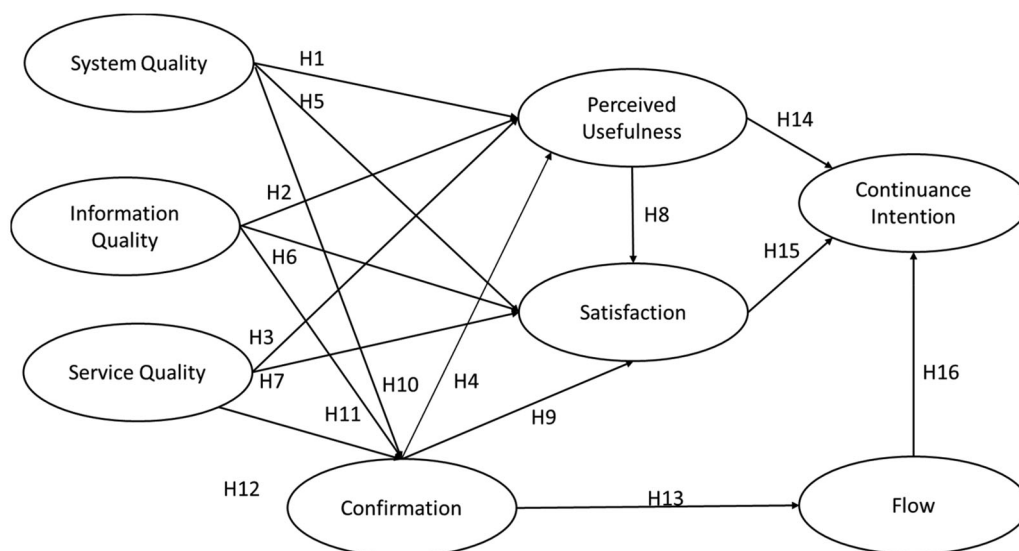
The flow, sense of presence, perceived control, and focus experienced during e-learning activities enhance students' internal motivation to continue using the e-learning platform (Goh & Yang, 2021; Wang & Lin, 2021). According to the literature review, this research's hypotheses are:

**H14:** The perceived usefulness positively impacts the user's intention to continue using blended learning.

**H15:** The satisfaction of users positively influences their intention to continue using blended learning.

**H16:** Flow positively affects the user's continuance intention in using blended learning.

The following is the research framework in this study (Figure 1):



**Figure 1.** Research model of the study that explains the factors that affect the desire to continue blended learning in the post-pandemic period.

### 3. Methodology

This study employs a multi-model approach to analyze the level of desire of university students to continue blended learning in the post-pandemic COVID-19 era. The model in this study integrates three theoretical models, namely the D&M IS success model (Delone & Mclean, 2003), the ECM ISC model (Bhattacharjee, 2001b), and also flow experience (Csikszentmihalyi, 1975). The research model in this study uses the variables of the D&M IS Success model (Delone & Mclean, 2003), namely system quality, information quality, and service quality to evaluate students' experience in using blended learning, and how these three variables affect satisfaction using blended learning.

Second, this research model uses the ECM-ISC Model (Bhattacharjee, 2001b) which aims to evaluate the desire to use an information system after the first use. This study uses the variables perceived usefulness, confirmation, and user satisfaction as variables that affect students' desire to continue blended learning.

Lastly, this study uses Flow Theory (Csikszentmihalyi, 1975) which evaluates the psychological state of the individual when he or she is immersed and highly involved in doing an activity, this psychological condition leads to higher satisfaction and performance. In the context of this study, variable flow experience is used to evaluate the extent of student experience immersion, concentration, and mastery in using blended learning.

In sum, this research explores the connection between system quality, information quality, service quality, perceived usefulness, confirmation, user satisfaction, flow experience, and intention to continue blended learning.

#### 3.1. Sampling and data collection

A survey research design was used, with a structured questionnaire as the research instrument. Data analysis was cross-sectional and conducted at a specific point in time. Data collection involved interviews using an electronic questionnaire. The population in this study is university students in Indonesia. Non-probability convenience sampling techniques were employed based on a set of criteria for sample selection. The research concentrated on university students who have undergone e-learning amidst the COVID-19 outbreak and are now moving towards blended learning after the pandemic.

As Hair et al. (2014b) indicated, G\*Power software estimated the sample size for this study. This study evaluates three predictors pointing to one endogenous variable using the minimal sample size, medium effect size, 0.95 model power, and 0.05 significance level. G\*Power suggests 119 samples for the study's research design. Two hundred ninety-seven people participated in this study. Thus, this study contains enough samples.

An electronic self-reported questionnaire was constructed and sent. Before administering questionnaires, the research goal was briefly explained. The authors also requested help distributing surveys from numerous colleague academics. A summary of the study's respondents is provided below (see Table 1).

**Table 1.** Descriptive analysis.

| Variable                                             | Category       | Number | Percentage |
|------------------------------------------------------|----------------|--------|------------|
| Gender                                               | Male           | 117    | 39.39%     |
|                                                      | Female         | 180    | 60.61%     |
| Age                                                  | 18 to 20 years | 251    | 84.51%     |
|                                                      | 21 to 23 years | 39     | 13.13%     |
|                                                      | >23 years      | 7      | 2.36%      |
|                                                      | <1 years       | 131    | 44.11%     |
| Length of time using the LMS                         | 1-2 years      | 126    | 42.42%     |
|                                                      | 3-4 years      | 39     | 13.13%     |
|                                                      | >4 years       | 1      | 0.34%      |
| The media used to access the LMS (multiple response) | Laptop         | 278    |            |
|                                                      | Smartphone     | 258    |            |
|                                                      | PC             | 36     |            |
|                                                      | Tablet         | 32     |            |

Based on Table 1, the descriptive analysis results showed that most respondents were women aged 18 to 20 years, with less than one year of experience using e-learning and accessing e-learning through laptops and smartphones.

### 3.2. Measurements and statistics methods

This study examined latent variables using research tools or indicators from previous studies that were modified to match its goals. The study analyzed eight latent variables with 26 indicators. The measures of variable system quality are taken from Cho et al. (2009) and Pituch and Lee (2006), the measurements of information quality are derived from (Lee, 2006) and Lee et al. (2009), and the measurements of service quality are adopted from (Cho et al., 2009), Lee (2010a), and Ozkan and Koseler (2009). Furthermore, measurements of perceived usefulness originated from (Lee, 2006), Ip et al. (2018) and Liang et al. (2011), while measurements of confirmation are taken from Bhattacharjee (2001a) and Lin and Wang (2012), flow is drawn from Lee (2010b) and Saadé and Bahli (2005). Indicators of satisfaction are derived from Bhattacharjee (2001a) and Lin and Wang (2012). Finally, this study examined continuation intention using indicators from Lin and Wang (2012). Students rated their agreement with each indicator. All the items were evaluated using a 7-point Likert scale (ranging from 1 for strongly disagree to 7 for strongly agree). All postulated associations were tested using SmartPLS version 4.0 and questionnaire survey data.

Data analysis was carried out using the Partial Least Square Structural Equation Model (PLS-SEM) approach. Data analysis using PLS-SEM involves two sequential assessment processes. The first stage of PLS-SEM analysis is the measurement of the validity of the research construct and the reliability of each research question indicator. This stage is known as measurement model analysis. The next stage is the hypothesis test stage to test whether there is a causal correlation between latent constructs in the research model (Nugraha et al., 2022).

Here are the question indicators used in this study:

## 4. Results

### 4.1. Measurement (outer model analysis)

The results of this research were evaluated using a two-stage sequential technique (Hair et al., 2014a). Henseler et al. (2009) state that the assessment of the measurement model is initially examined in PLS-SEM analysis. This involves verifying internal consistency reliability (composite reliability), convergent validity, and discriminant validity.

Table 2 shows that composite reliability for all variables exceeded 0.70 (Hair et al., 2014b). These results indicate internal consistency in variable indicators. All latent variables' AVEs exceeded the recommended 0.50. The AVE scores for system, information, and service quality were 0.638, 0.688, and 0.861. The AVE values for confirmation, perceived usefulness, satisfaction, flow, and continuation intention were 0.807, 0.767, 0.795, and 0.815, respectively. The findings indicate that all variables demonstrated convergent validity. The outer loadings for all measures were higher than 0.70. To enhance the variables' composite reliability and AVE values, items with loadings below 0.70 were eliminated (Hair et al., 2014b).

In our study, we employed the Fornell-Larcker criterion and HTMT ratio to evaluate the discriminant validity of the measurement model. As per these techniques, discriminant validity pertains to the association between a component and other constructs (Hair et al., 2016). Moreover, the Fornell-Larcker criterion involves comparing each construct's square root of AVE with its correlations with other latent variables. The results presented in Table 3 indicate that all constructs satisfied this requirement for discriminant validity.

Additionally, the research employed the Heterotrait-Monotrait Ratio. The values derived for the Heterotrait-Monotrait Ratio, as shown in Table 4, are below 0.90, which is in line with Gold et al. (2001) recommendation. Thus, the hypothesized structural model demonstrates favorable discriminant validity.

**Table 2.** Research observed variables (indicators).

| Latent variable       | Code      | Statement                                                                                                          | References                                        |
|-----------------------|-----------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Continuance intention | CI1       | I intend to continue using blended learning in the future                                                          | Bhattacharjee (2001a, 2001b); Lin and Wang (2012) |
|                       | CI2       | I will use blended learning regularly in the future                                                                |                                                   |
|                       | CI3       | I will use blended learning often in the future                                                                    |                                                   |
|                       | CI4       | My intention is to continue using blended learning rather than using any alternative means (face-to-face learning) |                                                   |
| Confirmation          | Conf1     | My experience using blended learning was better than I expected                                                    | Bhattacharjee (2001a, 2001b)                      |
|                       | Conf2     | The level of service provided by blended learning is better than I expected                                        |                                                   |
|                       | Conf3     | The use of the blended learning system is in line with my expectations                                             |                                                   |
| Flow                  | Flow1     | I'm engrossed in what I do when using blended learning                                                             | Lee (2010b); Saadé and Bahli (2005)               |
|                       | Flow2     | I like to spend a lot of time when using blended learning                                                          |                                                   |
|                       | Flow3     | I think using blended learning is very fun                                                                         |                                                   |
| Satisfaction          | Satisf1   | I'm satisfied with the performance of blended learning                                                             | Lee (2010b); Saadé and Bahli (2005)               |
|                       | Satisf2   | I am happy with the experience of using blended learning                                                           |                                                   |
|                       | Satisf3   | I'm happy with the functionality provided by blended learning                                                      |                                                   |
|                       | Satisf4   | I am satisfied with the overall experience using blended learning                                                  |                                                   |
| Information quality   | Inf_Sys1  | Blended Learning facilitates me with the latest, up to date and on-demand learning content                         | Lee and Chung (2009); Pituch and Lee (2006)       |
|                       | Inf_Sys2  | Blended learning provides the learning content I need                                                              |                                                   |
|                       | Inf_Sys4  | Flexible blended learning content delivery schedule                                                                |                                                   |
| Service quality       | SSQ1      | In case of any difficulty in using blended learning, I was provided with quick online assistance                   | Balaban et al. (2013); Delone and Mclean (2003)   |
|                       | SSQ2      | IT department facilitates me, when I face any difficulty while using blended learning                              |                                                   |
| System quality        | Sys_Qual2 | Blended learning can present subject matter in an easy-to-read multimedia format                                   | Pituch and Lee (2006)                             |
|                       | Sys_Qual3 | Blended learning allows for interactive communication between lecturers and students                               |                                                   |
|                       | Sys_Qual4 | I feel that the response from blended learning is fast, consistent, and reasonable                                 |                                                   |
| Perceived usefulness  | PU1       | Using blended learning increases my learning effectiveness                                                         | Lee et al. (2020)                                 |
|                       | PU2       | Using blended learning can improve my learning performance                                                         |                                                   |
|                       | PU3       | Using blended learning gives me more control over the learning process                                             |                                                   |
|                       | PU4       | I feel that blended learning is very helpful for me in understanding the learning material well                    |                                                   |

**Table 3.** The quality criteria for measurement model.

| Latent variable       | Item      | Outer loading | Cronbach's alpha | Composite reliability (rho_a) | Average variance extracted (AVE) |
|-----------------------|-----------|---------------|------------------|-------------------------------|----------------------------------|
| Continuance intention | CI1       | 0.901         | 0.924            | 0.924                         | 0.815                            |
|                       | CI2       | 0.911         |                  |                               |                                  |
|                       | CI3       | 0.945         |                  |                               |                                  |
|                       | CI4       | 0.851         |                  |                               |                                  |
| Confirmation          | Conf1     | 0.901         | 0.880            | 0.882                         | 0.807                            |
|                       | Conf2     | 0.925         |                  |                               |                                  |
|                       | Conf3     | 0.868         |                  |                               |                                  |
| Flow                  | Flow1     | 0.895         | 0.848            | 0.908                         | 0.767                            |
|                       | Flow2     | 0.815         |                  |                               |                                  |
|                       | Flow3     | 0.914         |                  |                               |                                  |
| Information quality   | Inf_Sys1  | 0.873         | 0.771            | 0.868                         | 0.688                            |
|                       | Inf_Sys2  | 0.860         |                  |                               |                                  |
|                       | Inf_Sys4  | 0.749         |                  |                               |                                  |
| Perceived usefulness  | PU1       | 0.879         | 0.898            | 0.929                         | 0.767                            |
|                       | PU2       | 0.904         |                  |                               |                                  |
|                       | PU3       | 0.838         |                  |                               |                                  |
|                       | PU4       | 0.882         |                  |                               |                                  |
| Service quality       | SSQ1      | 0.928         | 0.839            | 0.926                         | 0.861                            |
|                       | SSQ2      | 0.929         |                  |                               |                                  |
| Satisfaction          | Satisf1   | 0.893         | 0.914            | 0.939                         | 0.795                            |
|                       | Satisf2   | 0.902         |                  |                               |                                  |
|                       | Satisf3   | 0.854         |                  |                               |                                  |
|                       | Satisf4   | 0.917         |                  |                               |                                  |
| System quality        | Sys_Qual2 | 0.753         | 0.715            | 0.840                         | 0.638                            |
|                       | Sys_Qual3 | 0.782         |                  |                               |                                  |
|                       | Sys_Qual4 | 0.858         |                  |                               |                                  |

**Table 4. Fornell–Larcker criterion.**

|                           | 1            | 2            | 3            | 4            | 5            | 6            | 7            | 8            |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1. Continuance intention  | <b>0.903</b> |              |              |              |              |              |              |              |
| 2. Confirmation           | 0.636        | <b>0.899</b> |              |              |              |              |              |              |
| 3. Flow                   | 0.716        | 0.667        | <b>0.876</b> |              |              |              |              |              |
| 4. Information quality    | 0.585        | 0.632        | 0.578        | <b>0.830</b> |              |              |              |              |
| 5. Perceived usefulness   | 0.674        | 0.659        | 0.715        | 0.680        | <b>0.876</b> |              |              |              |
| 6. Support system quality | 0.585        | 0.633        | 0.585        | 0.589        | 0.643        | <b>0.928</b> |              |              |
| 7. Satisfaction           | 0.747        | 0.749        | 0.735        | 0.661        | 0.777        | 0.628        | <b>0.892</b> |              |
| 8. System quality         | 0.568        | 0.714        | 0.620        | 0.661        | 0.656        | 0.673        | 0.691        | <b>0.799</b> |

#### 4.2. Structural (inner model analysis)

After confirming the accuracy of the measurement model, PLS-SEM was employed to assess and validate the proposed conceptual model. The PLS method was used to evaluate how well the structural model fits the available data, often relying on the coefficient of determination ( $R^2$ ) as a critical factor in this analysis (Thompson et al., 1994). This study used Chin's (1998) endogenous latent variable  $R^2$  value evaluation method. Confirmation has a modest  $R^2$  score of 0.579, perceived utility 0.595, contentment 0.716, flow 0.445, and continuation intention 0.623. This study's endogenous latent variables were adequately explained.

The  $R^2$  value alone is not sufficient to evaluate a structural model (Hair et al., 2017, 2019). Therefore, we assessed the predictive validity of our structural model using Stone–Geisser's  $Q^2$  test (Geisser, 1974) to address this issue. The structural model's  $Q^2$  value should be greater than 0 if latent exogenous constructs predict latent endogenous constructs (Chin, 2010; Hair et al., 2017, 2019). The structural model's predictive relevance was assessed using SmartPLS's blindfolding technique. The  $Q^2$  values were all above zero, signifying predictive solid capability. Additionally, we computed the effect size ( $f^2$ ) to assess the influence of exogenous latent variables on endogenous latent variables using the prescribed criteria: 0.35 representing a significant impact; 0.15 indicating a medium impact; and 0.02 denoting a minor impact (Hair et al., 2014b).

Table 5 shows that the hypotheses testing results indicate a significant and positive relationship between perceived usefulness and system quality (Beta Value or  $\beta = 0.141$ , p-value = 0.032, with  $f^2 = 0.018$ ), information quality (Beta Value or  $\beta = 0.318$ , p-value = 0.000, with  $f^2 = 0.123$ ), service quality (Beta Value or  $\beta = 0.225$ , p-value = 0.000, with  $f^2 = 0.060$ ), and confirmation (Beta Value or  $\beta = 0.215$ , p-value = 0.000, with  $f^2 = 0.048$ ). Therefore, it can be concluded that hypotheses H1 to H4 are supported. A strong and positive link exists between satisfaction with system quality (Beta Value or  $\beta = 0.111$ , p-value = 0.027, with  $f^2 = 0.016$ ), perceived usefulness (Beta Value or  $\beta = 0.413$ , p-value = 0.000, with  $f^2 = 0.243$ ), and confirmation (Beta Value or  $\beta = 0.324$ , p-value = 0.000, with  $f^2 = 0.148$ ). However, information quality (Beta Value or  $\beta = 0.1314$ , p-value = 0.094, with  $f^2 = 0.010$ ) and service quality (Beta Value or  $\beta = 0.035$ , p-value = 0.263, with  $f^2 = 0.002$ ) have no significant effect on satisfaction. Consequently, hypotheses H4, H5, and H8–H9 are supported, while hypotheses H6–H7 are rejected. The study also found that confirmation is positively and significantly affected by system quality (Beta Value or  $\beta = 0.416$ , p-value = 0.000, with  $f^2 = 0.181$ ), information quality (Beta Value or  $\beta = 0.228$ , p-value = 0.000, with  $f^2 = 0.065$ ), and service quality (Beta Value or  $\beta = 0.218$ , p-value = 0.000, with  $f^2 = 0.058$ ). Thus, we can infer that hypotheses H10, H11, and H12 are substantiated. Moreover, the study also finds that confirmation positively affected flow (Beta Value or  $\beta = 0.667$ , p-value = 0.000,  $f^2 = 0.800$ ). Finally, the study demonstrates that satisfaction (Beta Value or  $\beta = 0.415$ , p-value = 0.000,  $f^2 = 0.151$ ) and flow

**Table 5. Heterotrait-monotrait ratio (HTMT) – matrix.**

|                           | 1            | 2            | 3     | 4     | 5     | 6     | 7     | 8 |
|---------------------------|--------------|--------------|-------|-------|-------|-------|-------|---|
| 1. Continuance intention  |              |              |       |       |       |       |       |   |
| 2. Confirmation           | <b>0.704</b> |              |       |       |       |       |       |   |
| 3. Flow                   | <b>0.805</b> | <b>0.762</b> |       |       |       |       |       |   |
| 4. Information quality    | <b>0.694</b> | <b>0.767</b> | 0.707 |       |       |       |       |   |
| 5. Perceived usefulness   | 0.740        | 0.740        | 0.812 | 0.817 |       |       |       |   |
| 6. Support system quality | 0.664        | 0.736        | 0.689 | 0.731 | 0.741 |       |       |   |
| 7. Satisfaction           | 0.812        | 0.833        | 0.826 | 0.787 | 0.857 | 0.718 |       |   |
| 8. System quality         | 0.698        | 0.894        | 0.792 | 0.894 | 0.823 | 0.869 | 0.849 |   |

Table 6. Path coefficient result.

| Hypotheses                                     | $\beta$ | T statistics ( O/STDEV ) | P values | Decision  | R <sup>2</sup> | Q <sup>2</sup> | f <sup>2</sup> |
|------------------------------------------------|---------|--------------------------|----------|-----------|----------------|----------------|----------------|
| H1 System quality -> Perceived usefulness      | 0.141   | 1.849                    | 0.032    | Supported | 0.595          | 0.558          | 0.018          |
| H2 Information quality -> Perceived usefulness | 0.318   | 4.292                    | 0.000    | Supported |                |                | 0.123          |
| H3 Service Quality -> Perceived usefulness     | 0.225   | 3.407                    | 0.000    | Supported |                |                | 0.060          |
| H4 Confirmation -> Perceived usefulness        | 0.215   | 3.612                    | 0.000    | Supported |                |                | 0.048          |
| H5 System quality -> Satisfaction              | 0.111   | 1.930                    | 0.027    | Supported | 0.716          | 0.559          | 0.016          |
| H6 Information quality -> Satisfaction         | 0.082   | 1.314                    | 0.094    | rejected  |                |                | 0.010          |
| H7 Service Quality -> Satisfaction             | 0.035   | 0.635                    | 0.263    | rejected  |                |                | 0.002          |
| H8 Perceived usefulness -> Satisfaction        | 0.413   | 5.639                    | 0.000    | Supported |                |                | 0.243          |
| H9 Confirmation -> Satisfaction                | 0.324   | 5.828                    | 0.000    | Supported |                |                | 0.148          |
| H10 System quality -> Confirmation             | 0.416   | 7.022                    | 0.000    | Supported | 0.579          | 0.566          | 0.181          |
| H11 Information quality -> Confirmation        | 0.228   | 4.041                    | 0.000    | Supported |                |                | 0.065          |
| H12 Service Quality -> Confirmation            | 0.218   | 3.600                    | 0.000    | Supported |                |                | 0.058          |
| H13 Confirmation -> Flow                       | 0.667   | 15.805                   | 0.000    | Supported | 0.445          | 0.426          | 0.800          |
| H14 Perceived usefulness -> CI                 | 0.119   | 1.635                    | 0.051    | rejected  | 0.623          | 0.421          | 0.013          |
| H15 Satisfaction -> CI                         | 0.415   | 6.063                    | 0.000    | Supported |                |                | 0.151          |
| H16 Flow -> CI                                 | 0.325   | 4.937                    | 0.000    | Supported |                |                | 0.114          |

(Beta Value or  $\beta = 0.325$ , p-value = 0.000,  $f^2 = 0.114$ ) impact students' long-term plans to use blended learning. Perceived usefulness, on the other hand, has no effect (Beta Value or  $\beta = 0.119$ , p-value = 0.051,  $f^2 = 0.013$ ). Therefore, it can be concluded that hypotheses H13, H15, and H16 are accepted while H14 is rejected.

## 5. Discussion

Prior to the COVID pandemic, Indonesia exhibited low levels of digital learning utilization (Luckyardi & Rahman, 2021; Saputra et al., 2020). Prior to the pandemic, the limited integration of technology in educational systems was attributed to technological barriers, including inadequate tools and internet access (Rahayu, 2019; Yulia, 2017), challenges related to human resources, such as insufficient knowledge, skills, and confidence among teachers regarding technology use (Prasojo et al., 2019; Rahayu, 2019) and a lack of student autonomy in the independent learning process (Zainuddin & Keumala, 2018).

During the pandemic, according to Aji et al. (2020), blended learning provides flexibility, motivation, engagement, and enhanced ICT skills, while also posing problems such as internet connectivity and content understanding for both students and lecturers. On the other hand, students prefer classroom learning over online learning due to its efficacy and clarity. Most students used computers or mobile phones for interactions and had great instructor assistance, although there were worries about online learning's efficacy and creativity loss. Parents were likewise dissatisfied, seeing online learning as less successful than traditional methods (Mongkaren et al., 2021). Moreover, Research shows that blended learning moves from a crisis reaction to a routine learning approach (Mahmud, 2021; Sukirman et al., 2022; Yang et al., 2023).

After the COVID-19 pandemic was declared over in 2022, students in Indonesia returned to teaching lectures in a blended learning manner from those who previously carried out the full online learning process via e-learning. Students from various educational backgrounds in higher education increasingly embrace blended learning as a significant shift away from traditional teaching methods. The question remains whether these newcomers will continue to prioritize blended learning even after the pandemic subsides. This study explores students' desire to sustain blended e-learning in Indonesia during the new normal era.

This study yielded several significant findings regarding the factors influencing the continued use of blended learning in Indonesia during the post-pandemic period. The findings of this research indicate that system quality, information quality, service quality, and confirmation significantly impact perceived usefulness. This finding aligns with earlier studies carried out by Ghazal et al. (2018), Daneji et al. (2019), Cheng (2012), Mahande et al. (2019), and Huang and Zhi (2023). Utilizing a user-friendly and dependable e-learning platform, the accuracy of information for comprehensive learning, readily accessible assistance when experiencing system access issues, and aligning information system performance with user expectations are critical factors in enhancing the perceived usefulness of blended learning systems.

The findings of this research further support previous studies indicating that system quality, perceived usefulness, and confirmation significantly impact user satisfaction with blended learning (AlMulhem, 2020; Gu et al., 2021; Riatun & Lestari, 2022; Yang et al., 2023). This indicates that when individuals perceive the system quality to be high, find it helpful, and have their expectations confirmed, they are more likely to experience higher satisfaction. However, although previous research conducted by Ghazal et al. (2018), Daneji et al. (2019), Al-Fraihat et al. (2020), AlMulhem (2020), and also Lee and Jeon (2020) found that the quality of information has a positive influence on the use of blended learning, in fact the results of this study show that the quality of information and service does not impact user satisfaction.

This can be attributed to the adoption of **blended learning, an educational approach that combines traditional face-to-face teaching with electronic learning tools**. In this method, students are not solely reliant on the online system for information and learning materials; they can access additional resources and engage directly with their teacher in a classroom setting, leading to enhanced performance and improved learning outcomes. This findings this contests the presumption that information and service quality are invariably essential to consumer satisfaction (Delone & Mclean, 2003). The characteristics of the blended learning model facilitate students to access supplementary online learning resources accompanied by face-to-face learning experiences. This reduces the dependence of students on using the e-learning platform in full.

The findings of this research also indicate that **system quality, information quality, and service quality** impact confirmation, leading to a subsequent increase in user engagement (flow). These results are in line with the results of previous studies conducted by Lee and Jeon (2020) and Li et al. (2022). These findings emphasize the need for ongoing technology and service delivery enhancement to augment customer pleasure and engagement in using e-learning system on blended learning methods.

Nevertheless, the results of this study emphasize the significant impact of satisfaction on the ongoing desire to use blended learning, as evidenced by the research conducted by Li et al. (2022) and Riatun and Lestari (2022). Learners' satisfaction level in the blended learning environment **plays a crucial role in their willingness to continue using e-learning** in blended learning. Moreover, according to Goh and Yang (2021) and Wang and Lin (2021), flow influences users' continuing intention to do blended learning. The feeling of flow—being immersed **in a learning experience—is vital to the continuous use of** this educational method.

However, the results of **this study found that perceived usefulness** did not **significantly** affect **the** continuity intention **to** do blended learning. These results contradict the Expectation-Confirmation Model (ECM) theory, which states that perceived usefulness is a predictor of continuance behavior (Bhattacharjee, 2001b). This can be caused by students' perception that the use of blended learning is carried out **in the post-pandemic period driven by the rules of the learning process administration in** institutions to use the platform as a place to store practical and flexible teaching materials, rather than their perception of the usefulness of the platform. The differences in results with the ECM model show that contextual factors—such as the **nature of blended learning, which combines online and offline methods—can change the dynamics of typical user behavior.**

## 6. Conclusion, limitation, and direction of future research

This study provides insight **into the factors contributing to the continued use of** blended learning in the current era of change. The **results indicate that system quality, information quality, service quality, and confirmation significantly impact perceived usefulness, satisfaction, and user engagement (flow) within a blended learning environment. These findings align with previous research and underscore the importance of enhancing technological capabilities and service provision to enhance user satisfaction and involvement.**

Practically, **the results of this research can be used by educational institutions to increase satisfaction and iterative use of blended learning** by focusing on improving the quality of the system, by creating a platform that is easier for students **to use and has a high level of** reliability so that **the platform used in blended learning is in accordance with the expectations of students** (confirmation). Further, Institutions should strive to enhance student engagement by integrating design elements that facilitate flow—immersive experiences that allow **students to get fully absorbed in the learning process. This may be**

achieved by developing interactive and dynamic online learning environments that integrate smoothly with in-person elements, hence enhancing student motivation and retention.

The study has made notable contributions; nonetheless, it is constrained by constraints, including a limited sample size and a primary focus on student users. Future study should explore additional elements, including social contact, technical support, and institutional aid, to further the knowledge of the impacts on the persistent usage of blended learning. Furthermore, subsequent study might investigate the impact of external factors, like educator attributes and institutional assistance, to expand the breadth of inquiry in this domain.

The successful usage of blended learning in higher education is affected by several institutional and structural issues. Robust infrastructure, technical and pedagogical support, evaluative data, and a clear institutional objective are essential for faculty uptake and the overall success of blended learning programs (Porter & Graham, 2016). Consequently, collaborative and learner-centred methodologies, together with the repurposing of educational materials, are essential for the sustainability of e-learning systems (Alharthi & Spichkova, 2016). Moreover, social support from friends and social interaction can increase positive attitudes and positive behaviors in the use of blended learning, thereby increasing collaborative behavior (Yang, 2023).

While, students and academics exhibit a general openness to blended learning; however, challenges remain, including inconsistent quality and differing levels of understanding among institutions. Resolving these issues necessitates considerable time and resources (Mestan, 2019). Institutional forces, encompassing coercive, normative, and mimetic factors, substantially affect faculty adoption of blended learning (Anthony Jnr, 2021; Versteijlen & Wals, 2023). Institutions must prioritise strategies that enhance engagement among students and faculty, offer sufficient technical and pedagogical support, and formulate policies that align with these objectives to ensure a successful transition. This comprehensive approach will enhance faculty satisfaction and instructional quality while also improving course administration and the quality of educational content provided (Anthony Jnr, 2021; Mestan, 2019).

Moreover, this study advances digital education by laying the framework for blended learning adoption and persistence research. Examine learning, technology, and socialization. Online learning can benefit from social media. Prior research found that social media can help PLC (Professional Learning Community) entry academics (Bedford, 2019). Social media spreads source information via social linkages (Kim et al., 2013). Anyone can learn anywhere, including on social media, which gives information through like-minded networks. Online students can socialize on TikTok. Higher education uses TikTok (Escamilla-Fajardo et al., 2021).

Disability-related technology can be discussed next in online learning. During the pandemic, studying was difficult, especially for disabled kids. Only 50% of school districts in the United States monitor student progress through attendance or individual check-ins. (Gross & Opalka, 2020). System designers possessed technical skills and understood the system's functional needs, but SWDs' education also relied on the system's social components (Alhabeeb & Rowley, 2018)—or disabled persons to learn successfully using features.

In addition to social interaction and technological assistance, individual learning preferences are one of the influential factors in blended learning that cannot be ignored. Few studies focus on user needs and preferences as the foundation of technological development. With a user-centered approach, technology has the potential to personalize learning and redefine the learning process. Using suitable learning media is an essential factor influencing student participation in online learning.

## Author contributions

E.E.: research background, Literature review, conceptualization. R.R.: data collection, data analysis, conclusion. E.E.: review-editing and writing, original manuscript preparation. All authors have read and approved the published on the final version of the article.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## About the authors

**Elissa Dwi Lestari**, Master's in Science Management graduate from Universitas Indonesia, is a full-time lecturer at Bachelor of Management Department in Universitas Multimedia Nusantara. She is also an e-learning coordinator in Faculty of Business, Universitas Multimedia Nusantara. Her main research interests include entrepreneurship education, entrepreneurship and business performance, marketing management, and e-learning utilization. She has published many paper in reputable international journals.

**Riatun Riatun**, Master's in Science Communication graduate, is a lecturer and taught at various universities. Along with his interest in the world of learning technology, in 2011 Riatun joined a technology-based company that specifically develops online learning with a position as an instructional designer or learning designer. Riatun was also a facilitator lecturer at the Open University and currently, apart from being a lecturer at Long Distance Communication Studies Program in Universitas Multimedia Nusantara (UMN). Riatun has also developed e-learning at UMN since 2018. In 2023, Riatun has won the Animation/Motion Graphics/Explainer Video category at the "Learning Video Innovation Work Competition from Ministry of Education, Culture, Research, and Technology."

## ORCID

Elissa Dwi Lestari <http://orcid.org/0000-0001-6732-0066>

Riatun Riatun <http://orcid.org/0009-0001-8045-7750>

## Data availability statement

The data is available upon request.

## References

- Adi, P. W., Martono, T., & Sudarno, S. (2021). Learning failures and barriers in schools during a pandemic at Indonesia: A literature review. *Duconomics Sci-Meet (Education & Economics Science Meet)*, 1(085230975597), 160–165. <https://doi.org/10.37010/duconomics.v1.5436>
- Aji, W. K., Ardin, H., & Arifin, M. A. (2020). Blended learning during pandemic corona virus: Teachers' and students' perceptions. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, 8(2), 632–646. <https://doi.org/10.24256/ideas.v8i2.1696>
- Al-Adwan, A. S., Albelbisi, N. A., Hujran, O., Al-Rahmi, W. M., & Alkhalifah, A. (2021). Developing a holistic success model for sustainable e-learning: A structural equation modeling approach. *Sustainability*, 13(16), 9453. <https://doi.org/10.3390/su13169453>
- Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating E-learning systems success: An empirical study. *Computers in Human Behavior*, 102(March 2019), 67–86. <https://doi.org/10.1016/j.chb.2019.08.004>
- Alhabeeb, A., & Rowley, J. (2018). E-learning critical success factors: Comparing perspectives from academic staff and students. *Computers & Education*, 127(October 2017), 1–12. <https://doi.org/10.1016/j.compedu.2018.08.007>
- Alharthi, A. D., & Spichkova, M. (2016). (2007). Individual and social requirement aspects of sustainable eLearning systems. *International Conference on Engineering Education and Research*, 1–8. <http://arxiv.org/abs/1701.06433>
- AlMulhem, A. (2020). Investigating the effects of quality factors and organizational factors on university students' satisfaction of e-learning system quality. *Cogent Education*, 7(1). <https://doi.org/10.1080/2331186X.2020.1787004>
- Anthony Jnr, B. (2021). Institutional factors for faculty members' implementation of blended learning in higher education. *Education and Training*, 63(5), 701–719. <https://doi.org/10.1108/ET-06-2020-0179>
- Asarta, C. J., & Schmidt, J. R. (2020). The effects of online and blended experience on outcomes in a blended learning environment. *The Internet and Higher Education*, 44(June 2018), 100708. <https://doi.org/10.1016/j.iheduc.2019.100708>
- Bagozzi, R. P., Davis, F. D. D., & Warshaw, P. R. (1992). Development and test of a theory of technological learning and usage. *Human Relations*, 45(7), 659–686. <https://doi.org/10.1177/001872679204500702>
- Balaban, I., Mu, E., & Divjak, B. (2013). Development of an electronic Portfolio system success model: An information systems approach. *Computers & Education*, 60(1), 396–411. <https://doi.org/10.1016/j.compedu.2012.06.013>
- Bedford, L. (2019). Using social media as a platform for a virtual professional learning community. *Online Learning*, 23(3), 120–136. <https://doi.org/10.24059/olj.v23i3.1538>
- Berliyanto, B., & Santoso, H. (2016). Indonesian perspective on massive open online courses: Opportunities and Challenges. *Journal of Educators Online*, 15(1), 1–14. <https://files.eric.ed.gov/fulltext/EJ1168947.pdf>
- Bhattacharjee, A. (2001a). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, 32(2), 201–214. [https://doi.org/10.1016/S0167-9236\(01\)00111-7](https://doi.org/10.1016/S0167-9236(01)00111-7)
- Bhattacharjee, A. (2001b). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3), 351–370. <https://doi.org/10.2307/3250921>

- Bouilheres, F., Le, L. T. V. H., McDonald, S., Nkhoma, C., & Jandug-Montera, L. (2020). Defining student learning experience through blended learning. *Education and Information Technologies*, 25(4), 3049–3069. <https://doi.org/10.1007/s10639-020-10100-y>
- Chen, Y.-M. (2014). Extending the expectation-confirmation model with quality and flow to explore nurses' continued blended e-learning intention. *Information Technology & People*, 27(3), 366–386. <https://doi.org/10.1108/ITP-01-2013-0024>
- Cheng, Y. M. (2012). The effects of information systems quality on nurses' acceptance of the electronic learning system. *The Journal of Nursing Research: JNR*, 20(1), 19–30. <https://doi.org/10.1097/JNR.0b013e31824777aa>
- Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, 295(2), 295–336.
- Chin, W. W. (2010). How to write up and report PLS analyses. In V. Esposito Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of partial least squares: Concepts, methods and applications* (pp. 655–690). Springer. [https://doi.org/10.1007/978-3-540-32827-8\\_29](https://doi.org/10.1007/978-3-540-32827-8_29).
- Cho, V., Cheng, T. C. E., & Lai, W. M. J. (2009). The role of perceived user-interface design in continued usage intention of self-paced e-learning tools. *Computers & Education*, 53(2), 216–227. <https://doi.org/10.1016/j.compedu.2009.01.014>
- Churiyah, M., Sholikhah, S., Filianti, F., & Sakdiyyah, D. A. (2020). Indonesia education readiness conducting distance learning in Covid-19 pandemic situation. *International Journal of Multicultural and Multireligious Understanding*, 7(6), 491–507. <https://doi.org/10.18415/ijmmu.v7i6.1833>
- Csikszentmihalyi, M. (1975). Beyond boredom and anxiety. In I. Csikszentmihalyi, R. Graef, J. H. Holcomb, J. Hendin, & J. MacAloon (Eds.), *Jossey-Bass behavioral science series*. Jossey-Bass Publishers.
- Daneji, A. A., Ayub, A. F. M., & Khambari, M. N. M. (2019). The effects of perceived usefulness, confirmation and satisfaction on continuance intention in using massive open online course (MOOC). *Knowledge Management & E-Learning: An International Journal*, 11(2), 201–214. <https://doi.org/10.34105/j.kmel.2019.11.010>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.5962/bhl.title.33621>
- Delone, W. H., & Mclean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9–30. <https://doi.org/10.1016/j.giq.2003.08.002>
- Escamilla-Fajardo, P., Alguacil, M., & López-Carril, S. (2021). Incorporating TikTok in higher education: Pedagogical perspectives from a corporal expression sport sciences course. *Journal of Hospitality, Leisure, Sport and Tourism Education*, 28(August 2020), 100302. <https://doi.org/10.1016/j.jhlste.2021.100302>
- Geisser, S. (1974). A predictive approach to the random effect model. *Biometrika*, 61(1), 101–107. <https://doi.org/10.2307/2334290>
- Ghazal, S., Aldowah, H., & Umar, I. (2018). Critical factors to learning management system acceptance and satisfaction in a blended learning environment. In F. Saeed, N. Gazem, S. Patnaik, A. Saed Balaid, F. Mohammed (Eds.), *Recent Trends in Information and Communication Technology. IRICT 2017. Lecture Notes on Data Engineering and Communications Technologies* (vol 5). Springer. [https://doi.org/10.1007/978-3-319-59427-9\\_71](https://doi.org/10.1007/978-3-319-59427-9_71)
- Goh, T. T., & Yang, B. (2021). The role of e-engagement and flow on the continuance with a learning management system in a blended learning environment. *International Journal of Educational Technology in Higher Education*, 18(1), 49. <https://doi.org/10.1186/s41239-021-00285-8>
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185–214. <https://doi.org/10.1080/07421222.2001.11045669>
- Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk, & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs, January 2006* (pp. 3–21). [www.pfeiffer.com](http://www.pfeiffer.com)
- Gross, B., & Opalka, A. (2020). *Too many schools leave learning to chance during the pandemic* (pp. 1–13). Center on Reinventing Public Education.
- Gu, W., Xu, Y., & Sun, Z. (2021). Does MOOC quality affect users' continuance intention? Based on an integrated model. *Sustainability*, 13(22), 12536. <https://doi.org/10.3390/su132212536>
- Hair, J. F., Hult, G. T., Ringle, C. M., & Sarstedt, M. (2014a). A primer on partial least squares structural equation modeling. *SAGE*, 46(1–2). (<https://doi.org/10.1016/j.lrp.2013.01.002>)
- Hair, J. F., Hult, G. T., Ringle, C. M., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014b). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2), 106–121. <https://doi.org/10.1108/EBR-10-2013-0128>
- Hair, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). *Advanced issues in partial least squares structural equation modeling*. Sage Publications Inc.

- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, 20(2009), 277–319. [https://doi.org/10.1108/51474-7979\(2009\)0000020014](https://doi.org/10.1108/51474-7979(2009)0000020014)
- Hermita, M., Farida, Margianti, E. S., & Fanreza, R. (2019). The determinants and impact of system usage and satisfaction on e-learning success and faculty-student interaction in Indonesian private universities. *Malaysian Journal of Consumer and Family Economics*, 23, 85–99.
- Hidayati, D., & Saputra, W. A. (2020). Implementation of online learning during the Covid-19 epidemic in Indonesia: Assessment of higher education students' use and implementation of online learning technology. *Universal Journal of Educational Research*, 8(10), 4514–4519. <https://doi.org/10.13189/ujer.2020.081019>
- Hsieh, J. J. P. A., & Wang, W. (2007). Explaining employees' extended use of complex information systems. *European Journal of Information Systems*, 16(3), 216–227. <https://doi.org/10.1057/palgrave.ejis.3000663>
- Huang, X., & Zhi, H. (2023). Factors influencing students' continuance usage intention with virtual classroom during the COVID-19 pandemic: An empirical study. *Sustainability*, 15(5), 4420. <https://doi.org/10.3390/su15054420>
- Ip, C. Y., Liang, C., Wu, S. C., Law, K. M. Y., & Liu, H. C. (2018). Enhancing social entrepreneurial intentions through entrepreneurial creativity: A comparative study between Taiwan and Hong Kong. *Creativity Research Journal*, 30(2), 132–142. <https://doi.org/10.1080/10400419.2018.1446744>
- Jääskelä, P., Häkkinen, P., & Rasku-Puttonen, H. (2017). Teacher beliefs regarding learning, pedagogy, and the use of technology in higher education. *Journal of Research on Technology in Education*, 49(3–4), 198–211. <https://doi.org/10.1080/15391523.2017.1343691>
- Kholishotul, M. & Sahiruddin, S. (2020). Blended online learning culture in an Indonesia Tertiary education during Covid-19 pandemic. *Jurnal Studi Budaya Nusantara*, 4(2), 133–143.
- Kim, Y., Chen, H. T., & Gil De Zúñiga, H. (2013). Stumbling upon news on the Internet: Effects of incidental news exposure and relative entertainment use on political engagement. *Computers in Human Behavior*, 29(6), 2607–2614. <https://doi.org/10.1016/j.chb.2013.06.005>
- Kim, L., Pongsakornrungrasit, P., Pongsakornrungrasit, S., Cattapan, T., & Nantavisit, N. (2022). Determinants of perceived e-learning usefulness in higher education: A case of Thailand. *Innovative Marketing*, 18(4), 86–96. [https://doi.org/10.21511/im.18\(4\).2022.08](https://doi.org/10.21511/im.18(4).2022.08)
- Kumalawati, R., Murliawan, K. H., Yuliarti, A., Kartika, N. Y., & Noermelani, E. (2021). Utilization of information technology for learning in Covid-19 disaster conditions. *IOP Conference Series: Earth and Environmental Science*, 716(1), 012001. <https://doi.org/10.1088/1755-1315/716/1/012001>
- Kuntoro, R. D., & Al-Hawamdeh, S. (2003). E-learning in higher educational institutions in Indonesia. *Journal of Information & Knowledge Management*, 02(04), 361–374. <https://doi.org/10.1142/S0219649203000553>
- Larson, L., & DeChurch, L. A. (2020). Leading teams in the digital age: Four perspectives on technology and what they mean for leading teams. *The Leadership Quarterly*, 31(1), 101377. <https://doi.org/10.1016/j.leaqua.2019.101377>
- Lee, J. W. (2010a). Online support service quality, online learning acceptance, and student satisfaction. *The Internet and Higher Education*, 13(4), 277–283. <https://doi.org/10.1016/j.iheduc.2010.08.002>
- Lee, M. C. (2010b). Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation-confirmation model. *Computers & Education*, 54(2), 506–516. <https://doi.org/10.1016/j.compedu.2009.09.002>
- Lee, Y.-C. (2006). An empirical investigation into factors influencing the adoption of an e-learning system. *Online Information Review*, 30(5), 517–541. <https://doi.org/10.1108/14684520610706406>
- Lee, Y.-C., Al-Fraihat, D., Joy, M., Masa'deh, R., Sinclair, J., Chen, Y.-M., Lee, M. C., Caner, M., Saadé, R., Bahli, B., Liang, J. C., Wu, S. H., Tsai, C. C., Cho, V., Cheng, T. C. E., Lai, W. M. J., Lee, B. C., Yoon, J. O., Lee, I., ... Oliver, R. L. (2020). Analysis of the effect of information quality, system quality, and support service quality on user satisfaction levels and its implications for blended E-learning continuance intention to use in the new normal era. *Computers and Education*, 53(2), 88–99. <https://doi.org/10.1016/j.chb.2019.08.004>
- Lee, K. C., & Chung, N. (2009). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's model perspective. *Interacting with Computers*, 21(5–6), 385–392. <https://doi.org/10.1016/j.intcom.2009.06.004>
- Lee, E. Y., & Jeon, Y. J. J. (2020). The difference of user satisfaction and net benefit of a mobile learning management system according to self-directed learning: An investigation of cyber university students in hospitality. *Sustainability*, 12(7), 2672. <https://doi.org/10.3390/su12072672>
- Lee, B. C., Yoon, J. O., & Lee, I. (2009). Learners' acceptance of e-learning in South Korea: Theories and results. *Computers & Education*, 53(4), 1320–1329. <https://doi.org/10.1016/j.compedu.2009.06.014>
- Li, L., Wang, Q., & Li, J. (2022). Examining continuance intention of online learning during COVID-19 pandemic: Incorporating the theory of planned behavior into the expectation-confirmation model. *Frontiers in Psychology*, 13(November), 1046407. <https://doi.org/10.3389/fpsyg.2022.1046407>
- Liang, J. C., Wu, S. H., & Tsai, C. C. (2011). Nurses' Internet self-efficacy and attitudes toward web-based continuing learning. *Nurse Education Today*, 31(8), 768–773. <https://doi.org/10.1016/j.nedt.2010.11.021>
- Lin, W. S., & Wang, C. H. (2012). Antecedences to continued intentions of adopting e-learning system in blended learning instruction: A contingency framework based on models of information system success and task-technology fit. *Computers & Education*, 58(1), 88–99. <https://doi.org/10.1016/j.compedu.2011.07.008>

- Liu, W., Wang, Y., & Wang, Z. (2020). An empirical study of continuous use behavior in virtual learning community. *PloS One*, 15(7), e0235814. <https://doi.org/10.1371/journal.pone.0235814>
- Loan, L. T., Doanh, D. C., Thang, H. N., Viet Nga, N. T., Van, P. T., & Hoa, P. T. (2021). Entrepreneurial behaviour: The effects of the fear and anxiety of covid-19 and business opportunity recognition. *Entrepreneurial Business and Economics Review*, 9(3), 7–23. <https://doi.org/10.15678/EBER.2021.090301>
- Luckyardi, S., & Rahman, L. (2021). Application of E-learning system in the world of education. *Jurnal Teknologi Informasi Dan Pendidikan*, 14(1), 47–52.
- Mahande, R. D., Jasruddin, J., & Nasir, N. (2019). IS success model for EDMODO E-learning user satisfaction through TAM on students. *Journal of Educational Science and Technology (EST)*, 5(2), 140–152. <https://doi.org/10.26858/est.v5i2.9575>
- Mahmud, R. (2021). Blended learning model implementation in the normal, pandemic, and new normal era. *Proceedings of the 5th Progressive and Fun Education International Conference (PFEIC 2020)* (Vol. 479, pp. 130–139). <https://doi.org/10.2991/assehr.k.201015.021>
- Mestan, K. (2019). Create a fine blend: An examination of institutional transition to blended learning. *Australasian Journal of Educational Technology*, 35(1), 70–84. <https://doi.org/10.14742/ajet.3216>
- Mongkaren, S., Pelenkahu, N., & Liando, N. V. F. (2021). Students and parents' perceptions toward english online learning during corona virus pandemic. *Jurnal Pendidikan Bahasa Inggris Undiksha*, 9(1), 91. <https://doi.org/10.23887/jpbi.v9i1.35049>
- Normelindasari, D., & Solichin, A. (2020). *Effect of system quality, information quality, and perceived usefulness on user satisfaction of webstudent applications to improve service quality for Budi Luhur University Students (ICMEB 2019)* (Vol. 120, pp. 77–82). <https://doi.org/10.2991/aebmr.k.200205.016>
- Nugraha, D. P., Setiawan, B., Nathan, R. J., & Fekete-Farkas, M. (2022). Fintech adoption drivers for innovation for SMEs in Indonesia. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(4), 208. <https://doi.org/10.3390/joitmc8040208>
- Oliver, R. L. (1977). Effect of expectation and disconfirmation on postexposure product evaluations: An alternative interpretation. *Journal of Applied Psychology*, 62(4), 480–486. <https://doi.org/10.1037/0021-9010.62.4.480>
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4), 460–469. <https://doi.org/10.2307/3150499>
- Ozkan, S., & Koseler, R. (2009). Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation. *Computers & Education*, 53(4), 1285–1296. <https://doi.org/10.1016/j.compedu.2009.06.011>
- Pituch, K. A., & Lee, Y. k (2006). The influence of system characteristics on e-learning use. *Computers & Education*, 47(2), 222–244. <https://doi.org/10.1016/j.compedu.2004.10.007>
- Porter, W. W., & Graham, C. R. (2016). Institutional drivers and barriers to faculty adoption of blended learning in higher education. *British Journal of Educational Technology*, 47(4), 748–762. <https://doi.org/10.1111/bjet.12269>
- Prasetyo, A., Anggadwita, G., & Pasaribu, R. D. (2020). Digital learning challenge in Indonesia. In *IT and the Development of Digital Skills and Competences in Education* (pp. 56–71). IGI Global. <https://doi.org/10.4018/978-1-7998-4972-8.ch004>
- Prasojo, L. D., Habibi, A., Yaakob, M. F. M., Mukminin, A., Haswindy, S., & Sofwan, M. (2019). An explanatory sequential study on indonesian principals' perceptions on ICT integration barriers. *Electronic Journal of E-Learning*, 17(1), 1–10.
- Rahayu, M. K. P. (2019). Barriers to Use E-Learning Platform in Indonesia Higher Education: Factors Related to People and Organization. *Advances in Economics, Business and Management Research (ICOI)* (Vol. 100, pp. 475–479). <https://doi.org/10.2991/icoi-19.2019.83>
- Ramakrisnan, P., Yahya, Y. B., Hasrol, M. N. H., & Aziz, A. A. (2012). Blended learning: A suitable framework for E-learning in higher education. *Procedia - Social and Behavioral Sciences*, 67, 513–526. <https://doi.org/10.1016/j.sbspro.2012.11.356>
- Riatun, R., & Lestari, E. D. (2022). Analysis of the effect of information quality, system quality, and support service quality on user satisfaction levels and its implications for blended E-learning continuance intention to use in the new normal era. *Formosa Journal of Sustainable Research*, 1(7), 1067–1082. <https://doi.org/10.55927/fjsr.v1i7.2226>
- Rodrigues, H., Almeida, F., Figueiredo, V., & Lopes, S. L. (2019). Tracking e-learning through published papers: A systematic review. *Computers & Education*, 136(December 2018), 87–98. <https://doi.org/10.1016/j.compedu.2019.03.007>
- Saadé, R., & Bahli, B. (2005). The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: An extension of the technology acceptance model. *Information & Management*, 42(2), 317–327. <https://doi.org/10.1016/j.im.2003.12.013>
- Sahni, J. (2019). Does Blended learning enhance student engagement? Evidence from higher education. *Journal of e-Learning and Higher Education*, 2019, 1–14. <https://doi.org/10.5171/2019.121518>
- Sakina, R., Kulsum, E. M., & Syaepul Uyun, A. (2020). Integrating technologies in the new normal: A study of blended learning. *International Journal of Quantitative Research and Modeling*, 1(4), 183–193. <https://doi.org/10.46336/ijqrm.v1i4.90>

- Saputra, R., Isnaini, N., Adhy, S., Bahtiar, N., Abidin, Z., & Suharto, E. (2020). Factors influencing student's adoption of Elearning in Indonesian Secondary Schools. *ICICoS 2020 – Proceeding: 4th international conference on informatics and computational sciences*. <https://doi.org/10.1109/ICICoS51170.2020.9299109>
- Selviandro, N., Suryani, M., & Hasibuan, Z. A. (2014). Enhancing the implementation of cloud-based open learning with E-learning personalization. *ICACT Transactions on Advanced Communications Technology*, 3(4), 471–479.
- Sukirman, S., Masduki, Y., Suyono, S., Hidayati, D., Kistoro, H. C. A., & Ru'ya, S. (2022). Effectiveness of blended learning in the new normal era. *International Journal of Evaluation and Research in Education (IJERE)*, 11(2), 628–638. <https://doi.org/10.11591/ijere.v11i2.22017>
- Tan, E. (2013). Informal learning on YouTube: Exploring digital literacy in independent online learning. *Learning, Media and Technology*, 38(4), 463–477. <https://doi.org/10.1080/17439884.2013.783594>
- Thompson, R. L., Higgins, C. A., & Howell, J. M. (1994). Influence of experience on personal computer utilization: Testing a conceptual model. *Journal of Management Information Systems*, 11(1), 167–187. <https://doi.org/10.1080/07421222.1994.11518035>
- Trisyani, Y., Emaliyawati, E., Priambodo, A. P., Mirwanti, R., & Nurhamsyah, D. (2019). The effect of blended learning approach on student satisfaction in the learning process at master degree nursing program in Indonesian context. *Padjadjaran Acute Care Nursing Journal*, 1(1), 1–9. <https://doi.org/10.24198/pacnj.v1i1.25222>
- Versteijlen, M., & Wals, A. E. J. (2023). Developing design principles for sustainability-oriented blended learning in higher education. *Sustainability (Switzerland)*, 15(10), 8150. <https://doi.org/10.3390/su15108150>
- Wan, L., Xie, S., & Shu, A. (2020). Toward an understanding of university students' continued intention to use MOOCs: When UTAUT model meets TTF model. *Sage Open*, 10(3), 1–15. <https://doi.org/10.1177/2158244020941858>
- Wang, Y. T., & Lin, K. Y. (2021). Understanding continuance usage of mobile learning applications: The moderating role of habit. *Frontiers in Psychology*, 12(November), 736051. <https://doi.org/10.3389/fpsyg.2021.736051>
- Yang, Y. (2023). Impact of organizational support on students' information and communication technology self-efficacy, engagement, and satisfaction in a blended learning environment: An empirical study. *Sage Open*, 13(4), 1–15. <https://doi.org/10.1177/21582440231216527>
- Yang, H., Cai, J., Yang, H. H., & Wang, X. (2023). Examining key factors of beginner's continuance intention in blended learning in higher education. *Journal of Computing in Higher Education*, 35(1), 126–143. <https://doi.org/10.1007/s12528-022-09322-5>
- Yulia, H. (2017). Readiness for blended learning viewed from the students' attitude towards learning aspects. *International Journal of Active Learning*, 2(1), 15–26.
- Zainuddin, Z., & Keumala, C. M. (2018). Blended Learning Method Within Indonesian Higher Education Institutions Zamzami. *Jurnal Pendidikan Humaniora*, 6(2), 69–77. <http://journal.um.ac.id/index.php/jph>
- Zhang, D., & Nunamaker, J. F. (2003). Powering E-learning in the new millenium: An overview of e-learning and enabling technology. *Information System Frontiers. Information System Frontiers*, 5(2), 207–218.