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ADVANTAGES AND CHALLENGES OF INTEGRATING M-LEARNING INTO SAUDI ARABIAN UNIVERSITIES: A LITERATURE REVIEW

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Abstract:
Rapid advancements in technology have resulted in increasingly widespread utilisation of smartphones and tablet computing technologies and solutions. Today, institutions nowadays over the world struggle to keep pace with the development of technology such as the adoption of Mobile Learning (M-learning) in education environment. Saudi Arabia universities are no exception. Recently, several universities in Saudi Arabia have integrated M-learning in their teaching and learning process to provide education available to their learners without temporal or spatial resections. Conversely, there has been little discussion about benefits and the challenges of the use of M-learning in higher education system in KSA. This paper will discuss the advantages and the challenges of applying M-learning in Saudi Arabia universities according to existing literature in the field.

Keywords: Saudi Arabia, m-learning, m-learning integration, ICT, higher education, educators, university

1. Introduction

1.1 E-learning and the adoption of ICT solutions in Kingdom of Saudi Arabia

In developing countries, the adoption and integration of educational technologies—such as Learning Management Systems (LMS) and Mobile Learning (M-Learning)—remain in their early stages of development, especially when compared to that of developing nations. Nevertheless, in recent years many Arabic countries have introduced technology into their education systems when faced with large numbers of learners intending to attend higher education institutions (Algahtani, 2017). Consequently, the introduction new technology systems into Universities in the Kingdom of Saudi Arabia (KSA) are essential if such universities are to provide

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adequate learning environments for prospective students. In the KSA, the modernization of the education system has been highlighted by the KSA's Ministry of Education (ME) as an important part of Saudi Vision 2030 (KSA, 2017). The adopting of Electronic learning (E-learning) and M-learning in teaching and learning process will advantage the KSA's educational environment, much like the integration of E-government has already benefited KSA and has "improved Saudi Arabia's ranking on several global indicators" (KSA, 2017); consequently, E-learning and M-learning solutions are not being explored for integration into environments and institutions in KSA (KSA, 2017). The integration and implementation of M-learning technologies is one that entails challenges and benefits; these must be investigated and identified so that prospective investment into M-learning by the KSA can be most effective.

1.2 Aims and objectives

The purpose of this literature review is to help determine and clarify the various advantages, drawbacks, limitations and barriers that will likely be encountered when implementing M-learning technologies and solutions into Universities in KSA. It is hoped that a more in-depth and comprehensive understanding of these challenges and benefits will increase the effectiveness of M-learning integration in Saudi Universities, and will facilitate—through greater affordability, expediency and simplicity—better information sharing, both globally and in the KSA.

This literature review hopes to inform and assist the successful integration of M-learning into the KSA's higher Education system by identifying and outlining the potential challenges and limiting factors highlighted in existing and relevant literature; key findings of relevant researches shall be explored, and common themes identified. It is hoped that the conclusions drawn herein will inform and guide those individuals responsible and thereby increase the likelihood of successful and fruitful integration of M-learning services into universities in the KSA.

1.3 Importance of this research

This research investigates existing literature and highlights previous studies conclusions and recommendations regarding the challenges and barriers facing Universities in the KSA when integrating M-learning into their educational practices and curricula. By identifying and detailing the main challenges and benefits within such a process, this research hopes to inform future investment, integration and use of M-learning technologies in higher education institutions in the KSA. Finally, it is hoped that this review will contribute to the existing literature in the field of M-Learning and inform future studies in the field, both in the KSA and globally.

2. Literature Review

This section will detail some of the researches that have been included in this review and shall explore the definition of M-learning according to previous research studies

and literature reviews in the field. The significance of M-learning and its integration into the curricula and systems of KSA Universities will then be considered; the benefits and challenges listed by the reviewed literature shall then be investigated and discussed.

2.1 Studies included herein

This literature review will include research on M-learning and, particularly, the integration of M-learning regarding the KSA Universities and its Higher Education system. However, other researches concerning other countries, systems and educational levels shall also be included due to their more advanced stages of M-learning integration, not yet encountered or possible in KSA, due to the fact that M-learning integration remains in its "developmental stages" in KSA (Almutairy, Davies & Dimitriadi, 2015), this should be explored so that Universities in KSA can learn from the experiences of other countries and prepare for similar prospective challenges and issues they might encounter (e.g. Scott et al., 2009; Franklin, 2011; Qureshi et al., 2012; Al-Hunaiyyan, Alhajrr, & Al-Sharhan, 2017). Studies specifically on M-learning integration into universities in KSA will also be assessed to determine the benefits and challenges facing M-learning integration according to other authors and researches. These studies are of importance when informing the prospective integration of M-learning solutions into the KSA's Universities as the equipment, infrastructure, resources, educators, students, curricula and educational environment are closely related and all are needed for successful M-learning integration (Alsadoon, 2012).

Due to its reliance on certain technologies, tools and infrastructural prerequisites, M-learning is a relatively recent phenomenon in education (Georgiev, Georgieva, & Smrikarov, 2004). Research on M-learning, and the successes and challenges faced when trying to integrate M-learning into educational curricula and systems, has only been possible in the last few decades. Indeed, all the literature reviewed herein have been published in the last 11 years; the exception being an early review of possible classification systems for M-learning solutions by Georgiev, Georgieva, & Smrikarov (2004).

2.2 Defining M-learning and the scope of M-learning integration

This section shall detail both the various definitions of M-learning and the broad impact that M-learning integration has concerning educational institutions and systems, as well as the individuals working among them. It must be noted that no definitive definition of M-learning exists and, due to the contemporary nature of M-learning and associated technologies, it would be inadvisable to formulate such definition to the exclusion of potentially useful researches. Consequently, this review will consider some researches that include different definitions for M-learning.

Several definitions of M-learning are given in the literature reviewed. Of these, the earliest is given by Georgiev, Georgieva and Smrikarov (2004), who define M-Learning as the capacity to learn and educate without spatial or temporal restrictions;

the authors indicated that this could be accomplished by using cell phones, Tablet PCs, PDAs and other portable devices. Due to restricted coverage of online mobile services and technologies in the first decade of the 21st century—especially in developing nations—it is likely that connectivity has improved since 2004; however, the importance of the array of devices and the device-oriented definition these authors give remains pertinent in 2018 (Alsadoon & Alsadoon, 2015). A more circumspect and broad definition is given by Franklin (2011), who defines M-learning as "learning that happens anywhere, anytime" (p.261); this definition seems to account for the importance of hardware and connectivity resources in M-learning. Similarly, Chen and Huang (2010) define M-learning as learning that takes place through the utilisation of electronic devices such laptops, smartphones, and other mobile devices.

The literature reviewed herein also included other terms used instead of 'M-learning' but that were clearly meant to refer of the same phenomenon; examples of these include "distance learning" (Chang & Huang, 2010) and "M-technologies" per Smith and Cap (2007). Furthermore, some researches chose to include a list of all related concepts, equipment and terms so to present M-learning as a broader and more holistic phenomenon (Fraklin, 2011). Some researchers consider E-learning to be a subcategory of M-learning (Alkhalaf, 2015), this suggests the significance of the mobile device or devices in question concerning both the definition and integration of M-learning and that a more pragmatic approach should be adopted by any institution or system hoping to integrate M-learning into its processes and structures. Corroborating this, Chartrand's (2016) study on M-learning's advantages and disadvantages in a language classroom environment concerns "mobile devices that may be used for educational purposes". Still other studies investigate and refer to M-learning indirectly through investigating the "impact of mobile phone use on student contributions" (Alsadoon & Alsadoon, 2015).

As a result of the various definitions and elements of M-learning highlighted in this section the impacts, challenges and benefits of M-learning shall be divided into three categories for the following section: *Hardware, Software, and Resources*, *Connectivity and Infrastructure*, and *Students and Educators*.

3. Current State of M-learning in the KSA

This section shall investigate the current situation regarding M-learning in KSA and its integration into the Saudi Education system. The impact of M-learning in education is outlined by several studies reviewed herein, some of which have been conducted in or are concerned with the Higher Education system and its institutions in the KSA.

Currently, the KSA hopes to transform resources and monetary investment into the Saudi economy to generate a more information and knowledge-based industry rather than one that relies on oil and oil-derived products, according to Saudi Vision 2030 (KSA, 2017), naturally this concerns education and the ME in KSA which is an integral part of Saudi Vision 2030.

The positive affect that technology and technological advancements have had on education and learning processes, as well as teachers and students, has been mentioned by several researchers (Alsadoon, 2012; Alfarani, 2015; Chartrand, 2016). Several of the researches reviewed in this paper were conducted in KSA and concerned Educational institutions in the KSA; participating institutions of the reviewed literature concerning KSA directly include King Kahld University, Umm Al-Gura University, Taiba University, and the Saudi Electronic University.

The rapid technological advancements in smartphone and wireless networking technologies in the KSA (KSA, 2017) over the last decade have served to increase the perceived significance of integrating M-learning into the Saudi education system. There are over 51 million mobile-cellular subscriptions in the KSA and a majority of these include 3G or 4G connectivity (Almutairy, Davies, & Dimitriadi, 2015). Consequently, the personal devices of students are likely to be compatible, at least concerning hardware capabilities, with M-learning demands. The infrastructure of KSA regarding connectivity and M-learning is also promising, especially compared to other developing nations (Almutairy, Davies, & Dimitriadi, 2015). As M-learning is predominantly "applied based on the use of a set of specific mobile applications, which possesses similar features and specific characteristics according to learning goals" (Alkhalaf, 2015) hardware and connectivity are crucial if students are to utilize their devices for educational purposes. Without their ability to integrate students' personal devices into University education the need to provide them with such devices would be a significant financial requirement. Except for a few studies (Chartrand, 2016; Alsadoon, 2012) most researches concern M-learning by using students' own devices. A social and cultural problem of integrating M-learning shall also be addressed, as certain researches (e.g. Al-farani, 2015; Alhajri, 2016) have highlighted issues encountered when students and educators are less than willing to adopt such new technologies into learning and teaching practices.

4. Positives and drawbacks of M-Learning

This section shall contain discussion of the advantages and limitations of integrating M-learning into University level education systems and institutions in KSA.

4.1 Hardware and Software

Universities and higher education schools have begun to adapt these new technologies and platforms into their teaching and educational practices, adapting learning tools and technologies to facilitate informational access for students and improve students' abilities using these tools. M-learning should be viewed differently than E-learning, according to Alhajri's (2017) Kuwaiti study, due to specifications of the hardware concerned; this stresses the significant of tools and hardware technologies for successful M-learning integration as each student must be equipped with their own device.

According to Smith and Cap (2007) using mobile phones in education will bring potential issues concerning hardware specifications of the devices concerned; small screens, limited input options, short battery life, limited memory capacity and the quality of videos provided per the device, all restrict M-learning integration if not compliant with a standardised infrastructure and system. However, among the advantages regarding the KSA is that most students already possess an M-learning compatible device when attending university (Keski and Metcalf, 2011; Alsadoon, 2012; Chartrand, 2016). Previous investment concerning national infrastructure and connectivity (KSA, 2017) in the country will also facilitate extracurricular M-learning among students when on the move or away from the classroom; indeed, a leaning at home and outside the classroom is noted as a significant advantage to successful M-learning by several studies (Kukulska-Hulme & Shield, 2007; Keski and Metcalf, 2011).

However, some additional equipment may be needed, as Chartrand noted (2016); in this case study students encountered a problem since the devices had no microphones or speakers, thus additional hardware had to be bought and set-up accordingly. This poses a demand for investment in such means by the KSA per University level M-learning integration (Almutairy, Davies & Dimitriadi, 2015). The author suspects that such issues will, however, become less problematic with increased affordability of mobile devices and the fact that many contemporary mobile devices feature these as standard. A further issue is that of "deteriorating devices" (Chartrand, 2016). Indeed, due to the rapid advancement of technology, the need for hardware devices to remain-up-to-date with software solutions related connectivity issues is something that can cause significant issues. Hence the longevity of software and E-learning and M-learning systems must consider the lifespan of students' devices. Conversely, the low cost of cell phones puts more advanced features of technology in students' hands (Chartrand, 2016). Further advantages are stated by Keski and Metcalf (2011) in that cell phones are powerful educational tools that can capture "digital natives' attention and help them to engage in in learning processes and materials"; this can be beneficial when capturing the attention of erstwhile less-engaged students (Kukulska-Hulme & Sheild, 2007; Chartrand, 2016). Moreover, M-learning devices offer immediate feedback from students concerning their peers or instructors.

4.2 Resources, Connectivity and infrastructure

Additionally, the Saudi ME has also developed an infrastructure that is able to address all Saudi Universities' online educational needs and demands through the adoption and implementation of the Afaq project; both Learning Management Systems and the National Centre of E-learning and Distance Education (NCELDE) are included per this online infrastructural change (KSA, 2017). Through implementation of this infrastructure, it is hoped distance learning through use of mobile-phones will be increased and advanced. The Afaq project's general objective is to facilitate certain M-learning features—including greater flexibility and speeds—and address the increasing demands and requirements of prospective and existing M-learning users.

M-learning offers a means by which information and understanding can be exchanged through online or virtual environments and platforms including virtual classrooms, blogs, YouTube channels, and other experimental educational means. Alhajri (2017) noted that institutional obstacles to M-learning were significant and that these entailed the cultural environment concerned. In the case of KSA, opposition and reticence toward M-learning must be heeded, and educator and student concerns noted; without student and educators support, the impact of M-learning, even if its integration into educational system is a success, will be hugely mitigated (Pietrzyk, Semich, Graham, & Cellante, 2011; Alhajri, 2017; Al-Hunaiyyan, Alhajri, &Al-Sharhan, 2017)

Smith and Cap (2007), also cite personal problems such as "high cost of the [M-learning] service", privacy, health risk and safety as major infrastructural concerns. Also, Alkhalaf (2015) revealed that in general the use of M-learning in education environment made learning more convenient since it saves time and helps students complete activates outside the class room, but challenges that students faced, such poor wireless network and technical issues, significantly limited these advantages.

Georgiev, Georgieva, & Smrikarov (2004), who stress the importance of "portability and personality" in M-learning and note the significance between E-learning and M-learning and regarding connectivity. Hence it can be inferred that any successful integration of M-learning solutions into a Higher Education system will require necessary E-learning support and connectivity.

Finally, Al-Hunaiyyan, Alhajri, and Al-Sharhan (2017) stress that security, support and understanding of both educators and students must be determined and integrated into the project itself. Difficulties that may arise during implementation have been highlighted by other studies; Queshi et al. (2012) for example state internet connectivity speeds, the presence of a stable and continuous electrify supply, and the presence and availability of up-to-date technology solutions should be considered when implementing the project, furthermore security, maintenance, administrative and technical support must be available (Qureshi, Ilyas, Yasmin, & Whitty, 2012) throughout the M-learning system to prevent failures and problems.

4.3 Students and Educators

Among the benefits of M-learning is that it makes a "significant difference" regarding classroom contributions from students (Chartrand, 2016; Alsadoon, 2012), and M-learning, when effectively integrated at the classroom level stimulates engagement and students' attentiveness (Alsadoon and Alsadoon, 2015). This has been the subject of many studies in recent years regarding how M-leaning increases learner's interest and motivation to learn—all of which reported a positive impact assuming a successful integration and active participation by students and/or learners (Pietrzyk, et al., 2011; Keskin, & Metcalf, 2011; Scott et al., 2010).

One Saudi Arabian study, conducted at Qassim University by Alkhalaf (2015), aimed to highlight M-learning to help students share knowledge, information and understanding with their peers; this, the author concluded, aided learning among

university students through utilisation of M-learning tools and equipment (Alkhalaf, 2015). The research, which used a case-study approach, used a sample comprised of 100 students who all participated in a course that was taught to them using M-learning. The researcher used a questionnaire as a data collection tool for collating the researches data. Results of this study revealed that most students preferred to use M-learning tools as part of their learning process and that most found M-learning to be useful and suitable tool for their learning process. More significantly, the study "proves that students continue their learning activities outside their classes anytime, provided a wi-fi network is available" (Alkhalaf, 2015); this is an important finding—one mentioned above per Chartrand (2016) and Kukulska-Hulme and Sheild, (2007)—and can counted among the main advantages of M-learning when successfully integrated into the KSA educational system.

Alhaji (2016) stressed that it is important to consider the "methodological issues [of integration of M-learning] to develop appropriate pedagogical models", highlighting that parity is needed between the curriculum and teaching practice of the institution in question and the M-learning system that is being integrated with it (Alhaji, 2016). A further concern unstated in the literature was that M-learning technologies will emerge from developed nations, the ME of KSA should ensure that any language translation issues that might arise.

Recently, Alfarani (2015) carried out a study that aimed to understand the impact integrating M-learning into the education process using Saudi female educators in universities in KSA. Alfarani indicated that, although teachers perceived M-learning as having the potential to improve communication with students, they determined some obstacles influencing the use and acceptance of M-learning including "pedagogical", "technological" and "individual" barriers (Alfarani, 2015). Smith and Cap (2007), cite educational problems such as potentially inappropriate interactions between learners and teachers, increased ease at which students can cheat, though also mention better network literacy and classroom management. Conversely more recent studies have confirmed that many students are using social networks for connecting with friends which may lead to class disruptions (Chartrand, 2016). In addition, (Kukulska-Hulme et al., 2007) showed that M-learning helps students to receive different learning content and considers the diversity among learners compared to traditional educational means. However, certain limitations, such as technical problems like difficulty connecting the Internet, and software issues should be considered (Alhajri, 2016). Alfarani (2015) found out that perceived social cultural and resistance to change impacted students and teachers' intention to use it in the future.

5. Discussion and conclusions

This literature review has demonstrated many different advantages and limitations facing the ME of KSA regarding the integration M-learning integration into the Higher Education system of KSA. All researches agree that successful M-learning integration

affords advantages to educators and students alike, broadening the scope of Higher Education practices and means through increased connectivity, student and teacher interactions, student-student interactions, readily available information and more diverse and tailored educational tools and processes. The scope of the studies reviewed herein show that research into M-learning at a University education level in KSA is limited, and further studies concerning other Arab and non-Arab nations have been included as a result. Additionally, the KSA may benefit from further financial advantages afforded by M-learning but only if M-learning is successfully integrated; hence any prospective financial remuneration and benefit would follow from initial investment and heeding the advice of studies in the field. The opening up of the 'online market' for Universities in KSA being one example. Several studies have revealed that M-learning cannot fit well with traditional education because it focuses on personal devices, learning across locations, and learning from experience unless proper integration is assured, and infrastructural demands are met. Consequently, the KSA needs to continue investment in Higher Education so to avoid prospective challenges and enjoy M-learning advantages such as increased student participation, more diverse teaching practices and accessibility regarding materials. Finally, another disadvantage that can be noted by using M-learning in teaching environments that inconsistent pedagogical quality of teaching materials can cause bad behaviour; therefore, teachers need to ensure their students have access to the right materials despite permanent online connectivity.

6. Limitations and suggestions for future research

Despite the number of studies reviewed here about M-learning and its integration into educational systems, a relatively small number concern the impact of M-learning on the population in question, and the generalization of their results and findings concerning University students and teachers in the KSA remains limited. This review only included studies that mention M-learning and related terms, while older researches including E-learning solutions and their integration into educational systems have been exempt, despite possible useful recommendations.

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