

Successful Factors for Teaching and Learning Using Mobile Applications

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Research education evolves day by day and has offers many new techniques to impart information and knowledge. One of the important discussions nowadays is ubiquitous engagement activities for students; learning in innovative ways. Hence the introduction of mobile applications as innovative ubiquitous engaging teaching and learning method. This review examined articles on mobile apps for teaching and learning at schools and up to higher institutions. A content analysis was used to analyse successful factors for teaching and learning via mobile applications. This review found that mobile apps improve knowledge accessibility, engagement of students, varieties of options, borderless education and yet allow collaborative between students and teachers. Furthermore, this paper gives insights on some items to be considered when developing mobile apps for T&L.

Key words: *Ubiquitous, Engagement, Easy of Access, Collaboration, Mobile Apps Development, Teaching and Learning.*

Introduction

There is significant emergence of technology applications for education purpose. A number of mobile applications (mobile apps) have been designed and developed to support the teaching and learning (T&L). Ubiquitous, collaboration and socializing are among the application features that made it as an interesting tool to possess (Oyelere et al. 2018). Moreover, the application allows learning resources to be accessed comfortably. This technology has changed the usual closed classroom setting to an open classroom with enhanced T&L tools for educators and students to improve their T&L experience.

The increased use of these mobile devices such as iPads, smartphones, tablets and PDAs is a global trend. People carry these technologies to improve and assist in their daily activities, particularly communication and dissemination of information and knowledge. Similarly, the



'anytime' and 'anyplace' concept offered can be utilized in mobile learning to enrich the educational activities in conveying and retrieving lessons. Hence the educators and students should consider to take this opportunity to benefit the advantages it can offer (Bidin & Ziden, 2013).

The enquiry on how to develop a useful T&L mobile apps has been continually discussed and has many points of views. Therefore, the purpose of this study is to review the current successful factors for teaching and learning via mobile applications that would contribute to the T&L mobile apps development. Furthermore, the factors to develop mobile apps for education purpose is recommended.

Methods

This study is conducted as a systematic literature review using the Kitchenham (2009) guidelines. The aim of this review is to identify the successful factor of T&L mobile apps development.

The current synthesis of research across 2010-2018 is focusing on the successful factors for teaching and learning by using mobile applications. Google scholars and websites were selected as options for collecting the information regarding to use of mobile applications for teaching and learning and its successful factors for teaching and learning. Keywords related to the topic are used to extract the relevant articles. A total of 5 articles discussing in detail, teaching and learning by using mobile applications were selected for this study, from 228 articles initially obtained from Google Scholar searches.

Results

The researchers analysed the factors by considering literatures in which the mobile devices were utilized as the teaching and learning tools. The results indicate that most issues and challenges found are related to mobile device features, while very limited resources discussed user's expectations. The academic and context matter such as the pedagogical and learning content matters are somewhat discussed.

Factors influencing mobile learning in education

Based on the result of this study, there are several factors that have been motivating learners and educators to use mobile applications. A total of 5 articles have been chosen and all of them discuss in detail teaching and learning by using mobile applications. Based on the articles, the authors of those articles mentioned that the attention should be given to these factors to adopt mobile learning successfully.

In 2010, Tomas D. Cochrane performed analysis research and discovered that there are 5 major circumstances as critical success (CS) factors for mobile applications use in education field.

Table 1: Critical successful (CS) factors (Cochrane, 2010)

<i>CS Factors</i>
The use of regular formative feedback from both lecturers and student peers
The level of lecturer modelling of the pedagogical use of the tools
The level of pedagogical integration of the technology into the course criteria and assessment
Appropriate choice of mobile devices and software
Technological and pedagogical support

Later in 2013, Bidin & Ziden pointed out three major factors that influence the use of mobile application as a successful tool for teaching and learning, as described in Table 2. Each major factor has a subcategory that details out the aspects related.

Table 2: Main Factor for T&L Mobile application (Bidin & Ziden, 2013),

<i>Main factor:</i>	<i>Subfactor</i>
Features of the devices	Usability
	Functional
User's expectations	Ownership
	Privacy
	Self-Regulated learning (Control of the learning)
	Flexible learning
	Life-long learning
	Fun
Pedagogical advantage	Collaborative learning
	Blended learning
	Interactive learning
	Experiential learning (Learning in context)
	Problem-based learning

Apart from that, the successfulness of learning and teaching using mobile applications is defined based on dependent and independent variables (Alqahtani & Mohammad, 2015), as stated in Table 3 below. However, it is noted that, the perspective of this finding is on learners, which indicated that the successfulness is dependent on learners.

Table 3: Categories of T&L successful factors (Alqahtani & Mohammad, 2015)

Dependent variables:	Independent variables:
Mobile learner performance	Independent variables:
Mobile learner satisfaction	Perceived usefulness
Mobile learner behaviour	Application's ease of use
	Content quality

Another study has emphasized the use of mobile application as a tool in education as a successful component in learning and teaching processes with regard the following factors: Perceived ease of use, Perceived usefulness, Attitude toward using, Self-efficacy, Prior use of e-learning, Perceived mobility value, and Behavioural intention toward using the device (Yadegaridehkordi, Iahad, & Baloch, 2015).

On the other hand, Alrasheedi, M., & Capretz, L. F. (2018) investigated students, instructors and management perspectives. They have suggested there are new classification aspects discovered as successful factor in the teaching and learning processes, by using mobile applications. Table 2 below listed the categories found by this research.

Table 4: Categories of T&L successful factors (Alrasheedi, M., & Capretz, L. F. 2018)

Categories	Variables
Technologies	Availability
	Accessibility
	Affordability
	Internet access
	Connectivity
	Choices of mobile devices
	Web 2.0 software
	Cross-platform capability

Management support	Ownership
	Institutional support
	Administrative support
	Assimilation with curriculum
	User feedback
Teaching pedagogy	Educator perceptions
	Technical competence of instructors
	Faculty commitment
	Develop assessment techniques
	User feedback
	Assimilation with curriculum
Learning approach	Learning community development
	User feedback
	Learner perceptions
	Technical competence of students
	User friendly design of content
	Assimilation with curriculum

According to Hamidi, H., & Chavoshi, A. (2018), there are seven factors related to adoption of mobile learning in educational institution, namely as ease of use, trust, characters and personal qualities, context, perceived usefulness of using, behavioral intention, and culture of using a research model.

From the literature, we also identified three key areas that may affect behavioral intention to adopt mobile learning. These include the pedagogical, personal innovativeness, and social influences area. The article indicates that the pedagogical area has the maximum effect on students' behavioral intention to use the mobile learning.

In addition, the Social area also plays an important role, especially the social image and subjective norm. However, the article exhibits that although personal innovativeness has some indirect influences, it has not been the main contributing factor (Hao et al., 2017).

Using a meta-analysis, most of the successful factors identified by previous studies linger around similar aspect such as users' perception, technological, content, pedagogical advantages/ learning approach as well as supports from management. Users perceptions include flexible learning and fun. On the other hand, technological reflects the features of devices such as usability and functionality as well as ubiquitous features. Content focuses on user-friendly content that refers to quality, trust, and curriculum related content. Pedagogical advantages or learning approach refers to collaborative and interactive learning which includes the learning community development and user feedbacks. Last but not least is the management support, which consist of proper policies on mobile learning and technical support systems.

The review conducted in this study has pointed to one potential insight that is the factors to be considered when developing a mobile app for T&L purpose. Figure 1 below indicates the factors to develop the mobile apps. Further research needs to be conducted to confirm the factors and it attributes. Perhaps the impact on students' attitude, engagement and learning (Heflin et al., 2017) can also be further investigated.

Figure 1. Factors to develop mobile apps for Teaching and Learning.





Conclusion

The use of mobile application has a positive impact on the learning and teaching process. It allows students to make an interaction with the educational content, without having any barrier of space in the real world. This paper examined articles on mobile apps for teaching and learning for educators and students, from schools up to higher institutions. A content analysis was used to analyse successful factors for teaching and learning using mobile applications. This review found that mobile apps improve knowledge accessibility, engagement of students, varieties of options, borderless education and yet allows collaborative learning between students and teachers. Furthermore, this paper gives insights on 5 items to be considered when developing a mobile apps for T&L users' perception, technological, content, pedagogical advantages/ learning approach as well as supports from management. Further research need to be conduct to test these items.



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