

Mobile Self-Efficacy and Perception about Mobile Learning among Engineering Students in Mizoram

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ABSTRACT

The use of mobile devices in the classroom has changed education in recent years by giving students more ways to access and interact with learning materials. This research focuses on mobile learning, often referred to as m-learning, which involves the use of mobile devices such as smartphones, tablets, and laptops to facilitate learning. The study investigates the level of mobile self-efficacy and the perception about mobile learning among engineering students in Mizoram. The study employs a quantitative research design, using a standardized tool and a self-constructed questionnaire to measure the levels of mobile self-efficacy and perception about mobile learning respectively. A stratified random sampling technique is used to collect data from two engineering institutions in Mizoram, viz., Mizoram University and NIT Mizoram. Findings reveal no significant difference in the levels of mobile self-efficacy and students' perception about mobile learning with respect to gender and institution. The study shows that most engineering students have a high level of mobile self-efficacy and view mobile learning as a useful educational tool.

Keywords: Mobile learning, Mobile Self-efficacy, Perception, Engineering Students

Mobile learning, often referred to as m-learning, is the use of mobile devices such as smartphones, tablets, and laptops to facilitate learning. It has become more common lately, especially in higher education institutions. According to Hwang and Tsai (2011), m-learning is described as using mobile technologies to facilitate learning. Mobile learning is a part of e-learning, but it is designed to work specifically through mobile devices. As Hwang and Chang (2011) explain, mobile learning is a form of e-learning that specifically uses mobile devices to integrate with ubiquitous computing technologies to deliver learning contents and supports. Mobile learning can extend the benefits of traditional e-learning by allowing learners to study through handheld mobile devices. Hung and Zhang (2012) stated that mobile learning can further extend the flexibility of e-learning regardless of learners' location using handheld mobile devices through wireless technologies.

The popularity of mobile technologies among students has also made mobile learning more practical. McConatha *et al.* (2008) observed that the growth of mobile technologies, like mobile phones, smart phones, personal digital assistants (PDA), and Tablet PCs have attracted the attention of the educators and researchers. Seppala and Alamaki (2003) pointed out that there is a strong base for mobile learning, as most university students already own mobile phones.

In higher education, mobile learning plays a major role in helping students stay connected and engaged with their studies. According to Hamidi and Chavoshi (2018), mobile learning plays an important role in higher education that allows

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students connect with each other and to the outside world with the help of internet. Oblinger *et al.* (2015) pointed out how mobile technology significantly enhances educational environments and supports the learning process in an innovative way.

Researchers have identified many benefits of mobile learning in education. According to Kukulska-Hulme and Traxler (2005), m-learning provides several advantages, including flexibility and freedom in learning, the ability to support social interaction and collaborative learning, self-learning opportunities through tests and quizzes and the ability to address different learning styles. Additionally, m-learning encourages student interest in education, enhances communication between students and teachers by allowing them to share assignments, automates assessments and provides immediate feedback (Osang *et al.* 2013).

Because of its many advantages, mobile learning is expected to become a more common and accepted part of education in the future. Alzahrani *et al.* (2014) mentioned that mobile learning has the potential to become main tool of education in foreseeable future. As mobile devices and internet become more accessible, mobile learning options will become easier for to offer to students. Mobile learning allows students to learn anywhere, creating a more flexible learning experience (Huan *et al.* 2015). In classrooms, m-Learning encourages collaborative learning, as students can easily communicate and share ideas through technology. This helps in mastering the subject matter as well as development of soft skills like teamwork and communication (Mehdipour & Zerehkaifi, 2013).

Mobile Self-Efficacy

Self-efficacy in general is a term from psychology that refers to an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments (Bandura, 1977). According to Compeau and Higgins (1995), self-efficacy is defined as an individual's belief in their ability to successfully use skills to perform a range of tasks. In mobile learning, this means students' belief in their capability of using mobile devices for learning. Odede (2021) noted that students' self-efficacy plays an important role in their decision to adopt m-learning.

Mobile self-efficacy is the belief that a person has in his/her ability to use mobile devices for learning. It is an important concept because it predicts whether students will be willing to use mobile devices in their learning. Odede (2021) defined mobile self-efficacy as the confidence in one's ability to use mobile devices for learning. Mahat *et al.* (2012) stated that self-efficacy is an important research issue to consider in the discussion on mobile technology acceptance. Understanding how confident students feel about using mobile devices helps educators plan how to introduce new learning tools in a way that supports students and builds their confidence.

Students' Perceptions of Mobile Learning

Perception refers to how an individual sees or understands something and forms either a positive or negative attitude toward it. As defined by the Oxford Dictionary (2014), perception is the tendency of individual behaviour to accept or reject a subject, often based on psychological factors that influence a person's attitude toward it.

Several research studies support the idea that students have positive perceptions of mobile learning. A study conducted by Al-Said (2015) at Taibah University found that undergraduate students appreciated mobile learning because it improved the learning process by making communication more effective and allowing them to learn at times that suited them. According to Clarke *et al.* (2008), most students reported positive experiences with m-learning. Rogers *et al.* (2010) also found that students believed m-learning made learning more interesting and engaging. Since students are already using mobile devices for entertainment and communication, it feels natural to extend their use into education. Pollara and Broussard (2011) noted that this existing familiarity encourages students to accept mobile learning more easily. When students enjoy using a learning method, they are more likely to continue using it, which leads to better learning outcomes.

Overall, students' perceptions of mobile learning were mostly positive. They view it as a flexible, effective, easy and engaging way to learn. Researchers like Kukulska-Hulme and Traxler (2005), Clarke *et al.* (2008), Pollara and Broussard (2011), Al-Said (2015) and others have shown that mobile learning can support student success and

motivation. A study by Hunaiyyan *et al.* (2018) obtained insights from both students and educators. Their findings showed that both students and educators were familiar with mobile devices and often used social media applications for educational purposes. The study confirmed that attitudes of students and educators toward m-learning were mostly. They also pointed out some barriers that could slow down the adoption of mobile learning.

Review of the Related Literature

Several research studies support the idea that students have positive perceptions of mobile learning. A study conducted by Al-Said (2015) at Taibah University found that undergraduate students appreciated mobile learning because it improved the learning process by making communication more effective and allowing them to learn at times that suited them. According to Clarke *et al.* (2008), most students reported positive experiences with m-learning. Rogers *et al.* (2010) also found that students believed m-learning made learning more interesting and engaging. Since students are already using mobile devices for entertainment and communication, it feels natural to extend their use into education. Pollara and Broussard (2011) noted that this existing familiarity encourages students to accept mobile learning more easily. When students enjoy using a learning method, they are more likely to continue using it, which leads to better learning outcomes.

Overall, students' perceptions of mobile learning were mostly positive. They view it as a flexible, effective, easy and engaging way to learn (Kim *et al.* 2013). Researchers like Kukulska-Hulme and Traxler (2005), Clarke *et al.* (2008), Pollara and Broussard (2011), Al-Said (2015) and others have shown that mobile learning can support student success and motivation. A study by Hunaiyyan *et al.* (2018) obtained insights from both students and educators. Their findings showed that both students and educators were familiar with mobile devices and often used social media applications for educational purposes. The study confirmed that attitudes of students and educators toward m-learning were mostly. They also pointed out some barriers that could slow down the adoption of mobile learning.

Rationale of the Study

Mobile learning has become more and more popular due to its advantages. It offers a more flexible and personalized learning environment that enable students to fit learning easily in their schedules. Because of its engaging and customizable learning experience mobile learning can raise motivation and engagement levels among learners. Also, it makes education more accessible to people who do not have time or access to traditional education.

Numbers of research have already highlighted the benefits of mobile learning for education. But, a more detailed and systematic research about mobile learning for education is still needed. Moreover, understanding how students perceived mobile learning can help determine its acceptance and adoption for learning. Researching perceptions about mobile learning can help identify barriers and challenges that prevent students for using mobile learning. Studying students' perception of mobile learning can also lead to the development of new and innovative ideas about mobile learning in educational setting. Moreover, investigators found no such study conducted in the North East region in general and Mizoram in specific, therefore the present study was conducted with the following objectives.

Objectives of the Study

1. To study the level of mobile self-efficacy among engineering students in Mizoram.
2. To study the perception of engineering students about mobile learning in Mizoram.
3. To compare the level of mobile self-efficacy among engineering students with reference to gender and type of institution.
4. To compare the perception of engineering students about mobile learning with reference to gender and type of institution.

Hypotheses of the Study

1. There is no significant difference in the level of mobile self-efficacy between male and female engineering students in Mizoram.
2. There is no significant difference in the level of mobile self-efficacy between NIT Mizoram

and Mizoram University engineering students.

3. There is no significant difference in the perception about mobile learning between male and female engineering students in Mizoram.
4. There is no significant difference in the perception between NIT Mizoram and Mizoram University engineering students about mobile learning.

Methodology

A descriptive research design was used to study mobile self-efficacy and perception about mobile learning among engineering students in Mizoram. A quantitative survey was conducted to study the level of mobile self-efficacy and perception of engineering students.

Sample

There are two government institutes of engineering in Mizoram. One is a central university and another is an institute of national importance. All the engineering students from School of Engineering and Technology (SET), Mizoram University and NIT Mizoram, studying in different branches were considered the population of the study. A total of 158 engineering students were selected using a stratified sampling technique. The chosen sample comprises of 79 engineering students each from Mizoram University and NIT Mizoram.

Table 1: Details of sample Selected

Institution	Male	Female	Total
Mizoram University	57	22	79
NIT Mizoram	54	25	79
Total	111	47	158

Research Instrument

The survey was conducted using two research instruments: 'Student Mobile Self-Efficacy Scale' modified by Yorganci (2017) and 'Perception about Mobile Learning Scale' developed by the investigators.

To measure mobile self-efficacy, student Mobile self-efficacy tool modified by Yorganci (2017) was used. Yorganci modified Computer Self-efficacy Measure (Compeau and Higgins, 1995) which included 10

items with 11-point Likert scale ranging from 0 (not confident) to 10 (totally confident) specifically in regards to mobile learning context. The internal reliability of the scale was 0.86.

Perception about mobile learning tool is developed by the investigator to measure students' perception about mobile learning. Students were given five options to respond to; the items assessed the utility of each factor. A 5-point Likert scale was used. The options are strongly agree, agree, neutral, disagree, and strongly disagree. The reliability of the constructed tool is measured using test-retest method. The correlation coefficient is 0.77.

Statistical Techniques Used: Descriptive and inferential statistics such as mean, standard deviation and t-test were used to analyse the mobile self-efficacy and perception of engineering students.

Analysis and Interpretation

This section focuses on analysing and interpreting data collected from mobile self-efficacy scale and perception about mobile learning scale of engineering students in Mizoram. Descriptive and inferential statistics were for the objectives and hypotheses.

Objective 1: "To study the level of mobile self-efficacy among engineering students in Mizoram".

The scores obtained from engineering students on the 'Mobile Self-efficacy Scale' were scored and tabulated. Based on their responses, mobile self-efficacy was classified into three levels as 'High', 'Moderate', and 'Low'. Depending upon their scores, the respondents were considered as having a high level self-efficacy (scoring above 33), a moderate level self-efficacy (scoring 16.5 - 33), and low level self-efficacy (scoring below 16.5).

Table 2: Level of Students' Mobile Self-Efficacy

Level	N	Percentage
High	121	76.58
Moderate	37	23.42
Low	0	0
Total	158	100

Table 1 shows that none of engineering students in Mizoram was found to possess low level mobile self-efficacy. The overall finding shows that the majority

of the students (76.85%) have high level mobile self-efficacy, and around a quarter of them (23.42%) possessed moderate level mobile self-efficacy.

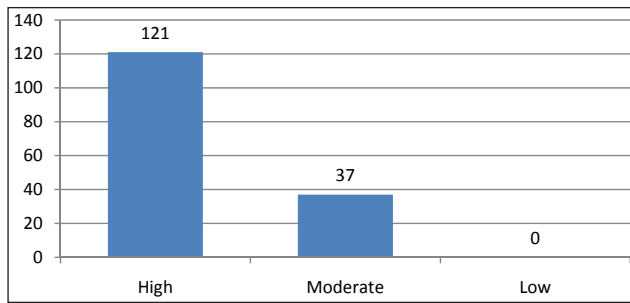


Fig. 1: Level of Students' Mobile Self-Efficacy

Objective 2: "To study the perception of engineering students about mobile learning in Mizoram".

The scores obtained from students of elementary school students on the 'perception about mobile learning scale' were scored and tabulated. Based on their responses, was classified into three levels as 'High', 'Moderate', and 'Low'. Depending upon their scores, the respondents were considered as having a high perception about mobile learning (scoring above 33), a moderate perception about mobile learning (scoring 16.5 - 33), and low perception about mobile learning (scoring below 16.5).

Table 3: Students' Perception about Mobile Learning

Level	N	Percentage
High	125	79.11
Moderate	33	20.89
Low	0	0
Total	158	100

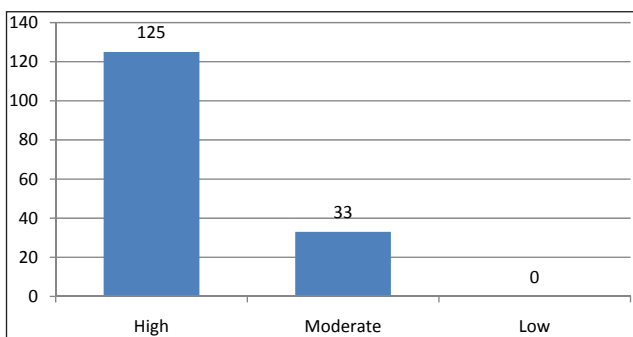


Fig. 2: Students' Perception about Mobile Learning

As shown in Table 2, most engineering students in Mizoram have high perception about mobile learning, and 3 none of them was found to possess

low perception about mobile learning. A very few of them (20.89%) were categorised as having a moderate perception about mobile learning.

Objective 3: "To compare the level of mobile self-efficacy among engineering students with reference to gender and type of institution".

Hypothesis No.1 states: "There is no significant difference in the level of mobile self-efficacy among male and female engineering students in Mizoram." Table 4 presents a comparison of students' mobile self-efficacy with reference to gender.

Table 4: Gender Differences in Students' Mobile Self-Efficacy

Gender	N	Mean	S.D.	t-value	Significance
Male	111	36.18	4.92	0.303	Not significant
Female	47	36.98	4.21		

From the table 4, it is seen that the calculated t-value is 0.28 which is lower than the critical value of 1.98 for 0.05 level of significance at $df = 156$. The results lack statistical significance; consequently null hypothesis is retained. The means of male (36.18) and female (36.98) engineering students show no significant difference for mobile self-efficacy.

Hypothesis No.2 states: "There is no significant difference in the level of mobile self-efficacy between NIT Mizoram and Mizoram University engineering students." Table 5 presents a comparison of students' mobile self-efficacy with reference to institution.

Table 5: Institutional differences in students' mobile self-efficacy

Institution	N	Mean	SD	t value	Significance
Mizoram University	79	36.30	4.49	0.76	Not significant
NIT Mizoram	79	36.53	4.97		

From the table 5, the calculated t-value is 0.76 which is lower than the critical value of 1.98 for 0.05 level of significance at $df = 156$. The results lack statistical significance; consequently null hypothesis is retained. The means of Mizoram University (36.30) and NIT Mizoram (36.53) engineering show no significant difference for mobile self-efficacy.

Objective 4: "To compare the perception of engineering students about mobile learning with reference to gender and type of institution".

Hypothesis No.3 states: “There is no significant difference in the perception about mobile learning with reference to their gender among engineering student in Mizoram.” Table 6 presents a comparison of students’ perception about mobile learning with reference to gender.

Table 6: Gender differences in students’ perception about mobile learning

Gender	N	Mean	SD	t value	Significance
Male	111	37.11	4.57	0.94	Not significant
Female	47	37.06	3.88		

From the table 6, the calculated t-value is 0.94 which is lower than the critical value of 1.98 for 0.05 level of significance at $df = 156$. The results lack statistical significance; consequently null hypothesis is retained. The means of male (37.11) and female (37.06) engineering students show no significant difference for mobile self-efficacy.

Hypothesis No.4 states: “There is no significant difference in the perception between NIT Mizoram and Mizoram University engineering students about mobile learning.” Table 7 presents a comparison of students’ perception about mobile learning with reference to institution.

Table 7: Institutional differences in students’ perception about mobile learning

Institution	N	Mean	SD	t value	Significance
Mizoram University	79	36.92	4.18	0.61	Not significant
NIT Mizoram	79	37.28	4.57		

From the table 7, the calculated t-value is 0.61 which is lower than the critical value of 1.98 for 0.05 level of significance at $df = 156$. The results lack statistical significance; consequently null hypothesis is retained. The means of Mizoram University (36.92) and NIT Mizoram (37.28) engineering show no significant difference for mobile self-efficacy.

Key Findings

Highlighted below are the main points illustrating how the objectives were met. The findings have been presented as follows:

1. *Mobile Self-Efficacy Among Engineering Students.*
 - ⊙ Majority (76.25%) of engineering students

in Mizoram had high level of mobile self-efficacy.

- ⊙ Nearly one fourth (23.65%) of engineering students in Mizoram had moderate level of mobile self-efficacy.
 - ⊙ None of them were found to possess low level of mobile self-efficacy.
2. *Perception About Mobile Learning Among Engineering Students*
 - ⊙ Majority (78.13%) of engineering students in Mizoram had high perception about mobile learning.
 - ⊙ Over one fifth of engineering students (21.87%) in Mizoram had moderate perception about mobile learning.
 - ⊙ None of them were found to possess low perception about mobile learning.
 3. There is no significant difference in the level of mobile self-efficacy with reference to their gender among engineering students in Mizoram.
 4. There is no significant difference in the level of mobile self-efficacy between NIT Mizoram and Mizoram University engineering students.
 5. There is no significant difference in the perception about mobile learning with reference to their gender among engineering student in Mizoram.
 6. There is no significant difference in the perception between NIT Mizoram and Mizoram University engineering students about mobile learning.

Recommendations

1. In this study, no students were found to have low mobile self-efficacy. Schools and colleges should start using mobile learning tools as a regular part of teaching, especially in engineering courses.
2. Although the majority of the students have a high perception about mobile learning, regular workshops and practice sessions should be held to help students feel more confident and skilled in using mobile devices for learning.

3. The study found that there is no significant difference in the level of mobile self-efficacy and perception about mobile learning base on gender. Learning strategies should be planned in a way that treats all students equally and includes everyone without any bias.
4. The study also found that there is no significant difference in the level of mobile self-efficacy and perception about mobile learning base on institution. Efforts should be made to give all students, especially those from poor backgrounds, access to affordable or free mobile devices and good internet.

CONCLUSION

The majority of the students have high level of mobile self-efficacy and high perception about mobile learning. It is found that male and female engineering students had the same level of mobile self-efficacy as well as perception about mobile learning. The finding indicates that most male and female engineering students possessed high level of mobile self-efficacy. Most students believed that they have the knowledge and skills to use m-learning technology. Also there is no difference in level of mobile self-efficacy and high perception about mobile learning between NIT Mizoram and Mizoram University Engineering students. Most engineering students saw mobile learning as an effective and innovative way of learning.

GENERATIVE AI DECLARATION

The author(s) confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI. The authors developed and verified all scientific content, data analysis, interpretation of results, and conclusions. The authors take full responsibility for the accuracy, integrity, and originality of the work presented, and no AI tool was listed as an author.

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