Emerging Mobile Learning Technologies for Future Emergencies: Lessons Learned from COVID-19 Experience from the Perspective of Al-Baha University Faculty

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Abstract: The purpose of this research was to investigate the adoption of m-learning application from the faculty members' perspective at Al-Baha University not limited to the COVID-19 pandemic but rather future advancement of e-learning in higher education. This research aims to contribute to the development of improvements in adoption, implementation, and barriers to ML tools to provide insights on how to improve training and learning in situations that are disrupted further in the future by both technology and increased shift toward distance and flexible learning environments. A survey research design with analytical descriptive design was conducted to analyse the level of adoption and usage of smart devices in teaching learning activities. The sample comprised 100 faculty members, with data collected via an online questionnaire containing 12 items divided into two key factors: the state and the practices of using mobile learning applications in teaching after the pandemic as well the difficulties met in the process.

The results revealed that the attitudes of the faculty members toward the mobile learning applications for distance education were mostly positive. Therefore, the study showed that the participants agreed on some challenges that are experienced when using such applications. This work is relevant since it fosters understanding of mobile learning as a teaching strategy at universities with reference to a crisis/emergency situation and potential didactical distance learning ideas in the future. Speaking of the findings made in the study, the emphasis is made upon the necessity to develop the ways to improve support and training for faculty what means that an academic staff, to share their experience and provide students with adequate knowledge about online classes. Thus, the contributions of this study transfer to studying and advancing education policy and practice, helping institutions coordinate their mobile learning and remove barriers that affect teaching and the learning process. They are particularly valuable as institutions plan for further disruptions such as future pandemics, technological advancements or other, to make sure that mobile learning stays viable solution in context of constantly changing environment of education.

keywords: Mobile learning application; Future emergencies; User experience (UX), Online learning, Human mobile interaction.

تقنيات التعلم عبر الهاتف المحمول الناشئة في حالات الطوارئ المستقبلية: الدروس المستفادة من تجربة كوفيد-19 من وجهة نظر أعضاء هيئة التدريس بجامعة الباحة

الملخص: كان الغرض من هذا البحث هو التحقيق في تبني تطبيق التعلم المحمول من وجهة نظر أعضاء هيئة التدريس في جامعة الباحة ليس فقط في ظل جائحة كوفيد-19 ولكن أيضًا التقدم المستقبلي للتعليم الإلكتروني في التعليم العالي. يهدف هذا البحث إلى المساهمة في تطوير التحسينات في التبني والتنفيذ والحواجز أمام أدوات التعلم الآلي لتوفير رؤى حول كيفية تحسين التدريب والتعلم في المواقف التي تعطلت بشكل أكبر في المستقبل بسبب التكنولوجيا والتحول المتزايد نحو بيئات التعلم عن بعد والمرنة. تم إجراء تصميم بحث مسحي بتصميم وصفي تحليلي لتحليل مستوى تبني واستخدام الأجهزة الذكية في أنشطة التعلم والتعليم. ضمت العينة 100 عضو هيئة تدريس، وتم جمع البيانات عبر استبيان عبر الإنترنت يحتوي على 12 عنصرًا مقسمة إلى عاملين رئيسيين: حالة وممارسات استخدام تطبيقات التعلم المحمول في التدريس بعد الوباء بالإضافة إلى الصعوبات التي واجهتها العملية. كشفت النتائج أن مواقف أعضاء هيئة التدريس تجاه تطبيقات التعلم المحمول للتعليم عن بعد كانت إيجابية في الغالب. لذلك، أظهرت الدراسة أن المشاركين اتفقوا على بعض التحديات التي يواجهونها عند استخدام مثل هذه التطبيقات. هذا العمل ذو أهمية لأنه يعزز فهم التعلم عبر الهاتف المحمول كاستراتيجية تدريس في الجامعات مع الإشارة إلى حالة الأزمة / الطوارئ وأفكار التعلم عن بعد التعليمية المحتملة في المستقبل. عند الحديث عن النتائج التي توصلت إليها الدراسة، يتم التركيز على ضرورة تطوير طرق لتحسين الدعم والتدريب لأعضاء هيئة التدريس، أي الموظفين الأكاديميين، لمشاركة خبراتهم وتزويد الطلاب بالمعرفة الكافية حول الفصول الدراسية عبر الإنترنت. وبالتالي، تنتقل مساهمات هذه الدراسة إلى دراسة وتطوير سياسة التعليم وممارساته، ومساعدة المؤسسات على تنسيق التعلم عبر الهاتف المحمول وإزالة الحواجز التي تؤثر على التدريس وعملية التعلم. وهي ذات قيمة خاصة حيث تخطط المؤسسات لمزيد من الاضطرابات مثل الأوبئة المستقبلية أو التقدم التكنولوجي أو غير ذلك، للتأكد من أن التعلم عبر الهاتف المحمول يظل حلاً قابلاً للتطبيق في سياق بيئة التعليم المتغيرة باستمرار.

1. Introduction

The acceleration of technology has dramatically transformed education, with e-learning becoming a prominent feature in both routine and emergency scenarios. Part of e-learning, mobile learning m-learning provides convenience, availability and richer learning engagements when using handheld devices like phones and tablets. Though, COVID-19 has played a good role to shift its concentration towards mobile learning as a crisis response, the current discussion has moved ahead to look at the contributions of this technology in other educational issues like providing distance education in the far away areas or to find out how prepared we are for next such crises [1]. Al-Baha university, like many institutions worldwide, implemented mobile learning applications to ensure continuity during the pandemic. These applications enabled faculty to deliver lectures, share resources, and interact with students, transcending geographical barriers. However, as learning management systems (LMS) have offered similar capabilities for over a decade, it is vital to identify how mobile applications contribute uniquely to educational outcomes beyond conventional systems [2]. This study evaluates the effectiveness and challenges of mobile learning applications in a post-pandemic context, with a focus on preparing for future scenarios where flexible, technology-driven learning may be essential. Mobile learning applications contain several types, including: educational content development applications, in which educational content is created and disseminated to students [3]. To highlight the Corona pandemic, it is considered a crisis that has affected systems education in many countries of the world, which led to the widespread closure of schools and universities wide. In order to continue the educational process after this pandemic, it is necessary to keep up with developments and rapid technological evolutions. Perhaps resorting to the online learning strategy after the Corona pandemic has played an important role in the continuation of the educational process [4].Therefore, it is important to investigate the importance and role of modern technologies in continuing, improving and developing the process of education after the Corona pandemic requires robust mechanisms and strategies for the success of the educational process. Learning through mobile applications has become a tangible reality in most schools and universities across the global [5]. The world to confront the Corona pandemic from the transmission of infection between students and their teachers, and thus learning has become E-learning in general and what it includes, such as mobile learning applications, is one way out in light of this pandemic to continue the educational process [6]. From this standpoint, and in light of the challenges posed by the COVID-19 pandemic, which led to the closure of schools and universities and the rapid shift to distance learning, this study was conceived as an attempt to explore the reality of using mobile learning applications among instructors at Al-Baha University. While the pandemic provided an urgent context for the adoption of mobile learning, this research also seeks to assess how these tools can be effectively integrated into higher education in the long term, in preparation for future disruptions whether from pandemics, technological advancements, or other unforeseen challenges.

2. Literature review

According to the researchers, m-learning means an ability to employ wireless devices like smart or personal devices connected into the Internet to get the learning content irrespective of the time and space [7], [8]. In other word [9], they defined that m-learning is the learning whereby; use PDA to access to the learning content and help them to perform other functions for instance, submitting of assignments and quizzes.

M-learning is defined as the delivery of learning content through use of mobile technologies while enhancing the learner's experience and traditional face-to-face education may be supplemented with e-learning and m-learning [10].

Many a study in the field suggests that integration of e-learning and especially m-learning is most effective when it complements traditional pedagogy rather than when it is implemented as a self-contained system [11]. The use of classroom teaching and teaching through information technology with the same device is called blended learning [9]. In some definitions the successful completion of a course module means the use of various varieties of instructional media as well as instructional modes. Exact reference: or Mobile learning m-learning is education that is delivered through mobile technology and smart devices. Another advantage that mobile learning points to is greater availability and more convenience [3], [12]. With the use of learners' pocket devices, students can learn at their own convenience ignoring space and time intervals [10]. Mobile learning also assists in different forms of learning such as the adaptive learning technologies and apps that addresses the needs of every individual learner [13]. This personalized learning can improve participation as well as increase learning outcomes making it easier for students to learn more comfortably through materials that cover their preferred learning styles at a difficulty level that matches their capability [13]. In most of the mobile learning platforms, data analytics was employed to monitor performance and adapt the learning processes and sequel Hence, the students experience more unique learning environments. Social integration of CMC in m-learning enables students to easily work in a group through the use of communication tools such as; Group text, social media networks, shared documents and forums [15].

This connectivity can improve conditions for cooperative learning among peers and support for group assignments where participants are dispersed in different geographical areas. The quality of learning environment plays an important role in the case of mobile learning and has significant impact over acceptability of technologies used in learning [16]. Accessibility is the degree to which learners are able to undertake learning tasks, also known as usability; engagement pertains to the creation of specified learning outcomes; overall satisfaction is a measure of the extent to which learners perceived learning design as helpful, easy to use, or enjoyable [17], [18].

Accessibility can be defined as the ability of users in terms of the ease at which they can access and move through the mobile learning platform. The usability features, as per [18], include learnability, efficiency, memorability, error frequency, and satisfaction. In the case of mobile learning, the intuitive presentation of course content is the most pivotal factor in keeping learners from disengagement. As pointed out by [12], it is evidenced that the 'intuitiveness and clearly defined navigation paths majorly contributes to usability of the application in the mobile learning system. While referring to accessibility in mobile learning, media refers to integration of the learning platform, to address the aspects of learning ability in the learning platform for learners with disabilities and the learning platform regardless of physical locations [19]. These include for instance the screen reader for visually impaired user, subtitles for hearing impaired user, flexible layout that can cater for different levels of lighting and other user interfaces [20]. This is so the case since other studies have shown that barriers in accessibility can hamper learning and the general user experience [21]. Also, the level of learners' interest and involvement is now considered as an element of UX in mobile learning, known as engagement [17]. Among them, game incorporation, 'fun' items, and the use of content and other media products are widely applied in order to increase activity level [18]. Besides this they also showed that gamification can increase the motivation of the users by a factor of 2 in education related systems. Further, incorporation of videos, quizzes, and interactive simulations increase on the quality of learning content by adding on the value of fun and interesting [22][23]. In adopting affective mobile learning, UX is a complex model that has implications on the success and adaptation of mobile learning technologies [16]. The pieces that must be implemented in order to improve the overall UX include usability, accessibility, interaction, user personalization, social interaction, contextual learning, and continuous feedback from the users [14]. These elements, when addressed, result in creative, full of interest, and effective mobile learning solutions.

There are many potential benefits of using m-learning ; however, there are numerous factors that challenge the utilization and implementation of m-learning [24]. These can be further subclassified into technology and teacher related factors and also factors related to students and context [25]. mobile learning has also its problems in this regard also that it raises some digital divide problems in front of learners, here not all the learners are able to get mobile devices and internet connections [26]. vibrating and screen and there are also problems associated with distractions data privacy and security [27], [28]. Mobile devices are also not as efficient as the conventional type of computers. Reduced display size, limited data storage and processing abilities have an impact on the usability and the learning activities taking place [27]. These restrictions may make it difficult to enter multi-parameter working characteristics or observe diagrams and large texts. In addition, there is the provision of reliable internet access which is very essential in m-learning in view of accommodation of Web 2.0 tools, and other resources located on cloud in addition to real time interaction. However, bandwidth, connection reliability and cost of data present major challenges, especially in rural or developing areas [30], [31]. Likewise, the absence of calls for technical support and maintenance to mobile learning platforms and devices may also hinder use [32]. This is about the provision of IT help desk for technical support, upgrading of applications and other software and the physical framework to host enterprise mobile learning projects [33]. Overcoming these barriers is therefore critical to the optimization of the opportunities of mobile learning.

3. Methodology

The research method used in the present study was analytical-descriptive in the assessment of the use of mobile learning applications in higher education. The participants in the study comprised 100 faculty members of Al-Baha University, KSA, asked for their experiences, perception, and contingencies of mobile learning tools. The questionnaire included two main dimensions:

1) the application of m-learning and/or mobile learning applications for instruction.
2) the problems faced while implementing these technologies.

Data analysis was done by use of Statistical Package for the Social Sciences (SPSS). Quantitative analysis, coefficient, and frequency distribution in the survey results were used to analyze the results from the faculty's next survey for presence of pattern of the faculty responses. To gain improved understanding, the responses were contextualized using data from prior research in mobile learning [2]. Accordingly with the objectives and questions of the study, the researchers used the questionnaire as in line with the objectives from the perspective of Al-Baha University faculty members. The current study, in its final form, consisted of two factors: the first one is the reality of the teachers mobile learning applications usage in teaching, and this factor embraced the following seven items:

1) Each of the applications explored in this study improved the learning performance compared to that of traditional learning.
2) Incorporate mobile learning applications in teaching students after COVID-19 (Corona).
3) Mobile learning applications have engaged the student hence making it easier to track their performance and document what they've learnt.
4) With the use of mobile learning applications, it is very easy to, and positively, engage students at any given time and place.
5) Mobile learning Application is easy and understandable.
6) Using mobile learning apps, contents are provided to students in a continuous or related way when taken in sequence.

7) Learning contents in mobile learning apps contain appealing and intriguing features.

The second one is the difficulties facing teachers in using learning applications mobile after the COVID-19, and this factor includes (5) items as listed below:

1) I don't have time to use mobile learning applications.
2) I prefer traditional methods of teaching students instead of teaching using applications of mobile learning.
3) My lack of knowledge about the optimal use of mobile applications for teaching.
4) I feel that using mobile learning devices causes a waste of time.
5) I feel that there is no benefit in using mobile learning applications in the learning process.

The researchers took care in formulating the questionnaire as simple and easy as possible; therefore, it is understandable to the research sample which was 100 instructors. The survey is graded respond to it according to a five-point Likert scale, which corresponds to each item of the questionnaire. The questionnaire has a specific value as follows: : Typically 5 marks which include 4.21-5, regularity 4 marks which includes 3.41-4.20, occasionally 3 marks which includes 2.61-3.40, Rarely 2 marks which includes 1.81-2.60, never 1 mark ranging 1-1.80.

4. Results and discussion

To determine the objectives that were set and to analyze the data collected, it analysed via the Statistical Packages for the Social Sciences (SPSS) program. A number of statistical methods and techniques were used to determine the trends of members as a representative of the study population. All but three of the faculty also noted the effectiveness of lecturing and sharing of resources or time irrespective of the time / geographical location and this was especially significant given the current confined mobility and access to learning institutions. As for the relations with the attendees, the mobile learning applications were described enabling one to engage in interactive sessions via Multimedia tools. However, one faculty said, the students could not pay attention for a long time; there is a literature of students possibly requiring faculty-directed promptness to remain active on the mobile platforms. The researchers used the following statistical tests such as frequencies, percentage, mean (weighted), standard deviation, and correlation coefficient. The responses of the first factor which is the reality usage for mobile learning applications in teaching after COVID-19, as presented in the following Table 1, and Figure1.

Table 1.The reality usage for mobile learning applications in teaching

No	Statement	Not at all (1)	Seldom (2)	Some (3)	Regularly (4)	Often (5)	Mean	SD	Choice
1	Mobile learning applications enhanced the learning performance compared to traditional education	5	17	5	33	40	3.85	1.33	Regularly
2	Use mobile learning applications in teaching students after COVID-19 (Corona)	0	5	11	25	59	4.40	0,91	Often
3	Mobile learning applications have made it easier to monitor students' performance and record their progress in learning	3	11	12	29	45	4,1	1.2	Regularly
4	Mobile learning applications have made it easier to communicate and interact positively with students anywhere, anytime	3	23	13	28	33	3.71	1.33	Regularly
5	Using mobile learning apps is simple and clear	2	10	8	52	28	3.97	0,93	Regularly
6	Mobile learning apps deliver content in a sequential and interconnected manner for students	3	12	15	31	39	3.83	1.23	Regularly
7	Mobile learning apps have interesting and attractive elements into the learning contents	6	16	20	20	38	3.47	1.20	Regularly
The mean of the total statements							3.90	1.22	Regularly

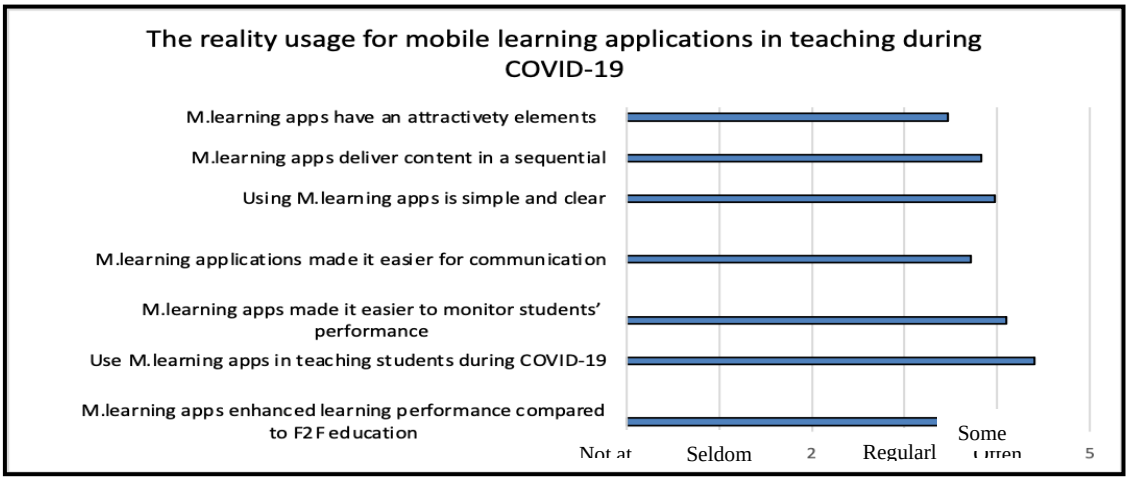

Figure 1. The reality usage for mobile learning applications in teaching

When looking into the Table 1, the result that found for statement of "Mobile learning applications enhanced the learning performance compared to traditional education" is 3.85 which is regularly. Whenever designed and facilitated correctly, we can obtain choice, simplicity, interaction, and individualization that may not always be feasible in classroom instruction. Consumers can make use of the content at any time and from anywhere making it easier and adaptable for learning. Also, mobile learning applications can include audio and video, as well as opportunities for learning through quizzes, control simulations, and others, which can improve results of knowledge and motivation. They can also be used to create multi-media presentation that enhances learning and communication among student and instructors. Furthermore, the result that been drawn from the sample for the statement of "Use mobile learning applications in teaching students after COVID-19 (Corona)" was 4.40 which means often. This is might because mobile learning applications provide flexibility for students to learn at their own pace and convenience. They can access educational materials anytime, anywhere, which is especially beneficial after periods of remote learning or lockdowns. This is influenced by other factors such as access to technology, engagement levels, teacher support, assessment methods, and social interaction opportunities. [34] and [35] confirmed an effective mobile learning applications design can provide flexibility for students to learn at their own pace and convenience and their research outcomes support the use of mobile learning applications in education. When moving into the statement of "Mobile learning applications have made it easier to monitor students' performance and record their progress in learning", the mean of the responses was 4.1 which is regularly.

Most mobile learning applications provide tools whereby the trainer is able to track the achievements of their students in real time through quizzes, tests and assignments. They can monitor the time students spend on resources, on tasks as well as time spent on different modules and content they use. These assessments provide immediate feedback to both students and instructors, allowing for quick identification of areas where students may need additional support or intervention. This finding is consistent with that [36] and [12] who investigated the effects of monitoring students' progress through mobile devices and found that mobile learning applications made the process of monitoring students' progress easy for instructors and they can get full details about their students learning progress in terms of what they have achieved and not achieved form the learning outcomes. Moreover, the result revealed that "Using mobile learning apps is simple and clear" was 3.97 which means regularly. Mobile learning apps are typically designed with consistency and intuitive user interfaces that prioritize ease of navigation and accessibility. Clear menu structures, well-labelled buttons, and simple layouts make it easy for users, including students and instructors, to find and use the app's features. This consistency enhances usability by ensuring that users can easily recognize and understand common interface elements and interactions. These features ensure that the app remains clear and usable for individuals with different abilities and preferences. This is in line with the statement made by [37] who stated that mobile learning apps are intuitively designed with friendly user interfaces that prioritize ease of navigation and accessibility and this will make the app remains clear and usable for users with different capabilities. The last two statements which are "Mobile learning apps have interesting and attractive elements into the learning contents" and "Mobile learning apps deliver content in a sequential and interconnected manner for students" revealed that the result is about 85% which was regularly. This is could because of mobile learning apps leverage multimedia elements such as videos, animations, infographics, and interactive simulations to make learning content more engaging and dynamic. Visual and auditory stimuli enhance students' understanding and retention of complex concepts. Some of the frequently applied approaches to encourage the learners are related to the fact that many mobile applications created to aid the learning process are designed as educational games. Gamified elements bring levels of engagement from students, compel them into participation and make students feel accomplished.

The finding is consistent with that [38] who investigated the combination of interesting and attractive elements in mobile learning apps and found it enhances students' engagement, motivation, and learning outcomes by delivering content in an interactive, interconnected, and personalized manner. These results support the findings of [39] who stated that mobile learning apps combined by the elements of interest and attractiveness can increase students' engagement, motivation, and learning outcomes. When moving to the data that been collected in order to answer the second factor which investigate the difficulties that faced teachers when using mobile learning applications after the COVID-19, the findings analysed and shown in following Table 2, and Figure 2.

Table 2. The difficulties faced by teachers when using mobile learning applications.

No	Statement	Not at all (1)	Seldom (2)	Some (3)	Regularly (4)	Often (5)	Mean	SD	Choice
1	I don't have time to use mobile learning applications	1	16	19	29	35	3.7	1.07	Regularly
2	I prefer traditional methods of teaching students instead of teaching using applications of mobile learning	1	6	31	37	25	3.85	0.87	Regularly
3	My lack of knowledge about the optimal use of mobile applications for teaching	1	1	6	43	39	4.4	0.71	Often
4	I feel that using mobile learning devices causes a waste of time.	15	57	10	9	9	2.3	1.2	Seldom
5	I feel that there is no benefit in using mobile learning applications in the learning process.	21	41	7	21	10	2.63	1.4	Seldom
The mean of the total statements							3.37	1.05	Some

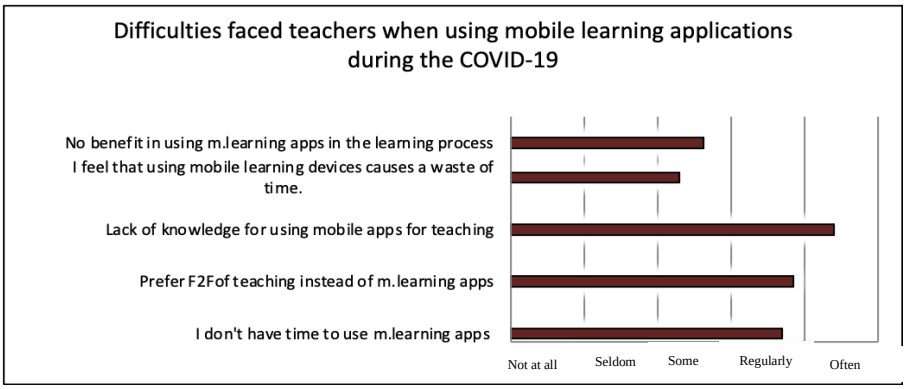

Figure 2. The difficulties faced by teachers when using mobile learning applications.

In Table 2, the findings revealed that the study sample is regular in their approval of the difficulties that instructors face after the usage of mobile learning applications as the mean between 2.62 to 3.40. In addition, the mean result that has been shown in the above table is between 1.05 to 3.8 that these ranges indicate their opinion is between (some to regular) against the barriers of using mobile devices in learning. That way the study stresses on benefits that mobile learning applications has in a process of changing education all while putting into emphasis that much has to be done in order to maximize the use of the technological advancements. Some faculty members' feedback pointed out on one hand differences between potential advantages and on the other hand implementation difficulties. However, in using multimedia and gamification elements in developing mobile tools, the authors have realized that these two aspects are not enough to ensure attention from the students. It was also revealed that designing the mobile courses with several non-consecutive sections will improve the students; attention span [2]. In order to make the desired equity possible, a lot of emphasis should be placed on infrastructure and offer trainings to the faculties severally. On the other hand, support services that include technical support services like IT support round the clock are handy and minimize on the hitches a user is most likely to encounter with the product or tool. In addition to synthesizing the faculty responses, this study found potential original sources of several of the challenges. In the same way, the digital divide increases disparities in the use of mobile learning, and when there is no support from the university, faculty members will not be prepared. Solving these challenges requires a complex solution set that involves technology solutions, policy, and instructional design. Furthermore, collaboration of the tasks under implementation may have the effect of promoting peer interaction and engagement. The lack of knowledge about how to effectively leverage mobile applications for teaching can indeed be a significant barrier for instructors which is 4.4 out of 5, especially during times like the COVID-19 pandemic. This might be related to the limited training opportunities for instructors. They may not have had sufficient training or exposure to use mobile apps for teaching purposes. Therefore, without proper training, they may struggle to navigate these tools effectively. This supports the findings of the research study which conducted by [40] on what affect instructors' intention to use mobile apps. They found that teachers without adequate training to use mobile applications for teaching, they faced challenges to navigate these apps effectively. In statement number 4 which investigates the usage of mobile technology in learning causes a waste of time, the result revealed that 2.3 out of 5 which means their responds are seldom.

This feeling might be related to the interactivity or engagement that behind the educational content design for mobile devices to hold students' attention. If the material is poorly presented, students may perceive it as a waste of time. This result reflects [41] who reported that the usage of mobile technology in learning causes a waste of time if the material is poorly presented for the students as this will cause disengagement with learning contents. The last statement which is "I feel that there is no benefit in using mobile learning applications in the learning process" shows the mean responses of the sample as 2.63 out of 5 which means seldom. This result indicates that much more of the sample does not agree with this statement of no benefit when using mobile devices in learning. The rest of the sample who has agree there is no benefit in using mobile learning might because technical challenges. Issues such as poor internet connectivity and device compatibility problems can hinder the learning experience and leave users feeling frustrated. People naturally tend to resist change, especially when it involves adopting new technologies or learning methods. Resistance to mobile learning applications may step from a fear of the unknown or a reluctance to step outside of what they dealt with. According to several research studies [42] [43][44] which conducted to investigate the effects of using mobile learning applications in the learning process and studying the benefits and challenges of mobile learning applications in education, it can be inferred that the use of mobile learning can be beneficial for instructors if they know how to use them properly whereas mobile learning apps can be useless if those instructors do not know how to use them or no enough training provided to them.

5. Conclusions

An analysis of the impact of employing mobile learning applications in Al-Baha University with emphasis on the effectiveness of these applications in the presence of the new reality owing to COVID-19 pandemic reveals pros and cons. It has been a time that saw a revolution in education across the world and Al-Baha University could not be left out. The authors determined that due to COVID-19, the shift towards online learning contributed to the emergence of mobile learning application among the faculty. At the same time, it became clear some of the main issues even in the spheres of staff development, information technology, and students' motivation. These are important lessons because as institutions adapt to post-Covid strategies, the lessons learned in Covid conscious and other disruptions in that line is paramount if the mobile learning needs to be a continued key player in current and future methods of delivering education. Building upon the main findings derived from the present studies, this conclusion addresses the advantages, difficulties, and consequences of employing these applications. Several advancements in mobile learning applications contributed to the improvement of access and flexibility the overall educational process. Lecturers could also teach as well as provide materials, students, and faculty, all without the restrictions of geographical location. This flexibility was important during such lock down periods because the education of the students was not interrupted. Mobile learning applications expanded the user participation using interactive instruments and multimedia. This marks the work interactivity and that they can be used to improve the performance of learning are statistically correlated. Discussion boards, quizzes, and recorded lectures kept students' attention and encouraged them because, compared to conventional classroom face-to-face teaching methods, which are mere talking and explaining, the formal distance learning tools provided adaptability and enhanced different forms of teaching–learning approaches. But major technological challenges were met there. The challenges encountered included poor internet connection, limited access to better devices and using a new set of technology altogether in some cases, by the faculty members. Among these challenges, the least developed mobile learning region experienced the most challenges due to the lack of adequate ICT infrastructures. The importance of this study therefore resides in the fact that it will bring out the faculty's practical experiences when the education system was undergoing change.

This study is helpful to report both advantages and disadvantage of integrating and implementing mobile learning since such information can help to strategize and policy educational direction to prevent disruptions in distance learning. The studies provide direction for institutions to improve the professional development of their faculty, to help educators become more prepared to integrate technology within their classroom and other educational settings. The technological factors must be resolved to enhance the use of mobile learning especially in areas that lack robust technological systems. By taking these implications into account, educational institutions will be more capable to create more tolerant, malleable, and adaptive learning environment that will not be as much affected by further global disruptions such as pandemics, shifts in technologies and so on to the existing traditional education paradigm.

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