

# Patterns of Smartphone Use for Mobile Learning: Findings from a Student Survey

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## ABSTRACTS

This study examines the extent of smartphone utilization for mobile learning (m-learning) among university students. The objectives of the research are to identify the level of smartphone use for learning purposes, to explore students' perceptions of smartphones as m-learning tools, and to determine the frequency and manner in which smartphones support learning activities. A quantitative survey design was employed, with data collected through a structured questionnaire and analyzed using descriptive statistical methods. The findings indicate that the majority of respondents actively use smartphones to support various aspects of m-learning, including accessing learning materials, engaging in online tasks, and communicating with instructors and peers. Overall, the results suggest that smartphones play a significant role in facilitating mobile learning and are widely accepted as a flexible, accessible learning aid. This study highlights the potential of smartphones to enhance teaching and learning in higher education and provides insights that may inform future development of mobile-based learning strategies.

**Keywords:** smartphones, mobile learning, m-learning, student perception, technology adoption, higher education

## INTRODUCTIONS

The rapid advancement of mobile technologies has transformed smartphones from simple communication tools into multifunctional devices that support entertainment, social interaction, productivity, and education. Their increasing affordability and accessibility have accelerated their adoption among young adults, particularly university students, who rely on smartphones for daily tasks and academic activities. Recent studies have shown that smartphone usage has become deeply embedded in students' behavioral patterns, influencing how they access information and participate in digital learning environments (Alam et al., 2025; Fu et al., 2021; Chen et al., 2020).

Aligned with this technological evolution, higher education institutions worldwide have begun integrating mobile learning (m-learning) to enhance flexibility, accessibility, and personalized learning experiences. M-learning refers to learning that is supported through mobile devices across various contexts, enabling interaction, collaboration, and access to digital content anytime and anywhere (Hidayat-Ur-Rehman, 2024; Abduljawad & Ahmad, 2023; Al-Emran & Teo, 2020; Berge & Muilenburg, 2013). Research has shown that students generally demonstrate positive readiness and acceptance toward m-learning, particularly when supported by user-friendly platforms, strong digital literacy skills, and relevant pedagogical design (Al-Rahmi et al., 2023; Qazi et al., 2020; Naciri et al., 2020; Sung et al., 2019).

In Malaysia, educational transformation initiatives such as the Malaysia Education Blueprint 2015–2025 (Higher Education) emphasize the integration of digital tools and ICT to promote innovative teaching and learning. The blueprint highlights the importance of leveraging mobile technologies to foster student-centered learning and improve digital competency among learners. Previous studies in Malaysia also indicate that

students possess adequate digital skills and are open to mobile-based instructional approaches (Zainuddin et al., 2022; Che Mustaffa & Sailin, 2022).

Smartphones, therefore, present a valuable opportunity for educators to implement m-learning strategies that increase engagement and promote active learning. They can support diverse activities such as accessing learning materials, participating in online discussions, completing assessments, and communicating with instructors. As mobile devices continue to influence learning behaviors, understanding how students use smartphones for educational purposes becomes increasingly important. This study aims to examine smartphone utilization for mobile learning among university students, including their level of use, perceptions, and self-reported skills.

## Research Objective

This study aims to investigate smartphone utilization for mobile learning among university students. Specifically, the objectives are:

1. To identify the level of smartphone use for learning among university students.
2. To examine students' perceptions toward the use of smartphones as m-learning tools.
3. To determine students' self-reported skills in using smartphones for m-learning activities.

## Research Scope

This study focuses on undergraduate students at Sultan Idris Education University, Malaysia across various faculties and semesters. The scope includes examining their level of smartphone use, perceptions, and digital skills related to m-learning. As smartphones are widely owned and frequently used among young adults, this study investigates their potential in supporting teaching and learning activities within a higher education context. The findings will contribute to understanding the impact of mobile technologies on students' learning practices and inform future strategies to enhance m-learning adoption in university environments.

## Problem Statement

Smartphones have become an essential part of university students' daily lives, functioning as primary tools for communication, entertainment, and increasingly, academic activities. As higher education institutions shift towards digital learning ecosystems, students are expected to adapt to new modes of learning that incorporate mobile technologies. However, despite widespread ownership of smartphones, their effective use for m-learning is not always guaranteed. Students may lack the necessary digital skills, confidence, or awareness to maximize smartphones as learning tools (Nguyen et al., 2023).

Current data from the Malaysian Communications and Multimedia Commission (MCMC, 2023) indicate that smartphone ownership exceeds 90% among individuals aged 20–34, the typical age group for university students. While this suggests strong potential for m-learning adoption, previous studies have identified challenges such as limited technological readiness, inconsistent digital literacy, and varying levels of acceptance toward mobile-based learning (Al-Rahmi et al., 2023; Qazi et al., 2020).

Furthermore, although mobile learning is widely practiced in developed countries, its implementation in developing contexts may face structural, pedagogical, and motivational barriers. Qashou (2021) highlights that m-learning adoption is influenced by both technological factors and social behaviors. In Malaysia, although initiatives to integrate ICT in education have been emphasized, empirical evidence on how university students actually utilize smartphones for learning remains insufficient and often outdated. Therefore, there is a need to investigate the extent to which university students use smartphones as m-learning tools, their perceptions toward such usage, and their skill level in navigating mobile-based learning tasks (Moya & Camacho, 2021). Understanding these dimensions will help inform educators, policymakers, and institutions on how to optimize mobile learning initiatives in line with the Malaysia Education Blueprint and global digital learning trends.

## METHODOLOGY

This study employed a quantitative research design to examine smartphone utilization for m-learning among university students. Quantitative methods are appropriate for studies that aim to describe trends, test relationships between variables, and generalize findings to a broader population (Creswell & Creswell, 2021). A survey design (Fig. 1) was selected because it enables efficient collection of data from a large sample and is widely used in mobile learning and educational technology research (Al-Emran et al., 2020; Nikou & Economides, 2021).

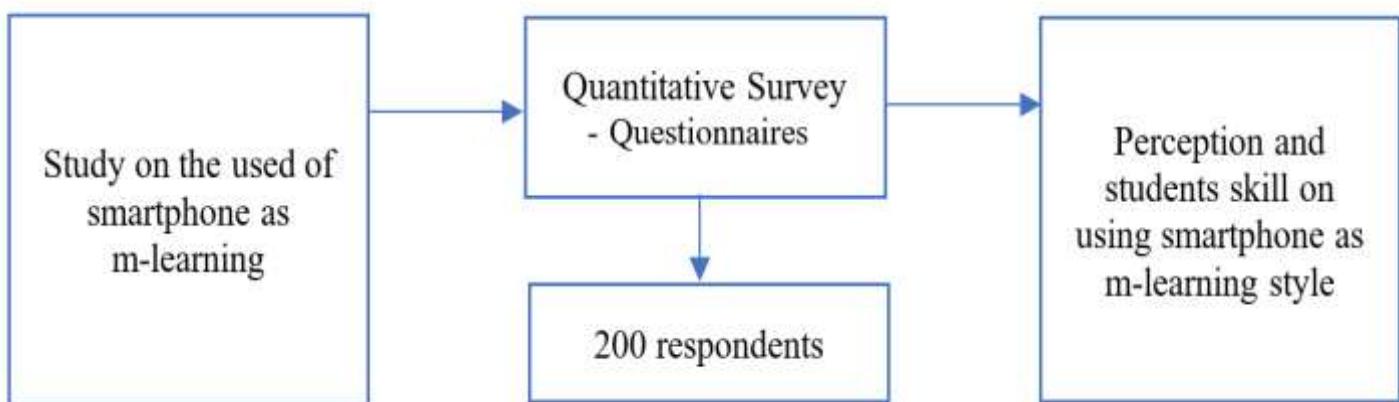


Fig. 1 Research Design

This study was selected to enable researchers to identify the outcome of student's perception and skill on by smartphone as m-learning style in university. A total of 200 undergraduate students from university participated in this study. Students were selected from different faculties and semesters using simple random sampling, ensuring equal opportunity for participation and reducing sampling bias (Etikan & Bala, 2017). The sample size is considered adequate for descriptive analysis and meets general requirements for survey research in higher education (Hair et al., 2020).

Questionnaire-based data collection offers advantages such as cost effectiveness, time efficiency, and the ability to obtain standardized responses suitable for statistical analysis. Prior studies on mobile learning adoption among students also frequently use self-report surveys to measure use, perceptions, and digital competency (Naciri et al., 2020; Sung et al., 2019). Data were collected using a structured questionnaire consisting of three sections: 1) smartphone usage patterns, 2) Students' perceptions of smartphones for m-learning and 3) Students' self-reported digital skills. The instrument used a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), a scale commonly used in educational and technology acceptance studies due to its reliability in capturing attitudes and perceptions (Joshi et al., 2015; Boone & Boone, 2012).

Data were analysed using descriptive statistics (mean, percentage, standard deviation) through the Statistical Package for the Social Sciences (SPSS). Descriptive analysis is commonly employed in studies examining technology usage behavior because it provides a clear overview of response patterns and trends among participants. The results were interpreted using mean score classifications to determine the level of agreement for each questionnaire item.

## DISCUSSION

Discussion of the results of this study was made into three parts of smartphone use among students, (1) the use of smartphones as m-learning, (2) students' perceptions of the use of smartphones as m-learning and, (3) students' skill of the use of smartphones as m-learning. The data obtained from the questionnaire from 200 sample from university students. Table 2 show the mean score interpretation for data analysed to measure the result of this study.

Table 1 Mean score interpretation

Mean Score	Mean score interpretation	
1.00 - 2.33	Low	(Less agree / less helpful / less skilled / less satisfactory / uncertain /sometimes / none / a small part)
2.34 - 3.66	Medium	(Agree / help / skilled / meet / half)
3.67 - 5.00	High	(Strongly agree / very helpful / very skilled / very satisfying / very always / all / most)

### Part 1. Use of Smartphones Among Students

Table 2 presents students' responses regarding their general smartphone usage. All mean scores exceeded 3.67, indicating strong agreement with the listed behaviors. Students reported frequent use of smartphones for entertainment, particularly listening to music ( $M = 4.17$ ) and playing simple mobile games ( $M = 3.84$ ). These findings are consistent with global trends showing that university students predominantly use smartphones for leisure and social activities alongside academic purposes (Chen et al., 2020; Yang, 2022).

Table 2 Respondents' Feedback on the Use of Smartphones

Questions	Min	SD		D		N		A		SA	
		N	%	N	%	N	%	N	%	N	%
Using to listen to music.	4.17	3	1.5	9	4.5	34	29.1	58	29.1	95	47.7
Use to play simple member games.	3.84	8	4.0	17	8.5	47	23.6	54	27.1	73	36.7
Using to surf social media.	4.75	0	0	1	0.5	5	2.5	37	18.6	156	78.4
Using to communicate.	4.88	0	0	0	0	4	2	16	8	179	89.9
Using to browse the website.	4.75	0	0	0	0	6	3	37	18.6	156	78.4
Store important information such as notes and assignments.	4.39	0	0	4	2	26	13.1	57	28.6	112	56.3
Execute Transactions online.	4.60	1	0.5	0	0	12	6	51	25.6	135	67.8
Access University System (ePortal, LMS)	4.65	0	0	2	1	10	5	44	22.1	143	71.9
Use as a reminder of important events.	4.32	1	0.5	10	5	28	14.1	46	23.1	114	57.3
Use as an alarm clock.	4.76	0	0	1	0.5	6	3	33	16.6	159	79.9

\*Min (Minimum), N (Number of Cases), % (Percentage)

Smartphone use for social media ( $M = 4.75$ ), communication ( $M = 4.88$ ), and browsing websites ( $M = 4.75$ ) recorded the highest mean scores. This aligns with recent studies indicating that social networking, instant messaging, and online browsing are among the most dominant smartphone activities among young adults (Nguyen et al., 2023; MCMC, 2023). These functions are integral to university students' daily routines, supporting peer communication and access to academic information. Students also reported strong agreement regarding the use of smartphones for storing academic information such as notes and assignments ( $M = 4.39$ ). This reflects increasing reliance on cloud-based applications (e.g., Google Drive, OneDrive) for organizing and accessing learning materials, a trend supported by recent findings in mobile learning research (Zainuddin et al., 2022).

Smartphone use for online transactions ( $M = 4.60$ ) and accessing university systems such as Education Portal and LMS ( $M = 4.65$ ) demonstrates the integration of digital platforms into students' academic and financial routines. The widespread adoption of online payment apps such as ShopeePay and Touch 'n Go is consistent with national digital economy trends (Bank Negara Malaysia, 2023). Finally, the use of smartphones as

reminders ( $M = 4.32$ ) and alarm clocks ( $M = 4.76$ ) indicates their role in students' self-management and scheduling. This is supported by literature suggesting that smartphones serve as organizational tools that support students' time management and academic responsibilities (Kumar & Chand, 2021).

Overall, these findings affirm that smartphones are deeply integrated into students' learning and daily life activities, supporting the relevance of investigating their role in mobile learning as identified in the research objectives.

## **Part 2. Students' Perceptions of the Use of Smartphones as M-Learning**

Table 3 summarizes respondents' perceptions regarding the use of smartphones for m-learning. Overall, students show strong agreement that smartphones enhance their productivity, provide easy access to learning materials, and are suitable tools for mobile learning. Students largely agreed ( $M = 4.31$ ) that smartphones increase their productivity. This concurs with previous studies showing that mobile devices can support self-paced learning, convenience in accessing resources, and flexibility that contribute positively to student productivity (Nikou & Economides, 2021; Rodrigues et al., 2022).

Table 3 Respondent Feedback on the Use of Smartphones as M-Learning

<b>Questions</b>	<b>Min</b>	<b>SD</b>		<b>D</b>		<b>N</b>		<b>A</b>		<b>SA</b>	
		<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
Smartphones increase a student's productivity.	4.31	1	0.5	4	2	31	15.6	60	30.2	103	51.8
Smartphones make it easy to open notes in the classroom	4.43	1	0.5	3	1.5	20	10.1	61	30.7	114	57.3
Smartphones are relevant to the learning process nowadays.	4.59	0	0	2	1	11	5.5	53	26.6	133	66.8
Smartphones are very suitable to be used as ABM in the classroom.	4.06	1	0.5	17	8.5	41	20.6	50	25.1	90	45.2
Smartphones make it easier for students to learn and understand the content of learning.	4.17	1	0.5	11	5.5	34	17.1	60	30.2	93	46.7
Smartphones can help students in achieving learning objectives.	4.02	3	1.5	12	6	42	21.1	64	32.2	78	39.2
Smartphones can improve the quality of learning.	4.02	3	1.5	10	5	40	20.1	73	36.7	73	36.7
Smartphones can encourage students to be active during the learning process.	4.01	5	2.5	17	8.5	34	17.1	58	29.1	85	42.7

\*Min (Minimum), N (Number of Cases), % (Percentage)

The statement "smartphones make it easy to open notes in the classroom" had a high mean ( $M = 4.43$ ), indicating that students appreciate the portability and convenience of smartphones compared to traditional notebooks or laptops. This aligns with findings that mobile learning supports anytime-anywhere access to educational materials, which improves convenience and lowers access barriers (Naciri et al., 2020; Zainuddin et al., 2022). Respondents strongly agreed that "smartphones are relevant to the learning process nowadays" ( $M = 4.59$ ), reflecting widespread acceptance of mobile learning as a modern educational approach. This supports arguments that in the digital era, mobile learning has become a necessary complement to traditional face-to-face instruction (Sung et al., 2019; García-Pérez et al., 2023).

The perception that smartphones are suitable to serve as teaching aids in classrooms ( $M = 4.06$ ), and helpful for learning and understanding content ( $M = 4.17$ ), suggests that students believe mobile devices can effectively support pedagogical delivery. Similar views have been reported in studies where instructors incorporate mobile apps and digital tools to enrich lessons, foster participation, and personalize learning (Chen et al., 2020; Kumar & Chand, 2021). The items “smartphones can help students achieve learning objectives”, “improve quality of learning”, and “encourage active participation in learning processes” garnered mean scores of above 4.00. These responses indicate a general optimism about m-learning’s capacity to support meaningful learning outcomes and active engagement — a view reinforced by meta-analyses showing that mobile learning can yield positive learning outcomes when properly implemented (Sung et al., 2019; Yang, 2022).

In summary, students’ perceptions strongly favor smartphones as effective tools for m-learning. This positive attitude is an essential factor for successful implementation, as prior research has shown that user acceptance and perceived usefulness dramatically influence adoption of mobile learning (Al-Emran & Teo, 2020; Naciri et al., 2020).

### Part 3. Level of Skills in Using Smartphones as M-Learning

Table 4 presents self-reported data on students’ digital skills and capabilities in using smartphones for various learning-related tasks. Overall, students reported moderate to high competence in several tasks, though some areas indicate potential for improvement.

Table 4 Feedback on the Skill Level of Using Smartphones as M-Learning

Questions	Min	SD		D		N		A		SA	
		N	%	N	%	N	%	N	%	N	%
Uploading my assignments using a smartphone.	3.78	9	4.5	16	8	49	24.6	60	30.2	65	32.7
Perform my tasks using a smartphone.	3.35	19	9.5	29	14.6	59	29.6	48	24.1	44	22.1
Collect learning materials using a smartphone	3.88	7	3.5	17	8.5	35	17.6	73	36.7	67	33.7
Editing / editing my tasks using a smartphone.	3.24	31	15.6	21	10.6	56	28.1	52	26.1	39	19.6
Join the webinar using a smartphone	3.89	8	4	13	6.5	43	21.6	63	31.7	72	36.2
Share learning materials using a smartphone.	4.50	1	0.5	3	1.5	14	7	58	29.1	123	61.8
Plan my learning using a smartphone.	3.87	6	3	16	8	41	20.6	71	35.7	65	32.7
Know all the functions in a smartphone to master m-learning.	3.98	2	1	10	5	49	51.6	67	33.7	71	35.7

\*Min (Minimum), N (Number of Cases), % (Percentage)

Tasks such as uploading assignments ( $M = 3.78$ ), collecting learning materials ( $M = 3.88$ ), joining webinars ( $M = 3.89$ ), sharing learning materials ( $M = 4.50$ ), planning their learning ( $M = 3.87$ ), and understanding smartphone functions ( $M = 3.98$ ) show acceptable to high skill levels. These results suggest that many students are comfortable with basic and intermediate smartphone functions relevant to mobile learning. This aligns with findings that digitally ready students tend to adapt well to m-learning, especially when they have prior exposure to smartphones and related apps (Zainuddin et al., 2022; Nguyen et al., 2023).

The relatively lower mean scores for “performing tasks using smartphone” ( $M = 3.35$ ) and especially “editing tasks using smartphone” ( $M = 3.24$ ) indicate potential skill gaps. Editing tasks (e.g., document editing, formatting) may still rely on more capable hardware (laptops) or users’ perception that smartphones are less efficient for complex tasks. This is consistent with other studies reporting that while mobile devices are convenient for content access and communication, more complex academic tasks are still often performed on PCs or laptops. The strong performance in sharing materials and accessing digital resources demonstrates that students are leveraging smartphone connectivity and applications (e.g., cloud storage, messaging apps) to support collaborative and distributed learning such a trend reinforced during and after the COVID-19 pandemic when mobile devices became primary tools for remote learning (Naciri et al., 2020; Chen et al., 2020).

The ability to plan learning and manage functions through smartphones suggests that many students have developed sufficient digital literacy to integrate m-learning into their routines. This self-regulation and autonomy in learning is a critical factor for effective mobile learning, as highlighted in digital learning readiness frameworks (Nguyen et al., 2023; Kumar & Chand, 2021). However, the lower competency in editing tasks signals a limitation: while smartphones are useful for many learning activities, they may not fully replace laptops/computers for tasks requiring substantial text editing or complex formatting. This insight is important for educators designing m-learning strategies, they should consider the limitations of mobile devices and possibly provide hybrid options (e.g., smartphone for reading/consumption, laptop for production-heavy tasks).

## Data Analysis

The findings of this study reinforce the importance of integrating smartphones meaningfully within higher education settings. Given students’ high level of acceptance and skill in using smartphones for learning, universities should shift from restrictive “device-ban” approaches toward clear, structured smartphone-use policies that emphasize appropriate, ethical, and productive usage in academic environments. Institutional guidelines can help reduce distractions while still enabling the pedagogical benefits of mobile technologies.

Furthermore, the strong student preference for quick access to information and short learning interactions suggests that microlearning is a highly suitable strategy in smartphone-based learning environments. Educators can design instructional materials in small, digestible learning units—such as short videos, quick quizzes, flashcards, and micro-assessments and strategically use smartphone notifications to reinforce learning, support revision, and sustain engagement.

From a research perspective, future studies should examine the effectiveness of microlearning delivered through smartphones, explore policy implementation outcomes, and investigate how different disciplines adopt mobile learning strategies. Longitudinal studies may also provide insights into how sustained m-learning practices affect student performance, digital literacy, and self-regulated learning.

## CONCLUSION

This study examined how university students utilize smartphones for mobile learning and found that smartphones play a significant role in supporting students’ productivity, accessibility, and engagement with academic content. The results highlight that students are not only capable of using smartphones for learning but actively do so for accessing notes, participating in online activities, and managing learning resources. This aligns with national efforts to strengthen digital education and leverage technology to enhance teaching and learning. The findings further suggest that smartphones offer strong potential for incorporating microlearning approaches, as students naturally engage with learning materials in short, frequent interactions. Thoughtfully designed microlearning content can enhance comprehension, encourage continuous engagement, and align with students’ existing smartphone habits. However, these benefits require a supportive institutional environment.

Therefore, institutions should move beyond blanket restrictions on smartphone use and instead introduce clear, structured policies that promote responsible, academic use of mobile devices. Such policies can balance the

need to minimize distractions while still enabling the pedagogical advantages of m-learning. Despite the positive outcomes, the study acknowledges several limitations, including its focus on university students who are generally more adaptable to digital change. Future research should broaden participant demographics and explore how mobile learning strategies particularly microlearning will affect long-term academic performance and digital competence.

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