Students' Attitudes towards Mobile Learning: A Case Study in Higher Education in Vietnam

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Abstract—The use of mobile learning has been investigated in many educational settings to support the effectiveness of mobile devices in teaching and learning. The study aims to explore students' attitudes towards the use of mobile technology in higher education. To gain insight into students' attitudes towards it, both quantitative and qualitative methods were employed from a 5-point Likert scale questionnaire and a semi-structured interview with the participation of 118 students in a university. The results showed that students expressed highly positive attitudes towards the use of mobile technology in learning. The easy access to resources and course materials was most beneficial to students accompanied by enhanced communication with peers and instructors to help students achieve better academic scores. Besides, students could develop various skills through mobile learning such as computer skills, analytical skills, and note-taking skills. It is to suggest the implication of using mobile devices to support teaching and learning to improve the quality of education in higher education as a whole.

Keywords—attitude, mobile learning, technology, higher education

1 Introduction

Vietnam is a developing country in Southeast Asia whose information and communications technology (ICT) is taking place at breakneck speed in recent years. According to statistics, in the year 2000, Vietnam had 200,000 Internet users [1], but this number rocketed to more than 72 million users in just over twenty years later [2]. On top of that, the number of mobile subscriptions is estimated to be equivalent to more than 150% of the total population with one person subscribing to more than one connection [2]. This sparks a concern as to whether users are prepared for technological changes that would soon permeate all aspects of their life.

In fact, banning mobile devices in the classroom was not an unusual practice in Vietnam prior to the pandemic [3]. The extreme lockdown has come to make online learning and technology-mediated instruction emerge as prevailing teaching formats [4], especially in a higher education context. More and more teachers are employing online learning platforms and tools to enhance students' interaction, engagement, and

interest [24]. Topping it all off, the Vietnamese government regulated that the "National Digital Transformation Program through 2025, with orientations toward 2030" in Decision No. 749/QD-TTg 2020 must be executed, which adds immediacy to the need for technology utilization in the education sector. Alternatively put, learning with mobile devices is becoming irresistible in higher education contexts [5].

Although several studies have concluded that the prospect of its widespread adoption in developing countries is almost certain [6], [7], mobile learning remains an unfamiliar approach for both learners and educators in the Mekong Delta of Vietnam. For that reason, an initial investigation into students' attitudes towards this concept is a preparation step for the proper adaptation of this technology-mediated learning in the years to come.

The purpose of this study is to investigate students' attitudes towards mobile learning in higher education as well as to gain insight into how students use mobile technology for their studies. Therefore, the research questions should be addressed:

1. To what extent do university students express their attitudes towards the use of mobile learning?
2. How do university students use mobile technology for their studies?

2 Literature review

2.1 Mobile learning

The idea that paved the way for the concept of mobile learning was rooted in the early twenty-first century when Sharples [8] envisioned a future educational environment encompassing characterized learning that was facilitated by technology. Since then, mobile learning, or M-learning, has become an excitingly new interest to scholars and researchers in the field. Nevertheless, the term seemed to mean different things to different scholars.

Early scholars attempted to give mobile learning an identity by distinguishing it from e-learning [9], [10]. The following years witnessed several studies trying to define mobile learning with a heavy focus on technological aspects [10], [11], [12]. In fact, in later years, Traxler [10] disregarded the technocentric approach reasoning that the term "mobile" would convey a new meaning in modern societies since the ever-changing mobile technologies would continue transforming the nature of things in our world including education and work, which would leave this definition outdated and temporary.

A few other scholars made an attempt to view the concept from a new angle implying that the term "mobile" should not only refer to technology alone but also deal with the ability of learners to move around making learning happen [13], [14].

Despite all the endeavors to conceptualize mobile learning, there was a consensus opinion among intellectuals that an agreed-upon definition was unachievable. A few studies took an innovative approach by recommending that identifying unique features of the concept might contribute to characterizing it [9], [10], [15], [16], [17]. Key attributes were ascribed to mobile learning during this period such as "situated, spontaneous, portable, context-aware, lightweight, informal, personal" [15], [16] or "personalized, learner-centered, situated, collaborative, ubiquitous, lifelong" [15].

Most recently, Crompton and Burke [18] has proposed a modified definition laying the foundation on the four main constructs of M-learning, that is "learning across multiple contexts, through social and content interactions, using personal electronic devices" (p. 4). This comprehensive definition seems to have embraced most of the unique characteristics of m-learning so far and, therefore, will be employed as the key concept in this study.

2.2 Research trends in mobile learning

Research on mobile learning has been growing at an increasing rate ever since portable devices became so prevalent a few decades ago. Noticeably, more and more interest has been paid to the research of mobile learning in a higher education context. Several systematic reviews have confirmed the dominance of higher education as the most prevailing setting in mobile learning research. In a meta-analysis' finding of research conducted in the time span from 2003 to 2010, Wu et al. [19] showed that mobile devices and activities mediated by mobile technology are more commonly employed in higher educational settings than any other institutions. In fact, the use of technological tools in education such as Quizlet and Quizizz has been widely used to motivate active learning [20]. It was also found by Hwang and Tsai [31] in their systematic review of articles published from 2001 to 2010 that undergraduate students were the most chosen target groups for mobile and ubiquitous studies. Other scholars also reported a similar trend in their systematic reviews [21], [22].

Within the higher education context, Krull and Duart [21] pointed out in their large-scale review of 233 studies during the time span of 2011–2015 that the most popular research purpose was an inquiry into the effectiveness of mobile learning (24%). While several studies (107) chose not to specify the type of devices they researched, mobile phones were the most used gadget (73) when considering the specific device. This also correlated with Kaliisa and Picard's [23] finding in their systematic review.

In the same manner, a more focused review of 72 papers published from 2010 to 2016 was systematically carried out by Crompton and Burke [18] to better understand what mobile learning had to do in a higher education setting. Major findings equally indicated that research on the effectiveness of mobile learning on students' achievement made up the highest percentage of all, followed by an investigation of students' perceptions of learning approaches mediated by mobile technologies.

2.3 Relevant studies in mobile learning and theoretical framework

In the early days of M-learning, an investigation into students' attitudes and perceptions towards mobile learning's efficacy was made by Al-Fahad [25]. His findings demonstrated that university students favored learning assisted with mobile technologies and that they highly valued M-learning approaches in improving their communication and learning experiences. However, since the study only focused on female students, it might not provide the big picture of how mobile learning was actually manifested in higher education. Several later studies were done, which presented stronger findings that supported the same outcome [26], [27], [28].

Contrasting to the above-mentioned positive results, a study explored what preparatory students at university viewed about the use of mobile technologies was implemented by Yurdagul and Oz [29] in the field of language learning pointed out that mobile learning was regarded as beneficial to the point that it provided rapid access (44%) to learning materials, yet only 10% believed that it supported their learning. Interestingly, although equipped with multi-functional gadgets, students mainly used them as communication tools, rather than for educational purposes.

Based on the theoretical framework of mobile learning developed by Sharples et al. [15], which emphasized the importance of a learning context in which students learn with their peers and teachers. Learning is mediated by knowledge and technology, in which interaction and communication play a vital role to make learning happen. To support and theorize mobile learning activities, Al-Emran et al. [30] stated that students who owned both smartphones and tablets and had a certain level of technological competence tended to think more positively about the usefulness of learning assisted with technology. At the same time, learners from distinct countries also differed in their attitudes towards the use of technology for learning. It seemed to the researchers that the disparity might be due to the availability of technological resources in the countries. These findings were unsurprising as Al-Emran and Shaalan [32] had reported earlier that, among the factors that were essential in examining attitude, country of residence had the strongest influence. Therefore, in this study, students' attitudes towards mobile learning could be investigated in terms of i) perceived usefulness, ii) communication with peers and teachers, iii) resources and course materials, and iv) learning process and skill development [30].

To sum up, the fact that not all attitudinal research shows positive outcomes raises a concern that a study of the same kind is still necessary, especially in a context where the country's technological resources and learners' familiarity with technology are still under desired like in Vietnam.

3 Methodology

3.1 Participants

For data collection, a convenience sampling technique was employed to select the population since all students had the same chance to express their attitudes. The t-Test from G*Power software (version 3.1) to calculate the total sample size was examined by a priori power analysis for one sample group with the input parameters: a two-tailed test, an effect size of $d = .3$, a significance level of $\alpha = .05$, the required level $(1 - \beta) = .8$. The result showed that the required total sample size was 90. Therefore, in this study, 118 university students were involved to complete a questionnaire, which was good to conduct the study. The participants were aged 18–21 with a proportion of 45.8% males and 54.2% females. They were from different majors and departments at a private university in Vietnam. Besides, 20 students out of 118 were randomly invited for semi-structured interviews. The participation was voluntary and the responses were confidential as informed to the participants before collecting the data.

3.2 Research instruments and design

The study adopted a mixed-method approach, in which both quantitative and qualitative methods were employed to explore the extent university students express their attitudes towards the use of mobile technology in their learning. A semi-structured interview was also used to get a deeper understanding of how these students used mobile technology in their learning processes.

For the quantitative method, the study employed a survey questionnaire with 15 items (questions), which are divided into 2 sections. The first section consists of questions about the participants' demographic information and the type of mobile devices students possess. The second section includes ten items representing students' attitudes towards the application of mobile learning in their studies. The survey questionnaire was designed and adapted from Al-Emran et al. [30], based on a 5-point Likert scale, namely 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. From the literature, the survey questionnaire items are classified as perceived usefulness, communication with peers and teachers, resources and course materials, and learning process and skill development. The content validity was examined by the supervision of some colleagues. The participants completed the survey questionnaire via Google Forms and it took approximately 15 minutes to complete it. The questionnaire items were measured by SPSS software (version 25) for reliability. The Cronbach Alpha value was .91, which indicates a good value to conduct the study.

For the qualitative method, the open-ended interview questions were designed on Google Docs due to the Covid-19 pandemic, in which students felt free to write their answers in detail. The answers were then manually analyzed and coded by themes to gain insights into how students used mobile devices in learning.

4 Results

4.1 Results from the questionnaire

A Descriptive statistics test and One Sample T-Test by SPSS software (version 25) were employed to investigate students' attitudes towards mobile learning, following a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree).

Table 1. Participants attitudes towards the use of mobile learning

Attitude Constructs	N	Mean (M)	SD
Perceived usefulness	118	4.20	.68
Communication with peers and teachers	118	4.33	.71
Resources and course materials	118	4.48	.67
Learning process and skill development	118	4.28	.75
Average	**118**	**4.32**	**.62**

As in Table 1, the result reveals that the average mean of participants' attitudes towards mobile learning (M = 4.32) was higher than 4.0 (agree). Besides, the result of One Sample T-Test indicates that the mean (M = 4.32) was significantly different from 4.0 (t = 5.63, df = 117, p = .00 <.05). It means that students expressed their significantly positive attitudes towards the use of mobile learning. Specifically, students paid the most attention to the resources and course materials used when using mobile devices in their learning process (M = 4.48). Besides, the other factors such as communication with peers and teachers (M = 4.33), learning process and skill development (M = 4.28), and perceived usefulness of mobile learning (M = 4.20) were highly appreciated when they decided to approach mobile learning.

Table 2. Participants' attitudes towards the perceived usefulness of mobile learning

Perceived Usefulness	N	Mean (M)	SD
Mobile technology is a useful tool for my study.	118	4.51	.77
Mobile Apps can help me to manage my study.	118	3.98	.97
Mobile technology can help me to do my coursework.	118	4.11	.92

Table 2 reveals that students perceived the usefulness of mobile learning at a high level. The participants supported that it was useful to use mobile technology for their study (M = 4.51). In addition, they agreed that mobile technology assisted them to do coursework and manage their study well (M = 4.11 and M = 3.98 respectively).

Table 3. Participants' attitudes towards communication with peers and instructors

Communication	N	Mean (M)	SD
Mobile technology can offer opportunities for communication and team-working.	118	4.31	.84
Mobile technology can be an easy way to get feedback and notifications from my instructors.	118	4.36	.82

As can be seen from Table 3, the results show that students also had positive attitudes towards mutual communication when they used mobile technology in their learning among their classmates and instructors. In particular, the participants found it easy to get feedback and notifications from their teachers when they used mobile devices in their coursework (M = 4.36) and could communicate better and enhance their team-work (M = 4.31).

Table 4. Participants' attitudes towards resources and course materials

Resources and Course Materials	N	Mean (M)	SD
Mobile technology can help me in finding resources related to my study.	118	4.52	.77
Mobile technology can help me to access the course-material anytime anywhere.	118	4.46	.81
Mobile technology can help me to exchange the course-material with my friends.	118	4.45	.78

The results from Table 4 indicate that students had highly positive attitudes towards the use of resources and course materials in mobile devices in their learning. The participants agreed that mobile technology could help them find materials and resources available on the Internet they needed for their study (M = 4.52). More importantly, students could access those materials and resources without limitations of time and place (M = 4.46). Sharing course materials was highly appreciated by the participants when they needed it via their mobile devices (M = 4.45).

Table 5. Participants' attitudes towards learning process and skill development

Learning Process and Skill Development	N	Mean (M)	SD
Mobile technology can bring many opportunities to the learning process.	118	4.36	.83
Mobile technology can help me to develop my learning skills.	118	4.20	.85

Table 5 shows that students could have more opportunities to learn more when mobile technology was used in their courses (M = 4.36). Moreover, they supported that they could improve a variety of skills when they used mobile devices for their study (M = 4.20).

4.2 Results from the interviews

To get a deep understanding of how students used mobile technology for their study, 20 participants were involved in the interviews based on four main domains, namely perceived usefulness of mobile learning, communication with peers and instructors, resources and course materials, and learning process and skill development.

Perceived usefulness of mobile learning. The results reveal that all students supported that mobile technology was a useful tool for their study. Specifically, students used their mobile devices such as smartphones, laptops, or tablets to look up some information for their assignments, and search for additional knowledge quickly. This helped students get their tasks done faster and achieve better results.

> *"Mobile device helps us to have better learning results because it is like a device as well as a friend to assist us in finding or looking up information. At the same time, we can also learn more knowledge through learning apps or on social networking platforms." (Student 1)*

Many of the participants used mobile applications or social networking sites to manage their studies such as OneNote, Reminder, Google Keep, Facebook, or Zalo. One participant described:

> *"I use Zalo, Facebook, or hourly reminder app to manage my studies." (Student 11)*

Communication with peers and instructors. The interview results indicate that students agreed that mobile technology really offered them opportunities to communicate with their classmates and teachers better. They could receive feedback and notifications from their teachers just in a short time via emails, social networking sites, Google Classroom, or text messages. One student presented:

> *"We receive feedback from teachers in many forms. With normal announcements, we usually communicate through social networks like Zalo or Facebook. More important instructions are available via email or a school platform or Google Classroom." (Student 10)*

Moreover, students added that they worked in groups more effectively thanks to mobile devices since they could exchange information and meet other members online when they were away or during the Covid-19 pandemic. One student stated:

> *"Mobile technology is also what helps us work better with others in a team because members can easily share information through social networking sites such as email, Facebook or Zalo. For example, during the covid-19 pandemic, if there is no mobile technology device then all students cannot continue their work." (Student 8)*

Resources and course materials. The participants supported that they could get easy access to resources and materials available as well as share and exchange the materials with friends at ease. They could download, share, or learn from many sources available online such as Wikipedia, Youtube, and Google Scholar. Students added:

> *"Technological devices open up new horizons, continuously access many materials and resources with supplementary information, helping learners to exchange information quickly and accurately like Google Scholar." (Student 17)*
>
> *"I have the opportunity to contact and get the knowledge that you have to go to many places but with only one phone and some keywords, I can get that knowledge in a short time." (Student 11)*
>
> *"The learning resources I often access on mobile devices such as lectures on YouTube, exercises, mock tests on, and references on Google Scholar." (Student 7)*

Learning process and skill development. From the interview analysis, students stated that mobile technology helped them to develop certain skills during their learning processes such as computer skills and analytical skills. They confirmed that they could type faster, search and filter information better as well as analyze and evaluate the information. Besides, they could improve their note-taking skills since they noted key information while searching and reading important course materials. Two students shared:

> *"The study skill that I acquired after using mobile technology is the skill of searching and filtering information." (Student 8)*
>
> *"I can look up and select information on the sites, so I take notes faster." (Student 1)*

5 Discussion

The findings suggest that students preferred to use mobile technology for their studies since mobile learning was highly appreciated by many students regarding the usefulness they perceived when they used mobile devices to support them in learning. The first finding reveals the students' highly positive attitudes towards the use of mobile learning because they could get easier access to course materials at any time and place, which was also in line with the findings by Yurdagul and Oz [29]. The next finding implies enhanced communication among users in their learning through mobile devices. In other words, students found it more connective with other peers and instructors via mobile technology such as sharing and exchanging information at ease. In fact, students agreed that mobile technology assisted them to improve their learning experiences, which was consistent with the results from the study conducted by Al-Fahad [25]. Especially, students could learn and improve different skills such as computer skills, analytical skills, and note-taking skills, which were considered essential for students in higher education. More importantly, all students indicated that their academic achievements were higher thanks to the use of mobile technology in their learning process, with the alignment from the study by Crompton and Burke [18].

6 Conclusion and suggestions for further research

In general, students expressed their positive attitudes towards the use of mobile technology for their studies since they could find out the effectiveness of using mobile devices to support them in their learning. More importantly, the resources and course materials should be provided and available for students' mobile learning since students paid most attention to the resources along with positive communication with their peers and instructors that could assist them to study more effectively. In addition, students had more positive attitudes towards the skills they could develop when they studied with mobile devices such as computer skills, analytical skills, and note-taking skills. This suggests pedagogical implications for mobile technology-enhanced learning in higher education. In particular, students could take advantage of mobile devices to achieve higher academic goals while instructors could use mobile-assisted learning tools and devices to improve the quality of higher education.

Although the study focuses on students' attitudes towards mobile learning with positive results, it would be more comprehensive to get a clearer picture of mobile learning if teachers' attitudes are also explored to see the similarities and differences between the two groups. Therefore, the suggestion for further research is raised for educators and researchers to assist learning and teaching with mobile technology.

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