Mobile Phone Use in Education and Learning by Faculty Members of Technical-Engineering Groups: Concurrent Mixed Methods Design

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The purpose of this study was to evaluate Mobile Learning Acceptance among faculty members. The research methodology was a concurrent mixed methods design. The research method in the quantitative part was descriptive-survey, and in the qualitative part a phenomenological approach was applied. In the quantitative part, the study population consisted of all female and male faculty members of technical-engineering groups at Shiraz University ($N = 147$), where 87 participants were selected using stratified random sampling method. In the qualitative part, the participants included a small fraction of the same faculty members who had also participated in the quantitative part, and were selected by purposive sampling approach with criteria technique. Research instruments consisted of a researcher-made scale of mobile learning acceptance. Upon verifying the validity and reliability of the scale, it was distributed among the subjects, and the collected data were analyzed using SPSS 21 software. Qualitative data were collected from semi-structured interviews with faculty members who had an experience of mobile learning. The quantitative results indicated that in all areas, except for Usefulness, the faculty members' acceptance of mobile learning was higher than average, and Usefulness was at a moderate level. In the qualitative part, after integrating and summarizing the data, a total of 17 basic themes and three organizing themes were extracted, including the benefits of mobile learning, the barriers and limitations of mobile learning, and the required infrastructure for effective implementation of mobile learning.

Keywords: mobile learning, acceptance, faculty members, technical-engineering groups, concurrent mixed methods design

INTRODUCTION

Technology is rapidly growing in all aspects of modern societies, and education is no exception. In line with this trend, information and communication technology is increasingly utilized as a teaching and learning tool in educational activities (Matimbwa and Anney, 2016). Academic institutions, like a learning organization, also pay considerable attention to the use of advanced technologies to facilitate their progress, especially in the areas of teaching and learning (Grabe, 2008 cited in Balash et al., 2011). Mobile learning has also emerged as a new technological achievement and educational trend that provides both educators and learners with ample opportunities (Ilci, 2014). With the use of mobile technologies, the potential for effective teaching

and learning is growing (Sanga et al., 2016; Abidin and Tho, 2018). This is due to the benefits of mobile learning, including the ability to share knowledge without any limits in space and time, the capacity to facilitate the development of critical thinking, participatory learning, problem solving, and the development of lifelong communication skills (Abidin and Tho, 2018).

The term "mobile learning" is still developing day by day and its exact meaning is still unclear. Despite the ambiguity, there are some keywords to explain this concept. Traxler (2007) points out some keywords, such as personal, spontaneous, situated, private, and portable to explain mobile learning. Lan and Sie (2010) describe mobile learning as a learning model that enables learners to access educational materials anywhere and anytime using mobile and internet technologies. Some features of mobile devices are that they are generally cheap, portable and flexible. Therefore, mobile technology seems to be very attractive to learners and usable in the learning process. Mobile phones have several applications that can be useful in the teaching and learning process, including general software, such as Word, Excel, and PowerPoint (Mtega et al., 2012) and other applications, such as language learning, mathematical problem-solving software, etc. (Alzaza and Yaakub, 2011). The main feature of mobile learning that distinguishes it from other learning technologies is its mobility. Despite the aforementioned benefits of mobile learning, it can never fully replace traditional education, but if used correctly, it can increase the value of existing learning styles (Liaw et al., 2010).

Globally, there has been a growing trend of using mobile phones for educational purposes, and many groups, especially teachers and students, use these devices for sharing information, consulting dictionaries and thesauri. They have been portrayed as one of the applications and as one of the application for teaching and learning in which it is portrayed as new opportunity for the ICT use in education (Lepp et al., 2015). "Mobile learning acceptance" is considered as the intention to use mobile technology or the attitude toward using that technology (Mittal et al., 2017). Mobile learning acceptance has also been defined as the People's recognizing recognition of people and a process or condition without attempting to change or exit (Abas et al., 2009). In their study, Ball and Levy (2009) found that "experience" played an important role in faculty members' acceptance of and intention to use new teaching technologies. In his qualitative study, Chun (2019) sought to examine the experiences of teachers in using mobile learning systems. His findings identified five topics, including: (a) teachers' perception of mobile learning, (b) motivations for adopting mobile learning, (c) standards of conduct in the use of mobile learning, (d) the challenges to the acceptance of mobile learning, and (e) the benefits of using mobile learning. Gan and Balakrishnan (2014) also examined the factors that can affect mobile learning acceptance and enhance teacher-student interaction during lectures, including: ease of use, self-efficacy, and enjoyment. In their study on faculty members at Kentucky and Tennessee colleges, Thomas et al. (2014) identified the determinants of mobile learning adoption, including Internet access, educational programs, calculators, and calendars. Potential obstacles include student cheating, inappropriate information on the Internet, cyberbullying, and

disruptions. In another study, Bere and Rambe (2019) examined mobile learning in higher education in a developing country. The findings suggest opportunities for collaborative learning through knowledge sharing, developing academic communities, and immediate communication. The recommended mobile learning in this study can create shared learning environments, which can in turn, enhance active learning opportunities.

In a mixed method research study, Çelik and Karayaman (2018) examined the attitudes of prospective mathematics teachers toward mobile learning, and the results showed that they had positive attitudes toward mobile learning. They stated that this type of learning has some advantages and disadvantages. It may be used in extracurricular environments and increase course success, but it is not economical.

Kafyulilo (2012) studied teachers' perceptions of cell phone use and found that they emphasized a decrease in the use of cell phones because of their negative impact on student conduct. In his research, Chen (2016) also examined students' and faculty members' perception and acceptance of using mobile in learning, and their results indicated a positive relationship between perception and acceptance. Ilci (2014) examined the levels of mobile learning readiness and mobile learning acceptance in pre-service teachers in the Faculty of Education at Middle East Technical University. The results suggested that the levels of m-learning readiness and m-learning acceptance among pre-service teachers were moderate. Bere and Rambe (2019) also examined in their study pre-service teachers' preparedness for mobile learning in teacher training colleges. The results showed that future teachers' preparedness did not vary by gender, and that they used mobile technologies mostly for communication, studying, access to information and making plans. Brown (2018), in his dissertation, addressed higher education teachers' perceptions of mobile learning, and the results showed that mobile learning techniques and tools were useful in teaching and learning approaches, effective in formulating classroom instruction strategies, useful for professional learning, influential over time constraints when acquiring knowledge at any time and place, and facilitating teacher-student communication.

Enayati et al. (2014) conducted a study on the use of mobile phones in providing educational content to students. The results indicated that transferring course materials via mobile phones and text messages are effective in learning; however, this method of transferring educational content does not offer any advantage over lectures. In a research on feasibility of implementing mobile-based learning (mobile learning) at university, Karimi et al. (2014) found that it was possible to establish a mobile-based learning system at Payam-e-Noor University in terms of hardware and software infrastructures, financial resources and support. However, with regard to content and professional human resources, it was not possible to establish a mobile learning system in that university. In a systematic review, Kaliisa and Picard (2017) reviewed the studies published between 2010 and 2016 on mobile learning in higher education systems of Africa. Their findings indicated that mobile learning at higher education institutions in Africa enhances student and teacher collaboration. It provides instant communication, increased student participation and interaction, facilitating authentic

learning and reflective practice, as well as empowering learning communities and altering the lecturers' approaches. The findings also highlight the major challenges in integrating mobile learning into higher education institutions in Africa, which include: poor technological infrastructures, lack of access to advanced mobile devices, lack of m-learning pedagogical skills among lecturers, poor attitudes among students and lecturers, incompatibility of mobile handsets with universities' online management systems, and the lack of policies to guide the implementation of mobile learning. Also, in another study, Baek et al. (2017) analyzed Korean teachers' attitudes toward mobile learning. The results of this study revealed that Korean teachers' attitude toward mobile learning was generally low. Female teachers had a more positive attitude compared to male teachers.

A brief review of the literature indicates that mobile learning is generally deemed as an advanced technology and there is a substantial research on mobile learning and its applications. However, in comparison to mobile learning studies and applications, very little research has been conducted on mobile learning acceptance and mobile learning readiness (Ilci, 2014). Also, "mobile learning" has not been successfully implemented in many countries due to the low level of awareness, acceptance, accessibility, and technological skills among teachers and learners (Chen, 2016). Hence, successful implementation of mobile learning is largely determined by teacher acceptance (Mac Callum, 2010). Mobile learning acceptance among students and lecturers is important because the successful implementation of mobile learning depends on understanding the factors that influence students and lecturers' acceptance of this method (Ilci, 2014). According to Liu et al. (2010), although mobile learning has become a popular area of research in many parts of the world, research studies on the factors affecting mobile learning acceptance have been limited. Given the rapid development of mobile learning in the technological world, mobile learning readiness and acceptance are also emerging as important areas of research (Ilci, 2014).

Despite the importance of faculty members' role in mobile learning acceptance, studies so far have mainly focused on the factors affecting student acceptance (Uzunboylu and Ozdamli, 2011). Therefore, faculty members' attitude toward the adoption of mobile learning is one of the factors influencing its implementation. Determining the attitudes of teachers and students toward using mobile learning systems helps in identifying its strengths and weaknesses as well as in the development of the required technological infrastructures (Mittal et al., 2017). Understanding and accepting mobile learning affects the way classroom instruction is organized. Instructors should refine their current teaching strategies, and in case there is a desire among students to apply this method of learning, they should adequately prepare students for a technology-based environment (Chen, 2016). This view is also supported by Mahat et al. (2012) who argue that prior to designing and implementing a mobile learning system, it is important to assess future users' perceptions of mobile learning, because these perceptions significantly affect their willingness to adopt mobile learning. Due to a number of social, cultural and organizational

factors, the inclusive implementation of mobile learning in higher education is still challenged (Corbeil and Valdes-Corbeil, 2007). For instance, in their study on Iranian university lecturers, Balash et al. (2011) concluded that the majority of them are reluctant to accept mobile learning. Mobile learning is still in its infancy in higher education, so the educational implications of mobile learning require further research (Kukulska-Hulme, 2007). Mobile learning in higher education is still in the early stages of development. For example, although many universities offer free programs (e.g., news, calendars, maps), these programs are usually used in a non-educational context (Park, 2011). Lack of research on the use of information systems is partly to blame for the insufficient use of these systems in developing countries (Park et al., 2009). Therefore, further research is needed to pave the way for more effective application of these systems. Given the limitations, the main purpose of the concurrent mixed-methods design in this study is to evaluate the acceptance of mobile learning among faculty members as an important factor in the design and implementation of a mobile learning system. To this end, the following questions are addressed:

In quantitative section: How high is the level of m-learning acceptance among faculty members at Shiraz University's technical-engineering groups?

In qualitative section: What are the faculty members' experiences in mobile learning?

In the following section, we discuss the research methodology, statistical population, potential participants, sampling and selection method, validity and reliability of quantitative research tools, qualitative data validation, research instruments and data collection method. Then, in the findings section, the qualitative and quantitative findings are presented, respectively. Finally, the findings of the research are discussed and conclusion is drawn.

RESEARCH METHODOLOGY

In the present study, a concurrent mixed method-validating was applied to evaluate mobile learning acceptance among faculty members. The general rationale for using a mixed-method design in this study was that quantitative and/or qualitative designs alone do not address the presented problem. The specific rationale for using this design comes to light when the researcher intends to use the qualitative results to validate the quantitative results as indicated in **Figure 1** (Creswell and Plano Clark, 2007).

FIGURE 1 | Validation of quantitative and qualitative data models (Creswell and Plano Clark, 2007).
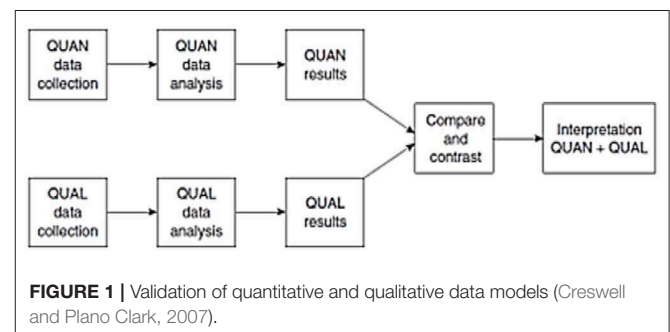
Research Method

Since the purpose of the quantitative part was to evaluate mobile learning acceptance among faculty members, the applied method was a descriptive survey. In the qualitative part, the phenomenological approach was used with the purpose of extracting faculty members' lived experiences in using mobile phones in learning. Clark and Creswell (2014) believe that phenomenological method is a method in which the research objective is to discover an experience. In the present study, the discovered experience is the faculty members' use of mobile phones in education.

Statistical Population, Potential Participants, Sampling Method, and Selection of Participants

The statistical population of the quantitative part of this study included 147 male and female faculty members of technical-engineering departments (including the College of Materials and Civil Engineering, College of Electrical Engineering and Computer, College of Chemistry, Oil and Gas, and College of Mechanical Engineering) at Shiraz University. Based on Cochran formula, a sample size of 106 individuals was obtained, and 110 questionnaires were distributed using stratified random sampling. A total of 87 filled out questionnaires were returned, accounting for an 82% return rate. In the qualitative part, in a phenomenological study, the individuals' lived experiences of a phenomenon are taken into consideration. At Shiraz University, the technical-engineering professors were the only group with a firsthand lived experience of using mobile phones in education. Therefore, they were selected as the potential participants in the qualitative phase of this research. Small group was selected from the same faculty members who participated in the quantitative part. Therefore, the sampling approach in this section was purposeful and the participants were selected using the standard method. In the qualitative part, there were two criteria for selecting faculty members: they had at least 1 year of university experience, and they were full-time faculty members with lived experience of using mobile in education. For that purpose, in the quantitative part the participants were asked: "have you had any lived experience of using mobile phones in education or not?" The participants in the qualitative part were selected based on their affirmative replies to the above question, and having a lived experience of using mobile phones in education.

Research Tools and Method of Data Collection

Data gathering tool in quantitative research was a researcher-made scale of mobile learning acceptance. It consisted of 53 items covering four dimensions of mobile learning, including Ease of Use (nine items), usefulness (20 items), Self-efficacy (nine items), and Challenges and Barriers (nine items). In this method, mobile learning was assessed on a 5-point Likert scale (strongly agree = 5 to strongly disagree = 1). Qualitative data collection was based on the participants' experiences of mobile learning. Semi-structured interviews were conducted to discover and extract the faculty members' lived experiences in adopting mobile learning. The interview included questions about the conveniences of mobile learning for faculty members, benefits of using mobile phones, the effect of mobile learning on their sense of self-efficacy, and the challenges they face in using mobile phones.

Validity and Reliability of Quantitative Research Instruments and Validation Qualitative Data

To verify the validity of the quantitative scale, the item analysis method (correlation coefficient of dimensions of mobile learning acceptance with total scale score) was used. The validity results of item analysis of the scale (obtained as the lowest and highest correlation coefficients of items in each scale are as follows: Ease of use 0.37–0.85, usefulness 0.37–0.91, self-efficacy 0.51–0.83, challenges and barriers 0.39–0.69. Cronbach's alpha coefficient was used to verify the reliability of the scale, and the reliability was confirmed. The results are as follows: Ease of Use = 0.81, usefulness = 0.90, Self-efficacy = 0.84, Challenges and Barriers = 0.77. To validate the qualitative data derived from the semi-structured interview questions, Credibility and dependability methods were applied using data Triangulation technique (Lincoln and Guba, 1985; Creswell, 2007). If a study was about the impact of cultural capital and employment opportunities among new immigrants and only Chinese and Pakistani participants were selected, it would lack transferability because the original context is not being accurately measured. The other consideration is concern about providing a complete understanding of the context being studied and ensuring that the research questions are appropriately answered. It is from here that readers can explore the research document and determine if the findings can be transferred to their setting or environment. So with generalizability, it is the researcher's responsibility to ensure that the findings can be generalizable to a larger context or the entire population. In transferability, it is the researcher's responsibility to paint a full picture of the context and then allow the reader to determine if the work is transferable to their context Transferability defined as The ability to transfer research findings from one group to another; thick description used to provide the reader with detailed contextual information; transfer of understanding is believed to occur if both contexts are similar (Guba and Lincoln, 1998).

RESULTS

Quantitative Analysis
Descriptive Findings

Table 1 presents descriptive statistics indices for the sample under study (n = 87). It should be noted that, with respect to the subscales of "ease of use," "usefulness," and "self-efficacy," moving above the average is considered as an advantage and positive point. As for the sub-scale of obstacles and challenges, rising above the average is considered a disadvantage and a negative point. According to the table and the obtained values, the dimension of "Challenges and Barriers" scores the highest mean value among the subscales for mobile learning acceptance

TABLE 1 | Descriptive statistics indices for the sample under study- the dimension of "Challenges and Barriers" scores the highest mean value (3.56), and the lowest mean value is attributed to the dimension of "Usefulness" (3.07).

Subscales of mobile learning acceptance	Number	Mean	Standard Deviation	Minimum	Maximum
Ease of use	87	3.30	0.67	1.56	4.78
Usefulness	87	3.07	0.63	1.55	4.25
self-efficacy	87	3.14	0.64	1.67	4.22
Challenges and barriers	87	3.56	0.54	2.00	4.78

TABLE 2 | One sample t-test results for comparing the mean values of different dimensions of m-learning acceptance (among faculty members of technical-engineering groups at Shiraz University) with adequate (Q2) and acceptable (Q3) levels.

Subscales of mobile learning acceptance	Mean	SD	Adequate (Q_2)	t Value	df	Sig.	Acceptable (Q_3)	t Value	Sig.
Ease of use	3.30	0.67	3	4.19	86	0.0001	4	9.59	0.0001
Usefulness	3.07	0.63		1.10	86	0.27		13.65	0.0001
Self-efficacy	3.14	0.64		2.07	86	0.04		12.43	0.0001
Challenges and barriers	3.56	0.54		9.65	86	0.0001		7.41	0.0001

(3.56), and the lowest mean value is attributed to the dimension of "Usefulness" (3.07).

Therefore, the results indicate that, from the faculty's point of view, mobile learning entails more challenges than the benefits (ease of use, usefulness, self-efficacy). Among the benefits of mobile learning, usefulness is the lowest subscale, since the faculty members believe that it offers the least benefit in m-learning compared to the "ease of use" and "self-efficacy".

Inferential Findings

How high is the level of m-learning acceptance among the faculty members of engineering departments at Shiraz University?

One-sample t-test was used to address this question. **Table 2** shows the mean values of different dimensions of mobile learning acceptance from the perspective of the faculty members in the research sample, and compares them with the adequate level (Q2 = 3) and the acceptable level (Q3 = 4). The adequate and acceptable levels were designated according to the selected scale. Given that the applied instrument is a five-point Likert scale, the average level (the 50% point) is number 3, which is the adequate level. Number 4 is the acceptable level, since it represents the 75% point, and 75% of the replies are above this level. According to the results, the mean values of Ease of Use (3.30), usefulness (3.07), Self-efficacy (3.14) and Challenges and Barriers (3.56) were above average (Q2 = 3). Based on the obtained t in the degrees of freedom (86), there is a significant difference (P = 0.0001) between the dimensions of Ease of Use and Challenges and Obstacles with the average level; there is a significant difference (P = 0.04) between Self-efficacy and the average. It can be stated that the dimensions of Ease of Use, Self-efficacy, and Challenges and Barriers are above the average. The results indicate that, according to the faculty members, the levels of "Ease of Use" and "Self-efficacy" are above average. Mobile use also presents some Challenges and Barriers that also rise above adequate and acceptable levels. However, Usefulness remains at an average level. Also, given that the mean values of all dimensions of mobile learning acceptance are below the

acceptable level (Q3 = 4), and that the t obtained in degrees of freedom (86) reveals a significant difference between these dimensions and the acceptable level (P = 0.0001), it can be concluded that the quality of all dimensions is lower than acceptable level. These results also indicate that the levels of "Ease of Use," "Usefulness," and "Self-efficacy" in mobile learning are below the acceptable level. At the same time, although m-learning presents some obstacles and challenges that are above the average level, these challenges are not higher than the acceptable level, to such an extent that their performance is disrupted (In case of challenges and barriers, the "acceptable level" stands for the abundance of challenges and barriers. Therefore, the acceptable level for this subscale is considered a negative point).

Therefore, the results imply that faculty members believe that mobile use is not efficient enough for learning, and that its usefulness is moderate, although it is above average in terms of Ease of Use and Self-efficacy. On the other hand, they believe that mobile learning is accompanied by many challenges and obstacles, which are above average.

Qualitative Analysis
Pivotal Question

What are the faculty members' experiences in using mobile learning?

To answer this question, thematic analysis was conducted to analyze the themes (basic, organizing and global themes) extracted from the interview questions. Thematic analysis is a method of identifying, analyzing and reporting patterns of meaning in qualitative data. This method is a process for analyzing textual data, and converts scattered and diverse data into rich and detailed data (Braun and Clarke, 2006). Accordingly, the interview transcripts were thoroughly studied, and then all the basic, organizing and global themes were extracted from these texts. At the first stage, the interviews with selected faculty members were analyzed and the primary semantic codes were extracted. Next, the resulting semantic codes

TABLE 3 | Table of basic themes derived from interviews with participants.

Participant numbers	Evidence	Basic themes
1	In the classroom, it reduces the learning concentration.	Decrease in learning concentration in classroom
1	Controlled use, only outside the classroom; It is difficult to control students.	Creating powerful tools for controlling student conduct
1 and 3	Internet costs are not a hindrance, because internet is free and the university provides easy access to the Internet in classrooms.	Free internet at university
3, 4, and 6	Students use social networks to communicate outside the classroom. They should be denied access to social media	Blocking some programs like social media platforms
1, 6, and 9	Mobile screens are small and the texts are difficult to read. On the other hand, frequent use of mobile phones may lead to visual problems, and therefore laptops are better (referring to the weakening of eyesight due to excessive reading of PDF texts on phone).	Small Mobile screen
1 and 6	Some students do not yet have smart phones and use laptops.	Mobile devices are not available to all students
3 and 6	Students can interact with outside of the classroom through mobile communication. Therefore, it is beneficial to use the device as a teaching aid provided that it is not used as a telephone.	Using mobile phones as a means of communication is an obstacle
3	It is useful as a teaching aid.	Being useful as a teaching aid
8	From the educational perspective, it is only useful in a class setting. It is not suitable outside the classroom, since students do not observe the teacher's privacy.	Violating professors' privacy
4 and 8	There is no culture of cell phone use and the necessary norms should be established. Students take advantage of this situation by searching the Internet and using other programs instead of educational content.	Searching for inappropriate and irrelevant content on the Internet
4	The College of Educational Sciences is obliged to establish the culture.	Culture-building by competent institutions (e.g., the College of Educational Sciences)
4	It is better to use automation to communicate because there is no culture of cell phone use.	Setting ethical rules and guidelines for proper use
7	In crowded classes, it fosters learner participation.	Enhancing learner participation
10	Students cheat using their phones.	The possibility of student cheating
2	A mobile phone is only useful for planning and management of the educational process, but not for education itself.	Ability to plan and manage the educational process
11	There is not enough time to use software programs. Thus, only basic concepts are transferred and creative students should use software programs on their own.	Lack of time to use software
12	Students are more skilled at using applications than professors.	Student competence in using mobile applications

were converted to basic themes. At this stage, 17 basic themes were extracted from the participants' interviews (**Table 3**). The relevant evidence gathered from the interviewees' comments are also stated beside each theme.

After obtaining the basic themes, the organizing themes are now extracted according to the basic themes (**Table 4**).

DISCUSSION AND CONCLUSION

The present study is a mixed methods research. In the quantitative part, the faculty members answered the questions of a researcher-made scale of mobile learning acceptance (in four dimensions: Ease of Use, Usefulness, Self-efficacy and Barriers). Based on the findings in the quantitative part, faculty members' mobile learning acceptance is above average in all dimensions (3) except Usefulness, which is at a moderate level, and their m-learning acceptance in all dimensions is below the desired level (4). The results imply that faculty members believe that mobile use is not efficient enough for learning, and that its usefulness is moderate, although it is above average in terms of Ease of Use and Self-efficacy (Consistent with Brown, 2018). On the other

hand, they believe that mobile learning is accompanied by many challenges and obstacles, which are above average. These results are in line with Kaliisa and Picard's research (2017).

The qualitative part of the research deals with the faculty members' lived experiences in using mobile phones in education. Based on the findings of this part and its merging and summarization procedures, 17 basic themes were extracted from interviews with the potential research participants. The extracted basic themes were placed in three organizing themes including: benefits of using mobile phones in education, barriers and limitations of using mobile phones in education, and necessary infrastructures for facilitating mobile learning in education.

Some responses implied that mobile phone, as a teaching aid, has several benefits in educational process, such as enhancing individual participation in the teaching-learning process, usefulness as a supplementary teaching aid, enabling the management and planning of the teaching process, the students' perception of mobile applications as an essential prerequisite. As can be deduced from the quantitative data, in terms of ease of use and self-efficacy the mean score of the participants rose above

TABLE 4 | Table of organizing themes derived from basic themes.

Global themes	Organizing themes	Basic themes
Mobile learning acceptance	The benefits of adopting mobile learning	Enhancing learner participation Being useful as a teaching aid Free internet on campus Ability to plan and manage the educational process Student competence in using mobile applications
	The obstacles and limitations of mobile learning	Using cellphones as a means of communication Lack of time to use software platforms The possibility of student cheating Violating professors' privacy Small Mobile Screens Decrease in learning concentration in classroom Mobile devices are not available to all students Searching for inappropriate and irrelevant content on the Interne
	The necessary infrastructure for facilitating mobile learning	Culture-building by competent institutions (e.g., College of Educational sciences) to facilitate effective m-learning adoption Creating powerful tools for controlling student conduct Blocking some programs like social media platforms Setting ethical rules and guidelines for proper mobile usage

the average level, while the dimension of Usefulness remained at the average level. These dimensions illustrate the benefits of using mobile phone, and the findings of the qualitative part (obtained from the participants' lived experiences) confirm these results. For instance, in the quantitative part, the questions involving student competence ease of management and planning by mobile phone, and increased student engagement and participation are consistent with participants' lived experiences. This finding is also in line with the findings of Gan and Balakrishnan (2014) who stated in their research that the adoption of mobile technology in learning can enhance teacher-student interaction, and factors, such as ease of use, self-efficacy, and enjoyment play an important role in mobile learning acceptance. In a study on the use of mobile phones to provide students with educational contents, Enayati et al. (2014) indicate that transferring course contents via mobile and text messages is conducive to student learning. The results are also consistent with the results of studies by Brown (2018), Bas and Sarigöz (2018), Bere and Rambe (2019).

On the other hand, some participants pointed to the challenges and limitations that undermine the efficient use of mobile phones in education, including searching for inappropriate content on the internet, cheating, violating professors' privacy, small mobile screen, decrease in learning concentration in classroom, inequality in the availability of mobile services to all students etc. The aforementioned points confirm the findings of the quantitative part, since the participants reported that the challenges to mobile learning were higher than the average level. These results are in line with the findings of Thomas et al. (2014), who identified potential obstacles to mobile learning, including student cheating, access to inappropriate materials on the Internet, cyberbullying, and disruptions (Thomas et al., 2014). The present results are also in line with the studies by Kaliisa and Picard (2017) and Çelik and Karayaman (2018), each of which has identified some defects and obstacles in mobile use.

In view of limitations, some participants alluded to the required infrastructures to facilitate the use of mobile phones in education, including: culture-building by competent institutions to facilitate effective m-learning adoption, creating powerful tools for controlling student conduct, blocking communication and social networking services, setting ethical rules and guidelines for proper mobile usage. The participants' lived experiences indicate that students have not yet adopted the culture of using mobile devices in classroom. This culture should be initially established, and the necessary rules and guidelines must be put in place to facilitate mobile use. It should be noted that one participant recommended the College of Educational Sciences as an effective institute in terms of building the culture for proper mobile learning. As the findings of the quantitative section show, mobile learning acceptance among faculty members is at a moderate level, meaning that they are willing to apply mobile technology in education. However, participants' lived experiences indicate that the necessary infrastructures are not prepared yet, and this view aligns with the findings of Ilci study (Ilci, 2014) were the Pre-Service Teachers' Mobile Learning Readiness Levels and Mobile Learning Acceptance Levels were examined. The results showed that the levels of m-learning acceptance and m-learning readiness in that group were moderate, even though there were no infrastructures in place for adopting mobile learning. The findings of this part of the study are also supported by Kaliisa and Picard (2017), whose findings identified weak technical infrastructures and absence of guiding policies as the major challenges in facilitating mobile learning.

Although mobile learning can never fully replace traditional learning, it can increase the value of existing learning styles if used correctly (Liaw et al., 2010). As mentioned in the introduction, before designing and implementing a mobile learning system, it is important to assess future users' perceptions of mobile learning, since their views do significantly affect their willingness to adopt mobile learning (Mahat et al., 2012). Despite the faculty members' critical role in promoting mobile learning

acceptance, studies have so far mainly focused on examining the factors that influence student acceptance (Uzunboylu and Ozdamli, 2011). Therefore, the present study evaluated faculty members' mobile learning acceptance in education as one of the important factors. Further studies can be performed to assess m-learning acceptance among other users of this program, e.g., managers, programmers, and students. Comparing the attitudes of all users could help researchers open up broader horizons in this field. To increase transferability in this research, qualitative researchers focused on two key considerations: (a) the participants relevant members of the community of Engineering faculties, and (b) the contextual boundaries of the findings explained based on precise descriptions of participants and their characteristics. It is also suggested that further similar research be carried out in other faculties and departments in order to compare and evaluate the results.

DATA AVAILABILITY STATEMENT

The data used to support the findings of this study are included within the article.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

SN drafted the literature review and collected data while MM and MS supervised the work. MM contributed outlining of the methodological considerations. MM and SN analyzed the data. MS involved in planning and drafted the manuscript. All got involved in the interpretation and provided critical feedback and helped shape the research, analysis, and manuscript.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2020.00016/full#supplementary-material

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