From Technology-Driven Engagement to Learning Effectiveness: A Systematic Literature Review of Mobile Learning in Higher Education

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Abstract
This study aims to explore student interest, satisfaction, effectiveness, and the supporting factors and challenges of mobile learning in higher education. Using the Systematic Literature Review (SLR) method with the PRISMA strategy, it analyzes articles published between 2015-2025 from Scopus, Science Direct, Taylor and Francis, and Eric. The keywords included "mobile learning", "m-learning", "android-based", and "higher education". Out of 1,919 articles found, 42 met the inclusion and exclusion criteria for analysis. Findings reveal that student interest in mobile learning grows with technological advancements. Students are generally satisfied with the user-friendly interface, and most find m-learning effective for education. Key success factors include engaging and relevant content design. However, challenges such as data security, privacy, and integration into formal curricula persist. Further research is needed to examine the availability of supportive technology in educational institutions to enhance mobile learning experiences.

1. Introduction

The rapid development of technology has become a central driver in the transformation of education in the modern era. The significant impact of technology on education can no longer be ignored (Zhao & Frank, 2003), as technology and education have come to form a close and mutually reinforcing relationship (Dočekal & Tulinská, 2015). Among the many innovations emerging from this integration, mobile learning stands out as one of the most influential, offering flexible and accessible learning that embraces the principle of learning "anywhere and anytime" (M. Sharples, Taylor, & Vavoula, 2017). Rather than being merely a passing trend, mobile learning reflects a broader evolution in learning styles in the twenty-first century (Nealbert, Calimag, Miguel, Conde, & Aquino, 2014), one in which learners are no longer bound by the spatial and temporal constraints of traditional classroom instruction. Through mobile platforms, learners can study independently, access learning resources on demand, and interact with peers and instructors efficiently (Hamidi & Chavoshi, 2018). Mobile learning also opens opportunities for a more personalized and adaptive approach to instruction, allowing educators to respond to the diverse needs and learning styles of individual students (El-Sofany & El-Haggar, 2020).

Mobile-based learning, delivered primarily through smartphones and other portable devices, has emerged as a particularly promising solution in this context (Al-Emran, Elsherif, & Shaalan, 2016). It enables learning materials to be presented in an interactive and easily accessible format and is widely regarded by educators and researchers as an effective tool for facilitating the understanding of complex concepts (Pilar, Jorge, & Cristina, 2013). The flexibility of time and place it offers has made mobile learning highly sought after by students, who are able to study according to their own schedules and preferences (Machmud, 2018). Because it can also be implemented at relatively low cost, mobile learning represents a solution that is not only pedagogically appealing but also sustainable for long-term adoption by institutions (Kadry & Ghazal, 2019). As a versatile learning tool, mobile devices support innovative, creative, and exploratory approaches that encourage students to engage in problem-solving and improve learning outcomes, both cognitively (Jabbour, 2014) and in terms of broader learning engagement (Hess, 2014; Nealbert et al., 2014).

The development of mobile learning is underpinned by several theoretical foundations that help explain why it has been so readily adopted across educational settings. Constructivist theory plays a particularly important role, framing learning as an active process in which individuals construct their own understanding through direct experience and interaction with their environment (Jonassen, 1991; Naciri, Baba, Achbani, & Kharbach, 2020). Within mobile learning, this constructivist orientation translates into a student-centered

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experience, positioning learners as active participants who shape their own learning trajectories ((Jonassen, 1991; L. H. Wong, Milrad, & Specht, 2015). Mobile devices also facilitate online collaboration among students, enriching the exchange of ideas through discussion (Traxler & Kukulska-Hulme, 2016) and enabling learners to deepen their understanding through ongoing interaction and reflection with peers and instructors alike (A Kukulska-Hulme & Traxler, 2005).

A second theoretical strand frames mobile learning as a form of technology-based learning, emphasizing the use of digital tools to improve the accessibility and interactivity of instruction (Chang, Wu, Chang, Tseng, & Wang, 2021). Research has shown that this approach succeeds in making education more accessible and more engaging for learners (Traxler & Kukulska-Hulme, 2016), particularly as mobile devices have become central to everyday life and, by extension, to learning that can happen anywhere and at any time (Machmud, 2018; P. P. Y. Wong et al., 2022). Learning delivered through mobile platforms also allows for greater personalization and accommodates a wider range of learning styles (Traxler & Kukulska-Hulme, 2016), while interactive media such as simulations, videos, and audio content help increase student participation and comprehension (Aytekin, Özköse, & Ayaz, 2022).

A third theoretical foundation is problem-based learning, which emphasizes the importance of engaging with real-world problems as part of the learning process (Savery & Duffy, 1996). Mobile-supported problem-based learning allows students to confront authentic problems that require teamwork and critical thinking (Shchedrina, Galkina, Petunina, & Lushkov, 2020), extending learning spaces beyond the confines of the conventional classroom and giving students access to interactive simulations, collaborative applications, and online discussion tools that support this approach (Romero-Rodríguez, Aznar-Díaz, Hinojo-Lucena, & Cáceres-Reche, 2020). Through these mechanisms, mobile learning helps students develop the critical thinking and problem-solving skills needed to navigate an increasingly complex and rapidly changing world (Savery & Duffy, 1996).

Finally, personalized learning theory emphasizes tailoring the learning experience to each student's preferences, needs, and abilities (Brusilovsky, 2001). This is considered an important strategy for ensuring that learning support remains relevant and meaningful to individual learners (Al-Emran et al., 2016). Personalization allows technology to deliver individually tailored content and learning experiences (Shchedrina et al., 2020), which in turn can increase intrinsic motivation and improve learning outcomes (Zheng, Long, Zhong, & Gyasi, 2022). Mobile learning further enables students to exercise greater control over their own learning process, selecting and customizing content according to their interests (Joynes & Fuller, 2016), while emerging technologies such as artificial intelligence and data analytics offer additional potential to dynamically tailor content to individual learning needs (L. H. Wong et al., 2015).

Within higher education specifically, mobile learning has come to occupy a central position in the broader shift from conventional, lecture-based instruction toward more technology-integrated approaches to teaching and learning (Helen Crompton, 2013). Empirical research confirms that mobile learning is an effective tool in supporting the learning process across educational levels, including at the university level (Akçayır & Akçayır, 2017), and consistent use of mobile learning has been associated with increased student motivation and improved academic outcomes (Herrington, Herrington, Mantei, Olney, & Ferry, 2009). Beyond simply providing access to learning materials, mobile learning in higher education creates opportunities for students to interact meaningfully with one another and with their instructors (Hamidi & Chavoshi, 2018). Features such as discussion forums, live chat, and collaborative applications facilitate active dialogue and the exchange of ideas within the learning community (Romero-Rodriguez, Aznar-Diaz, Hinojo-Lucena, & Gomez-Garcia, 2020), extending the boundaries of learning beyond the physical classroom and fostering a more inclusive, community-oriented learning environment. As mobile learning continues to develop, it has increasingly become an integral component of modern, technology-centered learning strategies in higher education institutions (Chang et al., 2021).

The growing importance of mobile learning in higher education has attracted a corresponding body of literature, including several systematic literature reviews. These include studies examining the use of serious games within mobile learning contexts (Yomeldi, Rosmansyah, & Dabarsyah, 2019), research tracing the development of mobile learning applications more broadly (Kumar & Sharma, 2020), and, more specifically relevant to the present study, a review by (Naveed, Choudhary, Ahmad, Alqahtani, & Qahmash, 2023) synthesizing the dominant theories, general contexts, acceptance characteristics, and research methods used in studies of mobile learning within university settings. Collectively, these reviews have offered valuable insight into how mobile learning applications are used and developed, and how the field's theoretical and methodological foundations have evolved over time.

However, existing reviews have tended to focus on the broader landscape of mobile learning applications, theories, and research methods, with comparatively limited attention paid to more specific, learner-centered dimensions of the mobile learning experience in higher education namely, students' interest in using mobile learning, their level of satisfaction with it, its effectiveness within the learning process, and the specific factors

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that contribute to its successful implementation or that hinder it. This gap is particularly notable given that these dimensions are directly relevant to how higher education institutions might refine and sustain their mobile learning initiatives in practice. Addressing this gap, the present study focuses specifically on mobile learning within the context of higher education, examining it through the lens of student interest, satisfaction, effectiveness, and the success factors and obstacles associated with its implementation. Based on this focus, the study is guided by the following research questions: (1) How interested are university students in using mobile learning? (2) What is the level of student satisfaction with the use of mobile learning? (3) How effective is the use of mobile learning within the higher education learning process? (4) What factors are associated with the success of, and the obstacles to, the implementation of mobile learning in higher education?

2. Method

The research method used is Systematic Literature Review (SLR) with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) method, a structured approach to compile and evaluate relevant literature systematically (Moher et al., 2015) The stages, which consist of identification, screening, eligibility, and included, are the foundation for the implementation of this method. Identification aims to identify studies that are relevant to the research topic, while screening is used to evaluate the studies initially. The eligibility stage is used to determine whether or not the studies meet the inclusion criteria, while the included stage is the final step where studies that meet the inclusion criteria will be included in further analysis.

2.1. Identification

The data collection process begins with choosing the right keywords. The keywords used include "mobile learning" OR "m-learning" OR "pervasive mobile learning" OR "android based" AND "higher education" OR "university education" OR "college education". The main data search is carried out through the Scopus database which is a database with credible reference sources and has good quality (Baas, Schotten, Plume, Côté, & Karimi, 2020) The search for articles was conducted from October 27 to November 21, 2025 specifically for "journal" and "proceedings", only "title word", and the year of publication "2015-2025". The year of publication is limited to the last 10 years with the intention that researchers can ensure that the information contained in the literature remains relevant to current conditions and developments. The search results show as many as 977 related articles that are relevant to the keywords used in Scopus. The data is collected and downloaded into the form of a CSV file that includes title, author, institution, abstract, keywords, and bibliography information. An additional search was conducted on Science Direct, Tailor and Francis, and Eric, which yielded 942 articles that matched the keywords and will be added. So that the total initial data obtained based on search results is 1,915 articles. The next article is filtered to avoid duplication. Duplicate filtering is intended to select articles contained in two or more databases using title parameters and DOI (Digital Object Identifier). After duplicate screening, as many as 862 articles were obtained that were different from each other.

2.2. Screening

After the articles that have been selected to avoid duplication, the next step is to re-filter them based on titles, keywords, and abstracts to match the topic of discussion, namely the use of mobile learning in the learning process in high schools. This process aims to ensure that the selected articles are more rigorously relevant to the established research topic. This screening process, each title, keyword, and abstract of the article must be carefully analysed to ensure that the article clearly and accurately describes its relevance to the use of mobile learning in higher education. Articles that do not meet these criteria are then eliminated. After a careful screening process, it was found that as many as 445 articles met quality and relevance standards to be reviewed in full text. This number reflects the rigor of the selection and research conducted and shows that the available literature on the use of mobile learning in higher education is substantial enough to support this research.

2.3. Eligibility

In the eligibility stage, after the articles are selected, the next step is to download and filter in full text. This process allows the researcher to examine in detail the content of each article considered. Articles that are considered feasible and in accordance with the inclusion criteria that have been established will be retained for use in this study (see Table 1). After going through a careful screening process, the results show that out of a number of articles examined, there are 42 articles that meet the inclusion criteria and are considered relevant for further analysis. This number reflects the level of rigor of selection applied to ensure that only the most relevant and high-quality literature can be used in the study.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Research articles published between 2015-2025.	The research article was not published between 2015-2025.
Articles are in the form of journals or proceedings.	Articles are not journals or proceedings.
Articles are not literature reviews.	Articles in the form of literature reviews.
The research article was written using English.	The research article was not written in English.

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Inclusion Criteria	Exclusion Criteria
The research article has been published after being submitted to the peer review process.	The research article has been published without a peer review process.
Only research is conducted at the higher education level.	Research other than those conducted in higher education.
The research article discusses at least one of the 4 topics about m-learning (interest, satisfaction level, effectiveness, acceptance rate, success factors and inhibiting factors).	The research article did not discuss at all of the 4 topics about m-learning (interest, satisfaction level, effectiveness, acceptance rate, success factors and inhibiting factors).

2.4. Included

The right selection of articles is an important foundation in solid research. In the included process, researchers must be careful in determining the relevance of each literature to the research question asked. Through the selection of full text, the researcher can ensure that the selected article is really in accordance with the focus of the research and has a significant contribution to the understanding of the topic discussed. Based on the results of the previous screening, 42 articles were selected from the available literature (see Figure 1). Based on the selected articles, it is hoped that the researcher can obtain a more focused and in-depth picture of the issue being researched. The next step is to conduct a thorough analysis of the articles, exploring the findings, arguments, and methodologies used to strengthen the conceptual framework of the research. Careful and thorough analysis will help researchers in formulating strong conclusions and make valuable contributions in their research field.

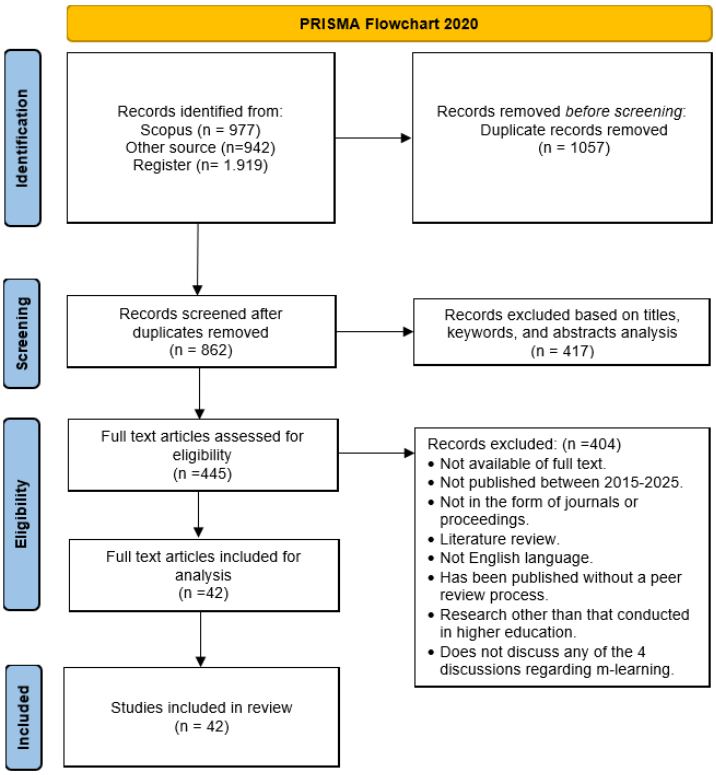


Figure 1. Prisma Flowchart

The characteristics of research included in the review are presented in Table 2.

Table 2. Research Characteristics Included in the Review

No	Author, Year, and Location	Research objectives	Result
1	(Maketo, Issa, Issa, & Nau, 2023), Zimbabwe.	Identify the benefits and challenges of transitioning traditional learning to m-learning.	There is a high interest in adopting m-learning as an alternative learning method.
2	(Suwansil, 2023), Thailand.	Knowing the use and perspective of science teacher students regarding m-learning media.	M-learning media can motivate students to learn.
3	(Yin & Fitzgerald, 2015), Malaysia.	Testing the influence of m- learning on the interest of distance learners.	The significant positive impact of mobile learning on the interest of distance learners.

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No	Author, Year, and Location	Research objectives	Result
4	(Y. Zhang & Zuo, 2019), China.	Optimizing the teaching design of individual classrooms for mobile English learning.	The majority of respondents felt that access to online learning resources was helpful in learning English.
5	(Salhab & Daher, 2023), Palestine.	Evaluate the involvement of m- learning among educational technology students.	Mobile technology in learning can increase student engagement rates.
6	(Jeno, Egelandsdal, & Grytnes, 2022), Norwey.	Investigate the experiences of biology students using m-learning.	It is important to consider the satisfaction of needs when designing technology.
7	(Zhonggen, Ying, Zhichun, & Wentao, 2019), China.	Identifying platforms significantly improves English as a foreign language proficiency.	Students who use the m-learning platform are more satisfied than students who do not use the m-learning platform.
8	(Oo et al., 2022), Malaysia	Exploring learners' views on the integration of mobile technology in clinical teaching.	Students responded positively to the use of mobile technology in clinical learning,
9	(M. C. Liu & Huang, 2015), Taiwan.	Explore sharing collaborative experiences powered by M-Learning.	M-Learning can create a more effective learning environment.
10	(Alkhalaf, 2015), Arab Saudi.	Assess the feasibility of implementing m-learning.	M-learning helps make the educational process more convenient.
11	(Al-Qatawneh et al., 2022), Arab Saudi.	Exploring the effect of using m- learning on student achievement.	M-Learning is effective in improving student achievement and achievement.
12	(Chiu & Huang, 2016), Taiwan.	Evaluate the success factors in m- learning.	Success factors of m-learning: situational, individual, interactive, and integrated.
13	(Krotov, 2015), Texas.	Investigate the critical factors of m-learning success from a socio- technical perspective.	Success factors include executive involvement, resource allocation, etc.
14	(Ghasia, De Smet, Machumu, & Musabila, 2018), Tanzania.	Investigate the status and situation surrounding the implementation of m-learning.	The importance of individual attitudes and readiness in adopting technology.
15	(Kabilan & Annamalai, 2022), Malaysia.	Understand the experiences and challenges faced by teaching online during the COVID-19 pandemic.	Emphasis on the importance of Teaching Presence (TP), Cognitive Presence (CP), and Social Presence (SP).
16	(Iqbal & Bhatti, 2020), Pakistan.	Investigate faculty members' perceptions of the use of smartphones in higher education in developing countries.	Most higher education lecturers in developing countries are reluctant to use smartphones for learning activities.
17	(Baharun et al., 2021), Indonesia.	Evaluate the effectiveness of the use of mobile learning during the Covid-19 pandemic.	The ability of m-learning to facilitate learning during the pandemic, increase student engagement, and ensure learning continuity.
18	(S. So, 2016), Hong Kong.	Exploring the use of mobile Instant messaging tools in supporting learning in college.	M-Learning improves learning achievement, positive perception and acceptance.
19	(X. Zhang, 2022), China.	Exploring the influence of m-learning on the optimization of Teaching modes in higher education.	M-Learning increases the effectiveness of learning, mastery of skills, and students' interest in learning.
20	(Nagovitsyn, Bartosh, Evtushenko, & Neverova, 2020), Russia.	Developing student competency information through mobile technology in higher education.	Improvement of students' abilities in science and independence.
21	(Criollo-C, Moscoso-Zea, Guerrero-Arias, Jaramillo-Alcazar, & Lujan-Mora, 2021), China.	Analyze the role of m-learning in driving innovation in the higher education sector.	M-learning motivates students to be involved in the learning process. Effectively improve the quality of higher education.
22	(Kaliisa, Palmer, & Miller, 2019), Uganda and Australia.	Comparing the use and adoption of m-learning in Uganda and Australian higher education.	Students show a positive attitude towards m-learning.
23	(Gómez-Ramirez, Valencia-Arias, & Duque, 2019), Colombia.	Analyze the factors that affect the acceptance of m-learning among college students.	Students tend to accept and use m-learning.

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No	Author, Year, and Location	Research objectives	Result
24	(Raza, Umer, Qazi, & Makhdoom, 2018), Pakistan.	Identify attitudinal, normative, and control influences on m- learning adoption.	Interest and acceptance of m- learning are influenced by attitudinal, normative, and control beliefs.
25	(Qashou, 2021), Palestine.	Analyze the factors that affect students' intention to adopt the m-learning system.	Perception of usability (PU), perception of ease of use (PEOU), and perception of self-efficacy are the dominant factors in m-learning acceptance.
26	(Azizah, N., & Irawan, 2023), India.	Identify the impact of the m- learning approach on student achievement and skill development.	M-learning has a positive impact on student achievement and skills.
27	(Al-rahmi et al., 2021), Malaysia.	Determinehow University of Malaysia students use m-learning in higher education.	Students' intentions in using m-learning have a positive impact.
28	(Marunevich, Kolmakova, Odaruyk, & Shalkov, 2021), Russia.	Provides insights into e-learning and m-learning in improving learning in Russian educational institutions.	Use smartphones regularly, and most of them want to use mobile technology more often.
29	(Kampa, 2023), India.	Explore the readiness and acceptance of m-learning.	There is a positive and significant influence on interest in using m-learning.
30	(Efiloğlu Kurt, 2023), Turkish.	Exploring the factors that affect student admissions to the use of m-learning.	The perceived pleasure, complexity, and facilitating conditions have an effect on the interest, acceptance, and effectiveness of using m-learning.
31	(Razzaque, 2020), Bahrain.	Exploring how m-learning can improve knowledge sharing among students.	M-learning increases the effectiveness of knowledge sharing among students.
32	(Abdallah, Abdallah, & Bohra, 2021), Palestine.	Investigate the factors that affect students' intention to use m- learning.	Factors that affect interest include personnel innovation, self-management, facilitation conditions, social influence, relative advantage, and business expectations.
33	(Swanson, 2020), United States.	Exploring the use of mobile technology in learning in higher education.	The use of mobile technology in learning can increase students' interest and motivation in learning.
34	(Ramchurn, Roodt, & Mulaji, 2021), South Africa.	Analyze the demographic profile of millennials in South Africa against m-learning.	There is a high level of interest and positive acceptance of m-learning.
35	(Zaidi, Kulakli, Osmanaj, & Zaidi, 2023), India.	Evaluating the quality of mobile- based learning (m-Learning).	The interest, acceptance, and effectiveness of the use of mobile learning have increased in the academic environment.
36	(Kamaghe, Luhanga, & Kisangiri, 2020), Tanzania.	Determine the level of awareness and use of existing mobile assistance technology for visually impaired students.	Most of the participants showed a high interest in engaging in m- learning.
37	(Badwelan & Bahaddad, 2021), Arab Saudi.	Identify the functional requirements needed to increase the acceptance of m-learning applications.	One of the things that affects students' interest is the quality of the mobile app.
38	(Al-Emran, Arpaci, & Salloum, 2020), United Arab Emirates.	Identify the factors that influence the continued intention of using m-learning.	Perception of ease of use, attitudes, behavioral controls, and subjective norms have a significant effect on interest.
39	(Habibi et al., 2023), Indonesia	Investigating the interest in using m-learning among prospective teachers in Indonesia.	Interest in using m-learning is influenced by the perception of benefits to technology.
40	(Shukla, 2021), India.	Exploring the factors that influence students' interest in adopting m-learning.	Affective needs have a significant positive influence on student intentions.
41	(Daud, Wong, Ghani, & Ramli, 2021), Malaysia.	Exploring gender differences in using m-learning for academic achievement.	Male students tend to have a more positive impact. M-learning has been proven to be effective in improving Arabic language proficiency.
42	(Dahham et al., 2025), Indonesia.	Examining factors influencing the adoption and continued use of app-based mobile learning systems in higher education.	Performance expectancy and user satisfaction significantly influence mobile learning adoption and continuance intention.

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3. Results and Discussion

3.1. Results

Based on 42 articles selected through the PRISMA method, the author can explore information relevant to the topic that has been formulated in the formulation of the problem. These articles discuss various aspects surrounding the use of mobile learning in higher education, including interest, satisfaction, effectiveness, as well as success factors and obstacles in the use of mobile learning. In this study, researchers can explore diverse views from previous researchers, looking for patterns, consistent findings, and even differences between existing studies. An overview of these findings is presented in Figure 2.

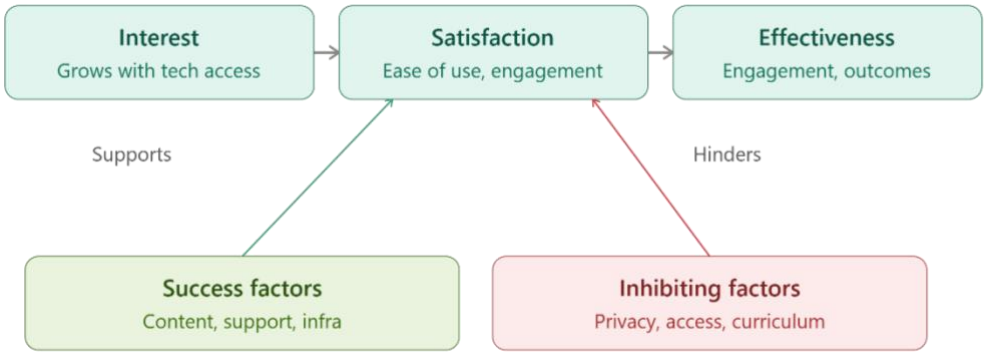


Figure 2. Overview of Findings on Interest, Satisfaction, Effectiveness, and Influencing Factors of Mobile Learning in Higher Education

3.1.1. Student Interest in the Use of Mobile Learning

The use of mobile learning has become increasingly significant especially in modern education, as mobile technology has become an important part of daily life (Efiloğlu Kurt, 2023) Based on the research that has been conducted, the majority of students have a positive attitude towards the use of mobile learning in schools (Al-rahmi et al., 2021; Kamaghe et al., 2020; Kampa, 2023; Ramchurn et al., 2021; Salhab & Daher, 2023; Y. Zhang & Zuo, 2019) Positive student interest in using mobile learning, one of which can be seen from the desire of students to use mobile learning more and more often (Marunevich et al., 2021) There are many factors that can affect students in using mobile learning. These factors are related to attitude, normative, and control beliefs (Raza et al., 2018; Shukla, 2021) In addition, interest in using mobile learning is also influenced by students' perception of the use of technology (Habibi et al., 2023) Research (Suwansil, 2023) shows that students' motivation in learning can increase due to the influence of a learning environment that becomes more enjoyable as a result of adequate mobile application (Badwelan & Bahaddad, 2021; Swanson, 2020) The high interest of students in using mobile learning makes this method can be used as an alternative learning method (Maketo et al., 2023) Mobile learning is able to facilitate learning during the pandemic, increase student involvement in the learning process, and ensure sustainability in learning (Baharun et al., 2021; Criollo-C et al., 2021) This can happen because access to learning materials is increasingly easy and flexible, allowing students to carry out the learning process anywhere and anytime (Abdallah et al., 2021; Yin & Fitzgerald, 2015) One of the other advantages of using mobile learning is that this method can be explicitly associated with mobile learning pedagogy, such as student-centered learning and personalized learning (Abdallah et al., 2021) Only a small percentage feel that mobile learning has no effect or that mobile learning has only a bad impact (Y. Zhang & Zuo, 2019) For example, there are several higher education lecturers in one of the developing countries who are reluctant to use smartphones for learning activities (Iqbal & Bhatti, 2020) There is also a narrative from teachers that students are more likely to use cooperative mode than collaborative mode when using mobile learning (H. J. So, Tan, & Tay, 2012).

3.1.2. Student Satisfaction in the Use of Mobile Learning

Students tend to show positive attitudes in the acceptance and use of m-learning in higher education environments (Dahham et al., 2025; Gómez-Ramirez et al., 2019; Kaliisa et al., 2019) Student satisfaction with the use of mobile learning is influenced by various complex and multifaceted factors. Some of the dominant factors that affect satisfaction in the acceptance of mobile learning in higher education include the perception of usefulness, perceived ease of use, and perception of self-efficacy (Qashou, 2021) In addition, technical quality includes various aspects such as user-friendly interfaces, availability of quality learning content, responsiveness of the platform to student needs, and good interaction between students and learning materials makes mobile learning experience a significant improvement in the academic environment, especially in higher education (Zaidi et al., 2023). Students who use mobile learning platforms in the classroom tend to feel more satisfied than students who do not use the platform (Zhonggen et al., 2019) Other factors that play a role in increasing student satisfaction include a sense of autonomy in learning, the ability to access learning materials easily, and the quality of relationships or communication built by students with the platform and teachers as teachers (Jeno et

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al., 2022; Y. Zhang & Zuo, 2019) Nonetheless, some students still have a preference for conventional learning by using textbooks rather than using mobile platforms, for reasons such as habits or personal preferences (Jeno et al., 2022) This shows that in assessing student satisfaction with the use of mobile learning is very complex and more attention is needed to pay attention to various factors that affect individual perceptions and preferences in the context of mobile learning (Al-Emran et al., 2020).

3.1.3. Student Effectiveness in the Implementation of M-Learning

Research in order to find the effectiveness of the use of mobile learning is important to be carried out because it can increase the accessibility and flexibility of learning. As research conducted by (Azizah, N., & Irawan, 2023; S. So, 2016; X. Zhang, 2022) revealed that almost all users consider smartphones as a mobile learning resource that is very effective in the learning process. In particular, the younger generation considers mobile learning as a medium that is not only cost-effective, but can also expand access through wireless networks and improve the overall quality of education (Y. Zhang & Zuo, 2019) Furthermore, mobile learning is able to create a more comfortable and flexible educational process (Alkhalaf, 2015) This is proven by the ability of mobile learning to create a more authentic, collaborative, and communicative learning environment, as well as increase student involvement effectively in the learning process (M. C. Liu & Huang, 2015) In addition, mobile learning can also significantly reduce the cognitive burden of students (Zhonggen et al., 2019) The learning outcomes of students who use mobile learning platforms also show significant improvements (Al-Qatawneh et al., 2022; Razzaque, 2020) Based on the use of constructive feedback, technical quality models related to the development of mobile learning can improve clinical competence, confidence in clinical reasoning, and focus on the discussion process (Oo et al., 2022) In addition to academic benefits, effective mobile communication between students and parents also provides significant benefits (Zhonggen et al., 2019) This not only helps students learn academic materials such as improving proficiency in Arabic (Daud et al., 2021) and Natural Sciences and self-reliance (Nagovitsyn et al., 2020) but also allows them to spend more time on rewarding daily activities (Al-Emran et al., 2020).

3.1.4. Success Factors and Inhibiting Factors in the Implementation of Mobile Learning

The application of mobile learning in the educational process can be influenced by several factors. The following are the success factors and obstacles in the implementation of mobile learning.

3.1.4.1. Success Factors in the Implementation of Mobile Learning

The factors that affect the successful use of mobile learning vary greatly depending on the context in which it is used and the goals to be achieved. Several factors that can affect the successful implementation of mobile learning have been identified in various studies. For example, research conducted by (Kamaghe et al., 2020) highlights five key factors that play an important role in the successful implementation of mobile learning. First, content design that is attractive and in accordance with the needs of students is very important. Well-designed learning content that is relevant to students' needs can increase their interest and motivation in learning through mobile platforms. In addition, adequate technical support and the availability of reliable technology infrastructure are also needed so that mobile learning users can access and use the platform smoothly and efficiently. Another factor that is no less important is the active participation and support from stakeholders, including teachers, students, parents, and school administration. In addition, the ability of teachers to apply these technologies in the learning process is also a determining factor for the success of the use of mobile learning (Oo et al., 2022) Research conducted by (Chiu & Huang, 2016) identified success factors in four different dimensions, including situational, individual, interactive, and integrated factors. Meanwhile(Krotov, 2015) emphasizes the importance of the involvement of educational institution executives, resource allocation, support for content creation and mobile learning applications, technological pluralism, and collaboration between various stakeholders in educational institutions. In addition, constructs such as authenticity, collaboration, and personalization are also considered important in supporting the successful implementation of mobile learning, as revealed in research (Marunevich et al., 2021) Individual attitudes and readiness as well as the role of the Information and Communication Technology (ICT) unit in the development of learning media also affect the success of the implementation of mobile learning in the context of education (Ghasia et al., 2018).

3.1.4.2. Inhibiting Factors in the Application of Mobile Learning

The use of mobile learning in education is inseparable from a number of obstacles that can hinder its success. One of the main obstacles that is often a concern is the issue of data security and privacy. (Gómez-Ramirez et al., 2019) highlighting the importance of keeping students' data safe as well as ensuring that their privacy is well protected when using mobile technology in learning. In addition, parents' concerns about their children's direct access to mobile technology are another factor hindering the adoption of mobile learning (Raza et al., 2018) Serious efforts need to be made to ensure that the use of mobile technology in learning is carried out with high security and privacy standards in mind. In addition to security and privacy issues, legal issues related to the use of mobile technology in education are also a serious concern (Abdallah et al., 2021) Challenges such as copyright, data use policies, and legal responsibilities in the context of digital learning need to be

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carefully addressed (Zaidi et al., 2023) The integration of mobile learning into the formal curriculum is also not without challenges. (Swanson, 2020) highlights the difficulties in adapting traditional learning methods to the interactive learning approaches offered by mobile learning. This requires educators to gain a deeper understanding of how to teach online with mobile learning (Kabilan & Annamalai, 2022) The lack of content and functionality for sharing information, along with information security concerns and the need for backup plans for mobile devices, became technical challenges that needed to be addressed (Oo et al., 2022) In addition, the lack of understanding of the increasingly developing technology is also an obstacle in the application of mobile learning. In order to overcome these constraints, educators and policymakers need to continue to develop their understanding and skills in dealing with the technical, legal, and security challenges associated with the use of mobile learning (M. C. Liu & Huang, 2015).

3.2. Discussion

3.2.1. Student Interest in the Use of Mobile Learning

The application of mobile learning has become an increasing trend among students along with the development of technology and the penetration of mobile devices among teenagers (Alshammari, Pasay-an, Gonzales, & Torres, 2020) Students' interest in the use of mobile learning is reflected in various studies that show that students tend to be more interested in engaging in mobile learning (Wang et al, 2009; Ying, Mursitama, & Abbas, 2018) One of the main reasons is the interactive features that mobile learning platforms have. Compare conventional learning with mobile learning, namely mobile learning platforms offer various interactive features that can increase student involvement in the learning process (Kim, Kim, & Lee, 2020; Thinyane, Kizito, & Rensburg, 2017) For example, the existence of interactive quiz features, discussion forums, and various educational games that can spark students' interest in learning (Oo et al., 2022) In addition, ease of access is also an important factor in increasing students' interest in the use of mobile learning (Darmaji, Kurniawan, Astalini, Lumbantoruan, & Samosir, 2019) The devices required to use mobile learning at least only require a mobile device and an internet connection, so that students can access a variety of learning materials whenever and wherever they are (Abdallah et al., 2021; Yin & Fitzgerald, 2015) The flexibility of time and place is also the main attraction of mobile learning (Lam & Wan, 2010) Students are no longer bound to a rigid learning schedule in the classroom, but rather they can learn according to their own rhythm and preferences, be it at home, on the road, or in other places that are convenient for them (Alshammari et al., 2020) This aims to give students the freedom to manage their study time according to their daily activities and busyness. The results of the study (Al-Adwan, Al-Madadha, & Zvirzdinaite, 2018) indicate that students see added value from using mobile platforms in their learning process. They feel that mobile learning gives them more ways to participate than relying solely on textbooks. In addition, mobile learning has also been proven to increase student motivation in learning (Pilar et al., 2013) An interactive and fun learning environment is offered by mobile learning platforms with the intention of being able to motivate students to actively participate in the learning process.

3.2.2. Student Satisfaction in the Use of Mobile Learning

The use of mobile learning as a flexible and easily accessible learning method has become a significant research focus in recent years. Various studies have been conducted to understand the factors that affect user satisfaction in using mobile learning platforms. Factors that consistently appear in studies outside the scope of higher education that are in line with research (Qashou, 2021) are related to the factor of ease of access. Easy accessibility via mobile devices and a stable internet connection allow users to be able to access learning materials wherever and whenever they want (Akkoyunlu & Soylu, 2008) Another factor that also plays an important role in increasing user satisfaction is interactivity (Marunevich et al., 2021) Features such as quizzes, discussion forums, and engaging multimedia content can make the learning experience more engaging and interactive, thereby increasing user satisfaction (Efiloğlu Kurt, 2023) However, it is undeniable that there are still obstacles that must be overcome in the use of mobile learning. One of the main obstacles is the limitations of technology (Kadry & Ghazal, 2019) Relatively small screens on mobile devices and slow internet speeds can hinder the user experience and lead to dissatisfaction (M Ally & Tsinakos, 2020) In addition, the lack of interaction between students is also a problem that needs to be considered. Although mobile learning platforms provide a variety of interactive features, the lack of social interaction and direct guidance from instructors or learning peers can reduce user satisfaction (Ng, 2012) Content quality is an important factor in determining user satisfaction, irrelevant content, low quality, or lack of innovation in learning materials can lead to user dissatisfaction and reduce their interest in using mobile platforms (Fombona, Pascual, & Ferra, 2020).

3.2.3. Student Effectiveness in the Implementation of M-Learning

A number of studies have highlighted the effectiveness of the use of mobile learning in the context of learning. Based on the results of the study, it can be seen that mobile learning can make a significant contribution in improving the quality of learning. According to research conducted by (Agnes Kukulska-Hulme & Shield, 2008; Mike Sharples, Taylor, & Vavoula, 2007) mobile learning can increase student engagement, learning motivation, and accessibility of learning materials. This is reinforced by findings from (Mohamed Ally, 2009; Helen Crompton, 2013) which show that mobile learning facilitates student-centered learning, enabling round-

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the-clock learning, and learning on the go. In addition, research (Traxler, 2007) highlights that mobile learning enables learning that is carried out contextually, where students can learn from their surroundings. (Pachler, N., Bachmair, B., & Cook, 2014) emphasized that mobile learning can expand the accessibility of learning, especially for those who have limited access to traditional education. (Chen & Denoyelles, 2013; Kearney, Schuck, Burden, & Aubusson, 2012) also found that mobile learning can improve student interaction and collaboration outside the classroom. Overall, these findings suggest that mobile learning has the potential to enrich the learning experience by providing greater accessibility, higher student engagement, student-centered learning, and enhanced collaboration systems.

3.2.4. Success Factors and Inhibiting Factors in the Implementation of Mobile Learning

3.2.4.1. Success Factors in the Implementation of Mobile Learning

Success in implementing mobile learning in learning is very important. Factors such as the integration of mobile learning with the existing curriculum in educational institutions have a significant impact on increasing learning effectiveness. Incorporating mobile learning elements into the curriculum helps strengthen the connection between learning materials and learning objectives that have been set (Hockly, 2013) This means that the material taught through mobile learning is more integrated with the learning objectives to be achieved, thereby increasing the relevance and value of learning for students. The ability of mobile learning platforms to be adapted to user preferences is also key in increasing learning motivation and effectiveness (Crompton, Burke, & Gregory, 2017) This adjustment of preferences can allow students to learn according to their individual style and needs, potentially increasing engagement and learning outcomes. Support and commitment from educational institutions also play an important role in the successful implementation of mobile learning. This includes the allocation of adequate resources and training for staff and students to make effective use of this mobile learning technology (Mohamed Ally, 2009) Educational institutions must also pay attention to the security and privacy aspects of user data in using mobile learning (Al-Hamad et al., 2021) Concerns regarding the privacy and security of user data can be a barrier to the adoption of these technologies, so it is important to ensure that adequate security measures are in place. Continuous evaluation of the effectiveness of mobile learning is the key to improving the quality of learning (Crompton et al., 2017) Through continuous evaluation, educational institutions can identify the strengths and weaknesses of their mobile learning approach and make necessary adjustments to improve the student learning experience. In addition, factors such as responsive content design, adequate instructional support, reliable technology infrastructure, active participation and collaboration, and integration with existing curricula also contribute to the successful use of mobile learning in learning (Kearney et al., 2012; Malley et al., 2005; Mike Sharples, Corlett, & Westmancott, 2002)

3.2.4.2. Inhibiting Factors in the Application of Mobile Learning

A number of factors have been identified as the main inhibiting in the use of mobile learning in the context of learning. Limited accessibility of technological infrastructure, especially related to the availability of stable internet connections and mobile devices, is one of the main obstacles. Some learners may experience difficulties in accessing mobile learning due to the lack of adequate infrastructure, especially in areas that are less accessible by the internet network or have limited access to mobile devices (Almaiah & Jalil, 2014; Traxler, 2014) In addition, low levels of digital literacy, especially among low-income groups or those who are less familiar with technology, can also hinder the adoption of mobile learning. Educators who are not skilled in the use of technology may have difficulty in harnessing the full potential of mobile learning (Blažič & Blažič, 2020) Concerns about user data privacy and security are also a significant obstacle to the implementation of mobile learning. Both learners and educational institutions are often concerned about the privacy risks associated with the use of mobile technology, which can hinder interest in adopting mobile learning (Almaiah & Jalil, 2014) Resistance to change from educators is also an important factor that can hinder the implementation of mobile learning. Some educators may be reluctant to change established teaching methods or feel uncomfortable with the use of technology in learning (Mohamed Ally, 2009) The lack of availability of quality and relevant content for mobile learning can be an obstacle to adopting this technology. Educators often need access to content that is appropriate for a particular subject or topic. However, such content may not always be available in a format that is suitable for mobile learning (Traxler, 2007) Financial constraints, such as the cost of devices and internet access costs, can also be an obstacle for some educators to be able to access mobile learning. This is especially relevant for those who come from low economic backgrounds or areas with limited infrastructure accessibility (Almaiah & Jalil, 2014) The low level of engagement from some educators is also an obstacle to the success of mobile learning. The lack of motivation from some educators in using mobile technology can reduce the effectiveness of using mobile learning in learning (Agnes Kukulska-Hulme & Shield, 2008) Lack of support and commitment from educational institutions, such as policies that do not support or lack of investment in the development of mobile learning infrastructure, can be an obstacle to the implementation of mobile learning (Crompton et al., 2017).

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3.3. Implications

The findings of this systematic literature review have important implications for theory, practice, and policy in higher education. Theoretically, the review suggests that student interest, satisfaction, and learning effectiveness are interconnected constructs that should be integrated with contextual factors such as content quality and technological support in future mobile learning models. Practically, the consistent importance of engaging content, interactivity, and user-friendly platforms highlights the need for universities and instructional designers to develop mobile learning environments that are collaborative, personalized, and aligned with curriculum objectives. From a policy perspective, the findings emphasize the importance of strengthening data privacy, security, infrastructure, and curriculum integration through institutional and governmental support to promote sustainable implementation of mobile learning in higher education.

3.4. Limitations

This study has several limitations. First, the review was limited to four databases and English-language journal and conference articles published between 2015 and 2025, potentially excluding relevant studies from other sources or publication types. Second, the 42 included studies represent diverse educational contexts, which may limit the generalizability of the findings. Third, as a qualitative systematic review, this study synthesizes evidence thematically rather than statistically through meta-analysis. Finally, variations in how interest, satisfaction, and learning effectiveness were defined and measured across studies may affect result comparability. Future research should incorporate meta-analytic approaches or empirical studies using standardized measurement instruments across broader higher education contexts.

4. Conclusion

The application of mobile learning, especially at the higher education level, is a form of response from educational institutions to technological developments. In its application, mobile learning has the ability to present learning materials in an interactive and easily accessible manner. Students give a positive response to the application of m-learning, this can be seen from the desire of students who are increasingly using mobile learning in the learning process. Factors that can make students fond of using mobile learning include related to attitudes, norms, and students' perceptions of the use of technology. Learning that is increasingly easy and flexible allows students to carry out the learning process anywhere and anytime. Students tend to show a positive attitude in the acceptance and use of m-learning in a higher education environment. Some of the dominant factors that affect satisfaction in the acceptance of mobile learning in higher education include the perception of usefulness, perceived ease of use, and perception of self-efficacy. In addition, technical quality includes various aspects such as a user-friendly interface, the availability of quality learning content, the responsiveness of the platform to student needs, and good interaction between students and learning materials, making mobile learning experience a significant increase in the academic environment, especially in higher education. Despite this, some students still have a preference for conventional learning. The majority of students consider the use of m-learning to be effective for the learning process, especially in the younger generation. Mobile learning is able to create a more authentic, collaborative, and communicative learning environment, as well as increase student engagement effectively in the learning process. One of the effects of using mobile learning is the impact on student learning outcomes which shows a significant improvement. The application of mobile learning in the learning process cannot be separated from supporting and inhibiting factors. Supporting factors in the implementation of mobile learning, there are at least five key factors that play an important role in the successful implementation of mobile learning. First, attractive and appropriate content design, well-designed and relevant learning content, adequate technical support, availability of technological infrastructure, and active participation and support from stakeholders. Meanwhile, the inhibiting factors are related to data security, privacy, and the process of integrating mobile learning into the formal curriculum.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethics and Consent Declarations

This study is a Systematic Literature Review (SLR) that analyzes previously published, publicly available secondary data (journal and proceeding articles) and does not involve direct data collection from human or animal subjects. Accordingly, ethical approval and informed consent were not required for this study. All

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primary sources analyzed are appropriately cited and referenced in accordance with academic and copyright standards.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declaration on AI Use

The authors declare that no generative artificial intelligence (AI) tools were used to generate the substantive content, analysis, or conclusions of this article. AI-based tools may have been used solely for auxiliary purposes such as language/grammar checking. The authors take full responsibility for the content, accuracy, and originality of the manuscript.

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