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Mobile Learning in School Education: A Study based on Eastern Province, Sri Lanka

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Abstract

This study aims to identify the factors affecting the intention to adapt mobile learning and the relationship between identified factors and mobile learning (m-learning) among school students in the Eastern Province, Sri Lanka. With the consideration of constructs such as performance expectancy, effort expectancy, perceived playfulness, social influence, and perceived usefulness, the survey was done among 150 Advanced Level school students in the Eastern Province, Sri Lanka. The model of the study was evaluated using the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Smart PLS was used for measurement model testing and structural model testing. The results showed factors such as performance expectancy, effort expectancy, and social influence have positive and significant influence on the perceived level of intention to use m-learning. Unexpectedly, the results also showed that factors such as perceived usefulness and perceived playfulness do not have a positive and significant influence on the perceived level of intention to use m-learning. The findings of the study provide information to educational institutions such as schools on factors that they should concentrate on when improving the use of m-learning. The study did not examine the m-learning intention among the school students from other grades, other schools as well as other districts. Therefore, it is suggested to consider school students with various geographical locations for future research.

Keywords: Mobile learning, performance expectancy, effort expectancy, perceived usefulness, social influence

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Introduction

Background

Mobile learning (m-learning) has emerged as a transformative tool in modern education, especially in the context of the widespread use of smartphones. As mobile technology continues to evolve, educational institutions globally are increasingly incorporating it into their teaching strategies. While the integration of mobile devices into education offers numerous benefits, such as convenience, accessibility, and engagement, its impact on academic performance is still an area of active research. This is particularly evident in developing countries, where schools adopt mobile-learning strategies to overcome traditional educational challenges and improve learning outcomes (Masrom, 2007).

The rise of mobile technology in education came at a time when smartphones and other portable devices have become nearly ubiquitous. This trend has made learning more flexible, as students can access educational content and resources anytime, anywhere. M-learning has the potential to break down geographical and economic barriers, offering learners in remote or underserved areas the chance to engage with quality educational materials that might otherwise be out of reach. Moreover, mobile devices facilitate personalized learning experiences, allowing students to learn at their own pace, revisit lessons, and receive immediate feedback.

In developing countries, mobile learning holds specific promise. These regions often face constraints such as overcrowded classrooms, limited access to textbooks, and a lack of qualified teachers. By leveraging mobile devices, schools can overcome these obstacles and provide students with supplementary educational resources. For example, mobile learning apps can offer interactive lessons, quizzes, and videos, which cater to different learning styles and help reinforce difficult concepts. This level of interactivity can boost students' engagement and motivation, which in turn can enhance their academic performance.

However, while mobile learning presents significant advantages, its integration into education is not without challenges. One of the main barriers is the disparity in access to mobile devices and internet connectivity, particularly in low-income or rural areas. Even though smartphones are increasingly affordable, many students in developing countries still lack the necessary infrastructure or the financial resources to acquire these devices. Additionally, inconsistent internet connectivity can hinder the use of online learning platforms, limiting the effectiveness of m-learning.

Another critical issue is the lack of training for both teachers and students on how to effectively use mobile devices for educational purposes. Teachers may not be equipped with the skills or knowledge to incorporate mobile technology into their lesson plans, and students may not be aware of how to maximize the educational potential of their devices (Sadaf & Johnson, 2017). Without proper training, the benefits of m-learning can be diminished, and students may not fully utilize the technology to improve their academic performance.

Moreover, the overuse of mobile devices for entertainment purposes, such as social media or gaming, can also interfere with students' learning. There is a risk that mobile technology could become a distraction rather than an educational tool if students are not properly guided on how to use it responsibly. This calls for a balanced approach to m-learning that encourages responsible usage and emphasizes educational content.

M-learning has the potential to revolutionize education, especially in developing countries where traditional educational resources may be scarce. However, to maximize its impact, schools must address challenges such as unequal access to devices and internet, insufficient training for educators, and the risk of distractions. By exploring these factors and refining m-learning strategies, educational institutions can create an environment where mobile technology enhances academic performance and supports student success.

Problem Statement

Despite the widespread use of mobile phones among school students, the adaptation of m-learning remains limited, especially in developing countries like Sri Lanka. While mobile phones are increasingly becoming an essential tool for communication and entertainment, their potential as an educational resource has yet to be fully realized. Several factors contribute to this limited adoption, including a lack of technological skills, internet connectivity issues, security concerns, and affordability challenges. These barriers hinder the effective use of mobile devices for learning, despite their growing presence in students' lives (Al-Emran et al., 2017).

One of the key challenges to the widespread adoption of m-learning is the lack of technological skills among both students and educators. In many developing countries, including Sri Lanka, students may be familiar with the basic functions of their mobile phones, such as calling, texting, or using social media. However, they often lack the necessary skills to use mobile devices for educational purposes. Similarly, teachers may not have the technical expertise to incorporate mobile technology into their lesson plans, which limits the effectiveness of m-learning initiatives. Without adequate training, both teachers and students struggle to make full use of m-learning resources, and the potential benefits of mobile technology are not fully realized.

Internet connectivity is another significant barrier to mobile learning adoption. In Sri Lanka, as in many developing nations, reliable internet access is often limited, particularly in rural areas. Even in urban centres, the quality of internet service can be inconsistent, with frequent disruptions or slow speeds (Alrasheedi et al., 2018). M-learning heavily relies on internet connectivity to access educational content, participate in online discussions, and utilize learning apps. Without stable and affordable internet access, students are unable to engage in online learning, making mobile learning an ineffective tool for educational enhancement. This digital divide further exacerbates inequalities in educational opportunities, as students in more affluent areas are able to take advantage of m-learning resources, while those in less privileged regions are left behind.

Security concerns also play a role in hindering the adoption of m-learning. Many students and parents are worried about the safety and privacy risks associated with mobile devices, particularly when it comes to sharing personal information or engaging with online platforms (Dahlstrom et al., 2013). Cyber security threats, including data breaches, online harassment, and exposure to inappropriate content, can make both students and educators hesitant to embrace m-learning. Schools and educational institutions must address these concerns by implementing security measures, educating students and parents about online safety, and providing secure platforms for learning.

Affordability is yet another challenge. Mobile devices, although increasingly affordable, remain out of reach for many families in Sri Lanka. The cost of smartphones, data plans, and internet connectivity can be prohibitively expensive, particularly for low-income households. Even when students do have access to mobile phones, the ongoing costs associated with mobile data and internet services can be a significant barrier to consistent use (Ferreira et al., 2013). This financial burden can limit the adoption of m-learning, especially when schools cannot provide devices or subsidized internet access to students.

Despite these challenges, studies suggest that certain factors can encourage the adaptation of m-learning among students. Motivations such as hedonic appeal, self-efficacy, and learning autonomy have been shown to play a positive role in adoption. Students who perceive m-learning as enjoyable, empowering, and flexible are more likely to embrace it. However, barriers like tradition, resistance to change, and concerns about the social image associated with m-learning can deter adoption. In Sri Lanka, cultural and educational traditions that prioritize face-to-face learning may also slow the transition to mobile-based learning.

While m-learning has the potential to enhance education in Sri Lanka, several factors, including lack of technological skills, poor internet connectivity, security concerns, affordability challenges, and cultural resistance, limit its adoption. To overcome these barriers, a multifaceted approach is required, involving better infrastructure, training programmes, affordable access to devices, and the development of secure and engaging m-learning platforms. Only by addressing these challenges, Sri Lanka realizes the full potential of m-learning in transforming its education system (Keller & Cernerud, 2005).

Research Questions

1) What are the factors that affect the intention to adopt m-learning for school education?
2) What is the relationship between the above identified factors and the intention to adopt m-learning?

Research Objectives

1) To investigate the factors that affect the intention to adopt m-learning for school education
2) To investigate the relationship between the above identified factors and the intention to adopt m-learning

Review of Literature

Mobile Technology

Mobile phones have become an indispensable part of daily life for billions of people around the world, with 5.1 billion unique mobile subscribers globally, reflecting their rapid growth and widespread use. These devices have revolutionized communication, offering a more accessible and cost-effective alternative to traditional technologies like computers. The impact of mobile phones extends beyond communication; they have transformed various aspects of daily life, including education (Kumar & Chand, 2011). In both developing and developed countries, mobile technologies have significantly reshaped how people connect, access information, and learn. In Sri Lanka, mobile phones have become particularly essential, both in urban and rural areas, due to their affordability, portability, and versatility.

One of the key reasons for the widespread adoption of mobile phones in Sri Lanka is their accessibility and low cost. Mobile phones, especially smartphones, have become more affordable in recent years, making them within reach for many students, even those from lower-income households (Agarwal & Karahanna, 2000). With internet connectivity, these phones offer a powerful platform for communication, learning, and entertainment. Unlike computers, which require fixed infrastructure and can be expensive, mobile phones provide an affordable and flexible option for students to access educational resources, connect with peers and teachers, and enhance their learning experiences (Keller, 2005). The portability of mobile phones also makes them more convenient, allowing students to access information on the go, whether they are in school, at home, or even traveling.

The wide adoption of mobile phones among students in Sri Lanka, both in urban and rural areas, has led to increased connectivity and learning opportunities. Mobile phones provide students with access to a wealth of information and educational materials through the internet (Pillai, 2018).

From educational apps and online tutorials to e-books and interactive quizzes, students can engage with a variety of learning resources that were previously unavailable or difficult to access. This opens up new opportunities for self-directed learning, as students can explore topics of interest at their own pace, outside of the traditional classroom environment (Norris et al., 2011). For rural students, in particular, mobile phones help bridge the educational gap by providing access to resources that might otherwise be unavailable due to geographical or economic limitations.

Furthermore, mobile phones have become essential tools for communication in the educational ecosystem. With texting, calling, and social media platforms, students can easily communicate with their teachers and classmates. In Sri Lanka, many schools use mobile phones to send updates on assignments, exams, and other important school-related information (Campbell, 2006). This fosters a more connected and informed student community, making it easier for students to stay up-to-date with their education. Mobile phones also facilitate collaboration among students, enabling them to share resources, work together on group projects, and discuss academic topics outside of the classroom.

In addition to enhancing educational opportunities, mobile phones help foster digital literacy among students. As mobile technology continues to advance, students are becoming increasingly proficient in using digital tools and platforms. This digital competence is essential in preparing students for future careers, as technology continues to play an increasingly central role in the global job market (Alrasheedi, 2018).

Mobile phones, particularly smartphones, have become essential tools for communication and education in the 21st century. In Sri Lanka, their widespread adoption among students in both urban and rural areas has opened up new opportunities for learning and digital engagement (Kennedy, 2008). With their affordability, portability, and versatility, mobile phones have revolutionized the way students access information, communicate with peers and educators, and engage with the learning process. As mobile technology continues to evolve, its role in education will only become more significant, helping to shape a more connected, informed, and digitally literate generation.

Mobile Learning

M-learning has emerged as a revolutionary method of education, providing students with the opportunity to learn anytime and anywhere through portable devices such as smartphones and tablets (O'Malley et al., 2005). This flexibility and convenience allow students to engage with educational content outside the traditional classroom setting, making learning more accessible and adaptable to individual needs. As mobile devices become increasingly widespread, the potential to enhance learning outcomes, student engagement, and overall satisfaction through m-learning is becoming more evident. Despite certain challenges such as connectivity issues and concerns about safety, the positive impact of mobile devices on education is being widely recognized (Dahlstrom, 2013).

One of the primary advantages of m-learning is the ability to access educational resources at any time. Whether students are at home, on public transport, or in a classroom, m-learning allows them to engage with learning materials and activities at their own pace. This accessibility helps accommodate different learning styles and schedules, particularly for those with busy or irregular timetables (Masrom, 2007). Students can review lessons, complete assignments, and participate in online discussions during times that suit them best. This level of flexibility is especially beneficial for learners in non-traditional education environments, such as adult learners or those balancing education with work or family responsibilities.

Research suggests that the use of mobile devices can have a positive impact on student outcomes. By providing students with immediate access to information and resources, m-learning helps reinforce classroom learning, increase productivity, and promote continuous development (Ajzen, 1975). Educational apps, interactive content, and online quizzes all contribute to creating an engaging, dynamic learning environment that fosters active participation.

Additionally, mobile devices support various learning activities such as collaborative projects, virtual labs, and discussions, all of which contribute to a deeper understanding of subjects and improved academic performance (Kumar, 2011). Furthermore, the portability of mobile devices encourages students to take ownership of their learning, enabling them to engage in self-study and reinforce knowledge outside of formal classroom settings.

The interactive and synergetic nature of m-learning also promotes the concept of lifelong learning. By facilitating access to educational materials and allowing students to pursue their interests beyond formal educational institutions, m-learning empowers learners to take control of their educational journeys (Al-Emran, 2017). With the increasing availability of open educational resources, mobile devices can act as tools for ongoing development and skill-building. This approach aligns well with the modern demand for continuous learning, where individuals need to adapt to new technologies, industries, and trends.

However, despite many benefits, m-learning faces challenges that hinder its widespread adoption. One of the main issues is the inconsistent availability of reliable internet connectivity, particularly in rural or low-income areas. Poor or unstable internet access can significantly hinder the effectiveness of m-learning, limiting students' ability to access online resources or participate in digital activities (Keller, 2005). In addition, safety concerns regarding data privacy, cyber bullying, and inappropriate content on mobile devices can deter both students and parents from fully embracing m-learning.

Furthermore, surveys highlight that engagement with m-learning is not universal. In regions such as the Gulf, for example, students show lower levels of interest in using mobile technologies for educational tasks like e-evaluation or online assessments (Davis, 1989). This lack of interest may stem from cultural attitudes, insufficient technological infrastructure, or limited awareness of the educational benefits of m-learning. In contrast, students in fields like engineering and business have reported significantly higher usage of mobile devices for educational tasks. These fields often require practical, hands-on learning, making mobile devices an effective tool for accessing simulations, case studies, and interactive exercises.

In conclusion, while m-learning offers immense potential for enhancing education, its success depends on overcoming challenges such as connectivity issues, safety concerns, and varying levels of engagement (Burton-Jones, 2007). The positive impacts of mobile devices on learning outcomes, student engagement, and lifelong learning are clear. However, further research and targeted strategies are needed to address the barriers to m-learning adoption. As technology continues to evolve, the role of m-learning in education will likely expand, creating new opportunities for students worldwide.

Technology Adaptation of Users

Recent studies have highlighted the growing importance of understanding how everyday technologies, particularly mobile devices, can be adapted for educational purposes. As mobile technology continues to become more embedded in daily life, it presents new opportunities for enhancing learning experiences. However, to maximize its effectiveness in education, it is crucial to understand the factors that influence users' adoption of m-learning apps and technologies. Scholars like Kennedy et al. (2008) have called for a deeper exploration into how technology can be seamlessly integrated into educational contexts to support learning goals.

The adoption of m-learning apps is shaped by a range of motivational, personal, and social factors. According to research by Pillai & Sivathanu (2018), several key factors drive users' decisions to adopt m-learning technologies. One of the primary drivers is hedonic motivation, which refers to the pleasure or enjoyment a user experiences when engaging with technology. In the context of m-learning, if students perceive educational apps as fun, engaging, and rewarding, they are more likely to use them frequently. This sense of enjoyment is particularly important in the case of younger learners, who are often more motivated by interactive and stimulating content.

Another important factor is self-efficacy, which is the belief in one's ability to successfully use mobile learning apps. When students feel confident in their ability to navigate and use mobile devices for educational purposes, they are more likely to adopt these technologies. Building digital literacy skills is essential for ensuring that students can engage with m-learning tools effectively. In this sense, self-efficacy plays a key role in facilitating the transition from traditional learning methods to more tech-integrated approaches (Alrasheedi, 2018).

Learning autonomy also significantly influences m-learning adoption. The flexibility that mobile devices offer allows students to take control of their learning process, deciding when and where they engage with educational content (Ajzen, 1975). This independence can be particularly appealing to learners who value self-directed education or need to balance other commitments, such as work or family responsibilities. Students who appreciate the ability to learn on their own terms are more likely to embrace m-learning as a means of enhancing their academic experience.

Moreover, perceived advantages such as convenience, accessibility, and efficiency of m-learning are key drivers in its adoption. M-learning apps offer instant access to a wealth of resources, such as videos, quizzes, and interactive tools, making learning more dynamic and accessible. These perceived advantages are often cited as motivating factors that encourage students to incorporate mobile technology into their study routines (Dahlstrom, 2013).

However, the adoption of m-learning apps is not without barriers. Studies also identify certain limitations that hinder the integration of m-learning into educational systems. Tradition can be a significant barrier, particularly in cultures or educational systems where traditional face-to-face learning is deeply ingrained (Ngampornchai & Adams, 2016). Teachers and students who are accustomed to conventional teaching methods may be resistant to incorporating mobile technology into the classroom. Similarly, concerns about the usage of mobile devices such as distractions or over-reliance on technology can limit their adoption. Some students may be hesitant to embrace m-learning because they fear it will disrupt their study habits or introduce unnecessary complexity into their education.

Social Influence also plays a role; students may worry about how their peers perceive their use of m-learning apps or the potential stigma associated with using technology for education.

To better understand these factors, models like the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) provide frameworks for analyzing user behaviour and the factors influencing technology adoption (Davis, 1989). TAM, for example, posits that perceived ease of use and perceived usefulness are crucial to determining whether users will accept and use technology. UTAUT expands on this by considering factors like performance expectancy, effort expectancy, and social influence, all of which can impact the adoption of m-learning.

Positive perceptions of mobile phones as tools for social connection, as highlighted by Campbell (2006) further support their integration into learning environments. Young people, in particular, are accustomed to using mobile phones for communication and social interaction. This familiarity with mobile devices as tools for connection makes it easier to integrate them into educational contexts, as students may already be comfortable using smartphones for various purposes outside of school (Sadaf & Johnson, 2017).

Understanding the factors that influence the adoption of m-learning technologies is crucial for enhancing educational outcomes (Dahlstrom, 2013). By addressing barriers such as tradition and usage limitations, while promoting the factors that drive adoption, such as self-efficacy, learning autonomy, and perceived advantages, educational institutions can help facilitate the successful integration of mobile devices into the learning process (Norris et al., 2011). The combination of theoretical models and positive perceptions among youth regarding mobile technology can pave the way for more widespread adoption and effective use of m-learning.

Methodology

Conceptual model and hypothesis development

The Theory of Planned Behavior and the Technology Acceptance Model are two influential frameworks used to understand how individuals accept and adopt new technologies. These models provide insight into the factors that influence user behaviour and help explain why certain technologies are more readily embraced than others. While both frameworks have contributed significantly to the field of technology adoption, they also have limitations, particularly in how they address individual differences such as age, gender, and education.

The Theory of Planned Behaviour (TPB), developed by Ajzen (1975), suggests that an individual's behaviour is determined by three key factors: attitude toward the behaviour, subjective norms, and perceived behavioural control. These factors together influence an individual's intention to engage in a particular behaviour, which in turn predicts actual behaviour. TPB is widely used in various contexts, including health behaviours, environmental actions, and technology adoption, as it offers a clear framework for understanding how attitudes, social pressures, and perceived control affect behavioural intentions.

Building on the TPB, the Technology Acceptance Model (TAM), proposed by Davis (1989), focuses specifically on technology adoption. TAM posits that two main factors determine an individual's intention to use a technology: perceived ease of use and perceived usefulness. These factors influence attitudes toward technology, which in turn affect users' behavioural intentions. TAM also incorporates subjective norms, which reflect the social influence of others in adopting or rejecting technology. In short, TAM simplifies the broader TPB model into a more focused framework to explain why users accept or reject technological innovations.

While TAM offers valuable insights into the factors that shape technology adoption, it has faced criticism for its limited scope in addressing individual differences. The model primarily focuses on perceived ease of use, perceived usefulness, and social influence, which are valuable but do not fully explain the complexities of user behaviour. One key limitation is that TAM does not consider how demographic variables such as age, gender, or education can influence technology acceptance. For example, younger users may have different attitudes toward technology than older individuals, and their motivations for adopting new technology may vary significantly. Similarly, individuals with higher levels of education may have a greater understanding of the benefits and complexities of technology, which could influence their adoption behaviours.

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh (2012) attempts to address some of these shortcomings by expanding on the constructs of TAM. UTAUT includes four key factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. These factors provide a more comprehensive framework for understanding technology adoption, as they capture not only individual perceptions of the technology but also the external conditions that may support or hinder its use. Performance expectancy refers to the perceived benefits of using technology, while effort expectancy focuses on the perceived ease of use. Social influence examines the role of others in the decision to adopt technology, and facilitating conditions encompass the resources and support systems that enable users to effectively utilize technology.

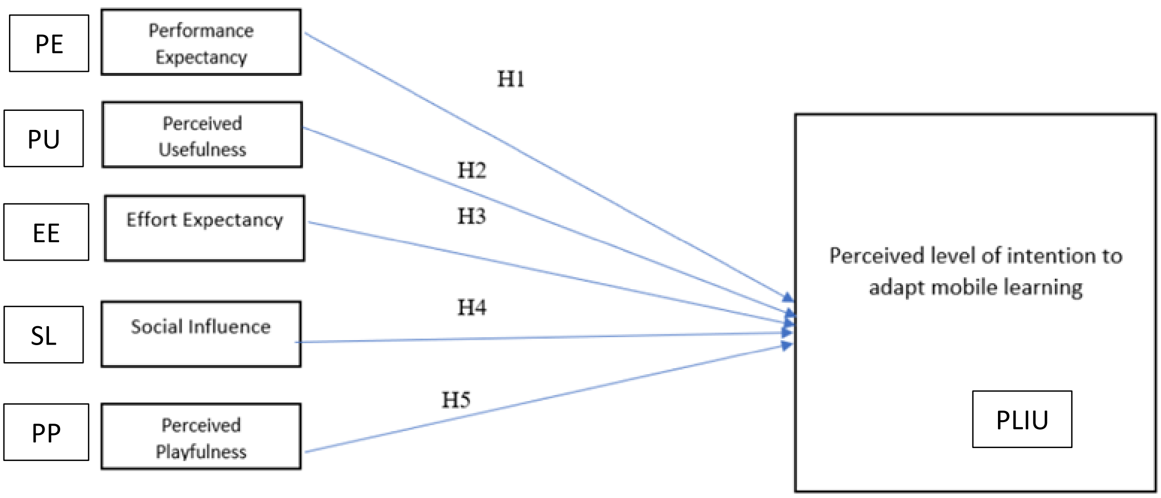
Despite its broader approach, UTAUT still overlooks the role of individual differences, such as age, gender, and education, in shaping technology adoption. Older individuals may have a different perception of performance expectancy or effort expectancy compared to younger generations. Gender differences can also play a role, with studies showing that men and women may have varying levels of interest in certain types of technologies or exhibit different patterns of technology use. These individual differences are particularly relevant in understanding adoption behaviours in diverse populations, and their omission in both TAM and UTAUT has led to criticisms of these models.

A significant critique, highlighted by Burton-Jones and Straub (2007) is that both TAM and UTAUT fail to incorporate the complexities of individual users. While these models offer useful frameworks for understanding broad trends in technology adoption, they do not fully account for the nuanced ways in which personal characteristics, social context, and cultural influences shape adoption behaviours.

Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), and Unified Theory of Acceptance and Use of Technology (UTAUT) provide important insights into the factors that drive technology adoption. However, these models are limited by their failure to adequately consider individual differences such as age, gender, and education. To gain a more comprehensive understanding of technology acceptance, future models must integrate these factors and recognize the diversity of users in the technological landscape.

Figure 1

Conceptual Framework



Design of the Study

This study adopted a quantitative research approach, utilizing paper-based offline questionnaires to collect data from Advanced Level students in National schools across the Eastern Province of Sri Lanka. A cross-sectional design was used to gather data at a single point in time, allowing for the examination of patterns and associations between variables. Data analysis was conducted using the SmartPLS software, with descriptive statistics (frequency counts, percentages, mean values) used to assess respondent characteristics. The relationship between factors and mobile technology adoption in education was analyzed through correlation and regression analysis, while the reliability of measurement scales was determined using Cronbach's alpha coefficient.

Population and Sampling Methods

The population in this research was all the Advanced Level students of Eastern Province, Sri Lanka. The total population included around 4000 school students. The total sample size of 150 students was randomly selected from 5 streams of Advanced Level, Eastern Province in Sri Lanka.

In this study, a stratified sampling method was employed to ensure a representation across diverse student groups from the Eastern Province of Sri Lanka, specifically, the Batticaloa District. A total of 150 Advanced Level students were randomly selected from five academic streams: Arts (14 students), Commerce (46 students), Bio Science (43 students), Physical Science (31 students), and Technology (16 students). To capture geographical diversity, students were also selected from both urban and rural areas, with 89 students (59%) from urban regions and 61 students (41%) from rural areas. This stratification allowed the study to include a balanced mix of academic disciplines and socio-geographic backgrounds.

Data collection methods

The data for this study were collected using a comprehensive questionnaire divided into three sections. Section One gathered information on m-learning activities, internet usage, and costs. Section Two collected personal data such as gender, residence, year of study, and stream.

Section Three focused on factors affecting the intention to adopt mobile technology for learning, using Likert-type questions.

Results and Discussion

Response Rate and Data Screening

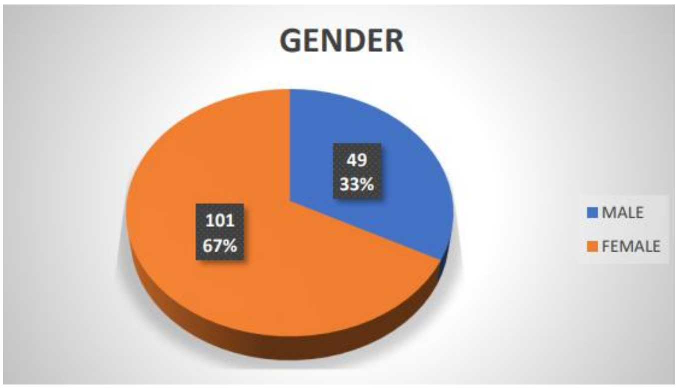
The population in this research was 4000 Advanced Level students of the Batticaloa District. Stratified sampling method was utilized in this study. The total sample size of 150 students was randomly selected from 5 streams of Advanced Level students in the Batticaloa District. The study collected 150 responses, and the response rate was 100%. The data were screened to find out the accuracy of the entering scores. Out of 150 responses from the students, there were no blank responses and no unengaged responses. Finally, all the 150 responses were considered as redefined responses.

Context of the Respondents

The demographic variable results are shown in the following figures.

Figure 2

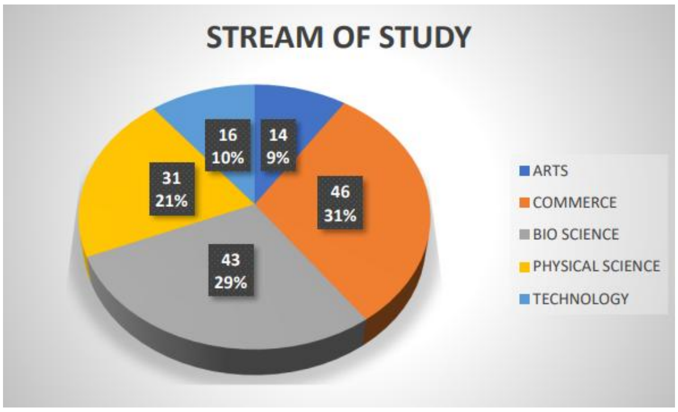
Gender of Respondents



The samples consisted of 101 female students (67%) and 49 male students (33%).

Figure 3

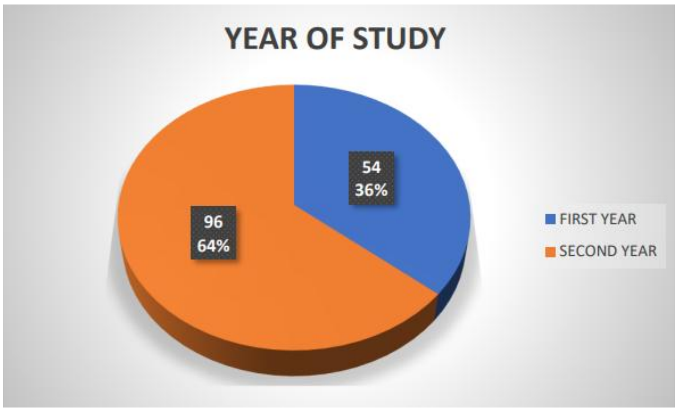
Stream of Study of Respondents



The samples consisted of 14 students from the Arts stream, 46 from Commerce, 43 from Bio Science, 31 from Physical Science, and 16 from Technology. The respective percentages for Arts, Commerce, Bio Science, Physical Science, and Technology streams are 9%, 31%, 29%, 21%, and 10%. The highest student participation was from the Commerce stream and the lowest participation was from the Arts stream.

Figure 4

Year of Study of Respondents

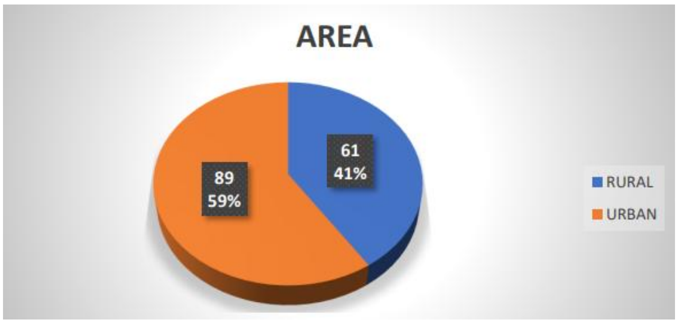


It was observed that 54 First Year students and 96 Second Year students have participated in data collection. The respective percentages of First Year and Second Year students are 36%

and 64%. More Second Year students have provided responses in comparison to First Year students.

Figure 5

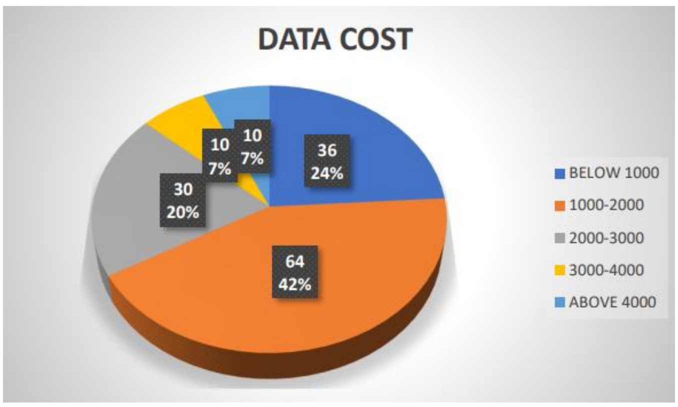
Area of Respondents



Considering the area from where students come to school, 61 students from rural areas and 89 students from urban areas have participated in the survey. The relevant percentages of students from rural and urban areas are 41% and 59%, respectively. It shows that most of the students in the data collection were from urban areas.

Figure 6

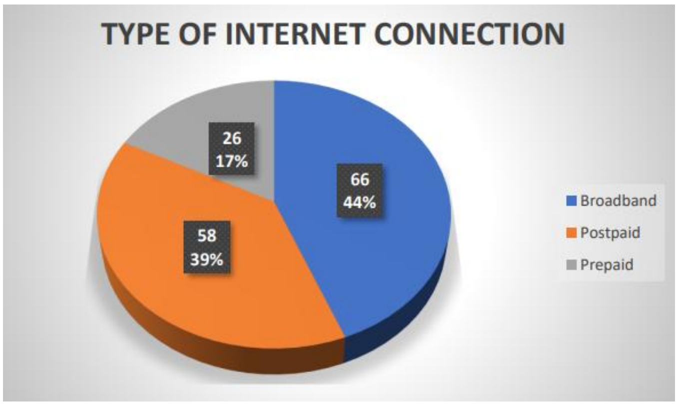
Data Cost of Respondents



Considering the data cost, 36 students incurred the data cost below Rs 1000/=; 64, between Rs 1000/= and 2000/=; 30, between Rs 2000/= and 3000/=; 10, between Rs 3000/= and 4000/=; and 10, above Rs 4000/=.

Figure 7

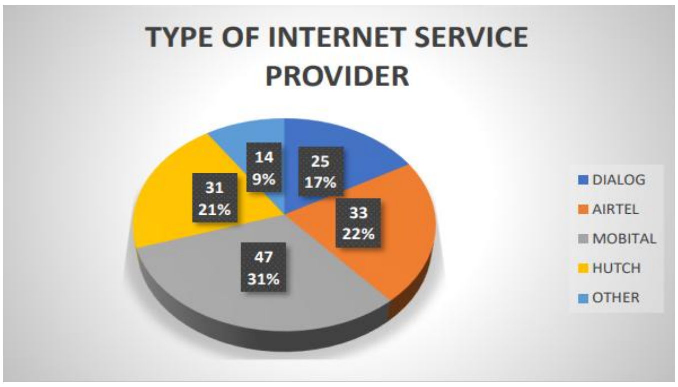
Type of Internet Connection of Respondents



When considering the type of internet connection, 66 students used broadband (44%), 58 used postpaid internet connections (39%), and 26 used prepaid internet connections (17%).

Figure 8

Type of Internet Service Provider of Respondents



When it comes to the type of internet service provider, 25 students used Dialog, 33 used Airtel, 47 used Mobitel, 31 used Hutch, and 14 used other ISPs. The relevant percentages of Dialog, Airtel, Mobitel, Hutch and other ISPs are 17%, 22%, 31%, 21%, and 9%. Most of the students who took part in the survey use Mobitel.

Descriptive Data Analysis

In order to examine the relationship between factors affecting m-learning and the intention to use mobile technology for learning purposes, a summary of analysis of demographic characteristics of research respondents are shown in Table 1.

Table 1

Demographic characteristics of participants

Parameter	Category	Frequency	Percentage (%)
Gender	Female	101	67.3
	Male	49	32.7
Stream of Study	Arts	14	9.3
	Commerce	46	30.7
	Bio Science	43	28.7
	Physical Science	31	20.7
	Technology	16	10.7
Year of Study	First Year	54	36.0
	Second Year	96	64.0
Area	Rural	61	40.7
	Urban	89	59.3
Type of Internet Service Provider	Dialog	25	16.7
	Airtel	33	20.0
	Mobitel	47	31.3
	Hutch	31	20.7
	Other	14	9.3
Monthly Data Cost (LKR)	Below 1000	36	24.0
	1000–2000	64	42.7
	2000–3000	30	20.0
	3000–4000	10	6.7
	Above 4000	10	6.7
Type of Internet Connection	Broadband	66	44.0
	Post-paid	58	38.7
	Pre-paid	26	17.3

Advanced Data Analysis

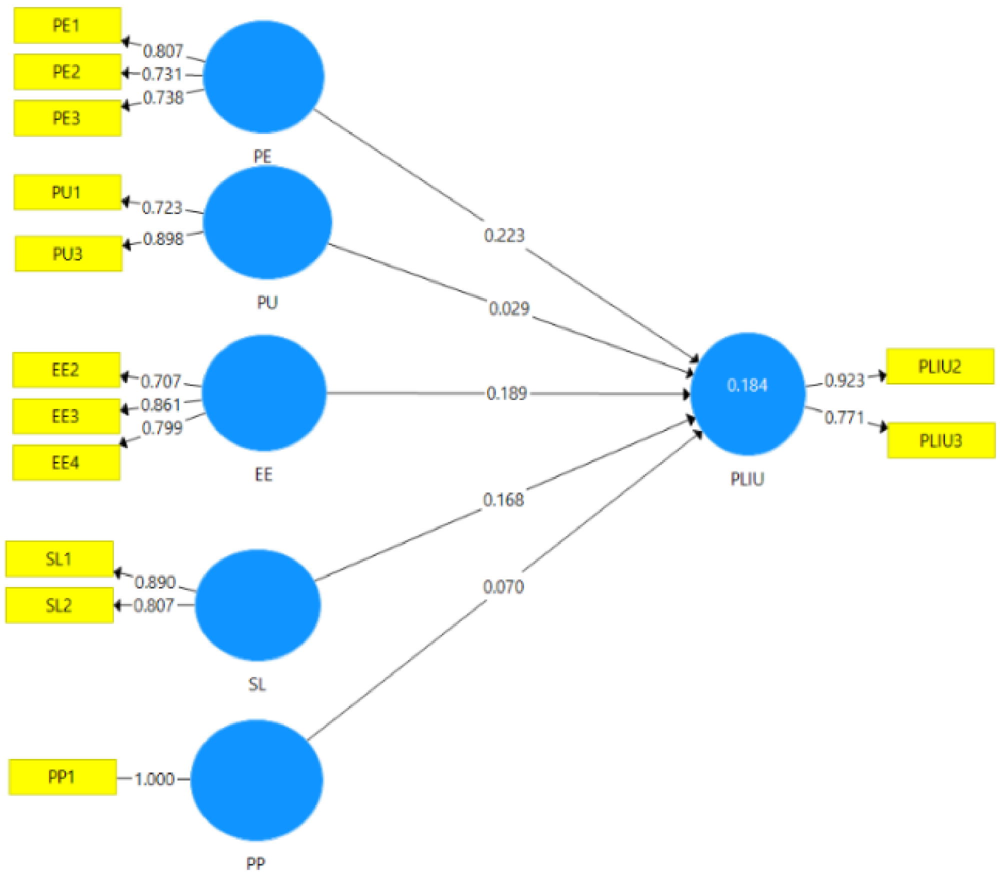
Under the advanced data analysis, model testing is adopted. Accordingly, under measurement model testing, indicator reliability, internal consistency reliability, discriminant validity, and convergent validity were tested as follows.

Indicator Reliability

The variables with values less than 0.7 such as PU2, EE1, SL3, PP2, PP3, and PLIU1 are removed to achieve indicator reliability. (Figure 9)

Figure 9

Indicator Reliability



Internal Consistency Reliability

Table 2

Internal Consistency Reliability

Construct	Cronbach's Alpha	Composite Reliability
EE	0.697	0.833
PE	0.637	0.803
PLIU	0.635	0.838
PP	1.000	1.000
PU	0.513	0.797
SL	0.619	0.838

To test internal consistency reliability, Cronbach's Alpha values and the composite reliability values were used. Both Cronbach's Alpha values and the composite reliability values should be greater than or equal to 0.7. In the research, the composite reliability values of all the variables were above 0.7, but the Cronbach's Alpha value of variable PP was only above 0.7 and the Cronbach's Alpha values of all the other variables such as EE, PE, PLIU, PU, and SL were below 0.7 with the respective values of 0.697, 0.637, 0.635, 0.513, and 0.619.

Discriminant Validity

Table 3

Discriminant Validity

Construct	EE	PE	PLIU	PP	PU	SL
EE	0.791					
PE	0.301	0.760				
PLIU	0.286	0.332	0.850			
PP	0.074	0.135	0.136	1.000		
PU	0.328	0.406	0.225	0.128	0.815	
SL	0.091	0.178	0.238	0.102	0.201	0.849

To test the discriminant validity, cross loading values were used. Square root of all diagonal values should be greater than correlation values of the corresponding constructs. All the diagonal values of the constructs (EE, PE, PLIU, PP, PU, SL) were greater than the correlation of the corresponding constructs. Therefore, discriminant validity was established in the research.

Convergent Validity

Table 4

Convergent Validity

Variable	Average Variance Extracted (AVE)
EE	0.626
PE	0.577
PLIIU	0.722
PP	1.000
PU	0.665
SL	0.721

After removing the variables with values less than 0.7, average value extracted (AVE) values were considered. AVE value of each construct should be 0.5 or above. Here, the AVE values of all the variables were above 0.5. Variables such as EE, PE, PLIU, PP, PU, and SL had the AVE values 0.626, 0.577, 0.722, 1.000, 0.665, and 0.721, respectively. Therefore, convergent validity was established. Apart from the measurement model testing, structural model testing was also tested. Under structural model testing, coefficient of determination (R2) and hypothesis testing were tested.

Coefficient Of Determination (R2)

Table 5

Coefficient of Determination (R2)

Variable	R Square	R Square Adjusted
PLIU	0.184	0.156

Coefficient of determination (R2) was tested to understand how well the model fits the observed data and the ability of the model to explain the variance in the dependent variables (18.4 % variability of perceived level of intention to use in m-learning intention to adapt). Generally, a higher R Squared indicates a better fit for the model. It is not always good for the model to have a higher R Squared because it can also indicate the problems with the model.

Hypothesis Testing

Table 6

Hypothesis Testing

Hypothesis	Relationship	Path Coefficient	T Statistics (|O/STDEV|)	P Values	Supported / Not Supported
H1	PE → PLIU	0.226	2.690	0.007	Supported
H2	PU → PLIU	0.045	0.357	0.721	Not Supported
H3	EE → PLIU	0.192	2.209	0.028	Supported
H4	SL → PLIU	0.176	2.205	0.028	Supported
H5	PP → PLIU	0.064	0.917	0.360	Not Supported

Findings and Discussion

H1: The higher the level of performance expectancy (PE), the higher the perceived level of intention to use mobile technology for learning (PLIU)

The t-value of the hypothesized path of PE and PLIU was 2.690, which is above 1.96 and p-value was 0.007. Therefore, the hypothesis is supported. It means there is enough evidence to prove that performance expectancy affects the perceived level of intention to use m-learning, and it also mentions that performance expectancy has a positive and significant influence on the perceived level of intention to use m-learning. In the past researches also, it is consistently stated that the performance expectancy has a positive and significant relationship on the perceived level of intention to use m-learning (Ngampornchai & Adams, 2016). Thus, the proposed association between perceived expectancy and the perceived level of intention to use m-learning was supported.

H2: The higher the level of perceived usefulness (PU), the higher the perceived level of intention to use mobile technology for learning (PLIU)

The t-value of the hypothesized path of PU and PLIU was 0.357, which is below 1.96 and p-value was 0.721. Therefore, the hypothesis is not supported. It means there is not enough evidence to prove that perceived usefulness affects the perceived level of intention to use m-learning, and it also mentions that perceived usefulness has a positive and significant influence on the perceived level of intention to use m-learning. This result is compatible with the earlier research (Soloway et al., 2011). Though a different context is used by the researcher for the perceived level of intention to use m-learning, it has proved that there is no significant impact of PU on PLIU.

H3: The higher the level of effort expectancy (EE), the higher the perceived level of intention to use mobile technology for learning (PLIU)

The t-value of the hypothesized path of EE and PLIU was 2.209, which is above 1.96 and p-value was 0.028. Therefore, the hypothesis is supported. It means there is enough evidence to prove that the effort expectancy affects the perceived level of intention to use m-learning, and it also mentions that effort expectancy has a positive and significant influence on the perceived level of intention to use m-learning. In the past researches also, it is consistently stated that the effort expectancy has a positive and significant relationship on the perceived level of intention to use m-learning (Ngampornchai & Adams, 2016). Thus, the proposed association between effort expectancy and the perceived level of intention to use m-learning was supported.

H4: The higher the level of social Influence (SL), the higher the perceived level of intention to use mobile technology for learning (PLIU)

The t-value of the hypothesized path of SL and PLIU was 2.205, which is above 1.96 and p-value was 0.028. Therefore, the hypothesis is supported. It means there is enough evidence to prove that social influence affects the perceived level of intention to use m-learning, and it also mentions that social influence has a positive and significant influence on the perceived level of intention to use m-learning. In the past researches also, it is consistently stated that social influence has a positive and significant relationship on the perceived level of intention to use m-learning (Ngampornchai & Adams, 2016). Thus, the proposed association between social influence and the perceived level of intention to use m-learning was supported.

H5: The higher the level of perceived playfulness (PP), the higher the perceived level of intention to use mobile technology for learning (PLIU)

The t-value of the hypothesized path of PP and PLIU was 0.917, which is below 1.96 and p-value was 0.360. Therefore, the hypothesis is not supported. It means there is not enough evidence to prove that perceived playfulness affects the perceived level of intention to use m-learning, and it also mentions that perceived playfulness has a positive and significant influence on the perceived level of intention to use m-learning. This result is compatible with the earlier research (Agarwal & Karahanna, 2000). Though a different context is used by the researcher for the perceived level of intention to use m-learning, it has proved that there is no significant impact of PP on PLIU.

Conclusion

The study on m-learning adaptation among school students in the Eastern Province of Sri Lanka identified several key factors influencing adoption, including performance expectancy, effort expectancy, and social influence. Performance expectancy, which refers to students' belief that m-learning will improve their academic performance, was found to be a significant factor driving adoption. Similarly, effort expectancy, or the ease with which students can use m-learning tools, played a crucial role. Students are more likely to adopt m-learning when they perceive it as simple and user-friendly.

Social influence was another key factor, with students being more inclined to adopt m-learning if they perceived support from teachers, peers, and family. Interestingly, Perceived usefulness and perceived playfulness did not significantly influence adoption, suggesting that students may prioritize practical benefits over entertainment when it comes to learning technologies. Regarding infrastructure, broadband and Mobitel were identified as the most commonly used mobile services, with data costs ranging from Rs 1000 to Rs 2000. These costs may present a financial barrier for many students, limiting the extent of m-learning usage.

The study recommends that schools in the Eastern Province of Sri Lanka actively promote m-learning to increase student engagement with Information Technology (IT). Schools should provide training for both teachers and students to improve digital literacy, and consider partnerships with mobile service providers to offer affordable data plans, ensuring that m-learning is accessible to all students.

The findings of the study provide valuable insights for educational institutions, particularly schools, on the factors influencing students' intention to use m-learning. Understanding these factors can help schools better integrate mobile technologies into their teaching methods. The study highlights the importance of performance expectancy, effort expectancy, and social influence, suggesting that schools should focus on making m-learning easy to use, beneficial for academic performance, and supported by teachers and peers.

Moreover, the study encourages schools to explore innovative ways of incorporating m-learning technologies into their curriculum. By adopting m-learning tools, schools can create a more engaging and dynamic learning environment. This mode of teaching and learning can offer several advantages for both teachers and students. For students, m-learning can be more interactive, flexible, and engaging, making the learning process less monotonous and more enjoyable. It also allows students to access educational resources at their own pace, fostering greater learning autonomy.

For teachers, m-learning can streamline lesson delivery, enable more personalized learning experiences, and enhance communication with students. It can also help teachers incorporate a range of multimedia and interactive resources, making lessons more engaging and accessible to diverse learning styles.

M-learning presents a promising opportunity for educational institutions to improve both teaching and learning experiences. By focusing on ease of use, engagement, and support, schools can effectively harness the benefits of mobile technology for enhanced educational outcomes.

Recommendations

The research focused on understanding the adaptation and intention to adopt mobile m-learning among Advanced Level students in Eastern Province, Sri Lanka. The study highlighted key factors such as performance expectancy, effort expectancy, and social influence, which significantly influence students' intention to use m-learning technologies. While this research provides valuable insights into the adoption patterns within a specific region, expanding the study to include students from other grades and provinces across Sri Lanka would offer a more comprehensive view of m-learning adoption trends across the country.

Including students from different educational levels, such as Ordinary Level or primary school students could reveal varying patterns of technology adoption. Different age groups may have distinct attitudes, needs, and levels of digital literacy, which can influence how they engage with m-learning tools. For instance, younger students might have different expectations from m-learning compared to older students preparing for advanced exams.

Furthermore, broadening the research to encompass students from different provinces, including urban, suburban, and rural areas, would provide a more holistic understanding of the barriers and opportunities for m-learning across diverse contexts. Urban students may have better access to technology and internet connectivity compared to those in rural or less developed areas, which could affect their experience with the adoption of m-learning. Incorporating a wider sample would allow researchers to identify regional differences in adoption factors, such as infrastructure, social influence, and cultural attitudes towards technology. This broader perspective could help shape more targeted and effective strategies for promoting m-learning in schools across Sri Lanka, ensuring equitable access and maximizing its educational benefits for all students.

Declaration

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