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PERCEPTIONS OF PEDAGOGICAL AFFORDANCE OF SMART MOBILE TECHNOLOGY

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ABSTRACT: Smart mobile devices are becoming ubiquitous among educators and students in Palestine. Mobile devices can be used to provide learning that is contextualized, personalized and unrestricted by location and time. Although these device capabilities are available, many faculty in higher education are not effectively incorporating this technology into their teaching. This study therefore examined academics' perceptions of the value of integrating mobile devices into their teaching activities. A questionnaire survey collected data from 56 academic staff of the Palestine Technical University - Kadoorie, eliciting perceptions of the pedagogical affordance of mobile devices and challenges to their use in teaching. The findings show that participants were still at the stage of actively experimenting with smartphones and iPads, trialing their use at different levels and for different purposes. In general, although participants were unaware of the full potential of their functionalities, they viewed positively the various pedagogical affordances of integrating these devices into their teaching activities. The most important affordances were linking formal and informal learning spaces by providing anywhere-anytime learning opportunities, and developing interest in the subject matter, thus making learning more enjoyable, meaningful, and accessible. The results also identify various challenges including lack of experience and knowledge, finding the time to design and implement such integration, and selecting appropriate apps for the content being taught. Participants also expressed concerns with the limited connectivity and unreliability of Wi-Fi and 3G/4G networks in Palestine.

Key words: Faculty perception, smart mobile devices, mLearning, affordance, self-efficacy.

INTRODUCTION

Smart mobile devices (SMDs), particularly smartphones and tablets, are becoming increasingly ubiquitous among educators and students. Increasing advances in mobile technology, wireless communication networks, physical features of devices and high penetration usage will drive future trends in mobile learning (Johnson, 2011). By 2015, 80% of people accessing the Internet will be doing so from smartphones and tablets rather than PCs (Johnson, 2011). Reflecting global trends, mobile device penetration in Palestine reached 75% in 2012 (GSMA, 2013). Given the ready-at-hand availability of SMDs, it is reasonable to recognize the valuable affordance of these technologies to enhance the practice of teaching and learning in higher education (HE) in Palestine, as well as to meet the needs of a generation for whom mobile devices are becoming an integral part of their everyday lives.

Mobile learning (mLearning) offers many new opportunities in the evolution of technology-enhanced learning (Looi et al., 2010). More than just learning delivered and supported by handheld technologies, mLearning is learning across multiple contexts, through social and content interactions, using personal electronic devices (Crompton, 2013a). mLearning is still at an experimental stage, but one theme emerging from research is the need to integrate mobile devices into a broader learning ecology (Pegrum et al., 2013). mLearning reflects a pedagogical trend towards empowering learners (Pachler et al., 2010), letting them choose when to learn, where and how. Students use their devices to connect with subject content and peers in private or public spaces (Lui and Kao, 2007). However, as lesson delivery changes, this mobile-connected generation of students presents its own set of challenges to educators. From the educator's viewpoint, with these new forms of learning, students can expect learning to be "just in time, just enough, and just for me" (Rosenberg, 2001). Despite the advantages

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of mLearning, demands for personalized learning can cause instructors to feel apprehensive about using technology (Amado, 2008; Amado & Carreira, 2006).

Recent studies indicate that while technology is used increasingly, many teachers are not effectively incorporating it into their teaching (Groff & Mouza, 2008; Levin & Wadmany, 2008; Russell et al., 2007). This can be attributed to teachers' negative perceptions of technology (Crompton, 2013a). Academics' perceptions of mobile technologies significantly influence the effective implementation of mLearning (MacCallum & Jeffrey, 2009; Handal et al., 2013). Therefore, if academic staff are to enhance teaching and learning practice effectively by integrating emerging mobile technologies, they have positive attitudes towards their pedagogical affordances and recognize challenges to implementing them in education. In Palestine, university teachers' views on integrating mobile technology into their teaching are rarely considered. Therefore, this research explores the perceptions of academic staff at the Palestine Technical University - Kadoorie (PTUK) towards the integration of SMDs in teaching, focusing on the most popular devices in Palestine: Android phones, iPhones and iPads.

LİTERATURE REVİEW

SMDs are revolutionary in combining computing and communication features in a single mobile device (Khaddage, 2013). Their popularity arises from the mobility of the technology, of the learner and of learning, especially in the HE landscape (El-Hussein & Cronje, 2010). Smartphones (e.g. iPhone, Android, BlackBerry and Windows phones) and tablets (e.g. iPad, Galaxy, LePad, Dell Streak) are portable, handheld devices with the processing power and memory capacity to run various applications and store data such as documents, pictures and videos. In addition to calls and messages, they offer e.g. internet access, cameras, global positioning systems (GPS), audio and video recorders, which can be valuable instructional tools (Woodill, 2013). SMDs also provide a wide range of interactive software applications (apps), either pre-installed or freely and cheaply available, to support web browsing, social media, communication, location-based functions, interactivity, media production, entertainment etc. This makes SMDs highly customized, personalized platforms for communication, organization, social networking, information production and content management (Khaddage & Lattemann, 2013). The effective use of SMDs in education requires knowledge of their functionalities and how to use them, but teachers must also understand their pedagogical affordances (Mishra & Koehler, 2006). Klopfer & Squire (2008) summarize these as portability, social interactivity (collaboration), context sensitivity (gathering real or simulated data), connectivity (to data collection devices, other handhelds, networks) and individuality.

More recently, Kearney & Maher (2013) explored mobile learning for pre-service teachers, who used their iPads to mediate their own professional learning, exploiting features of authenticity and personalization in both formal and informal settings. The participants captured out-of-class math phenomena, following up and discussing implications for their teaching. They also used their devices to facilitate an enhanced awareness of math in everyday contexts, then used this knowledge to develop rich, contextualized ideas for their own ICT-mediated math tasks. They exploited the iPad's potential to conveniently and spontaneously take notes, observe lessons and make multi-modal reflections. Finally, they trialed a range of iPad-supported math assessment techniques, involving the generation and annotation of new media. Khaddage & Lattemann (2013) studied the use of three mobile apps (e-Lecture-Producer, Dropbox and QR Code) by 26 second-year students on an e-commerce course at Sharjah Women's College. They found that mobile devices and apps can be used as a form of ubiquitous learning, allowing teachers and students to collaborate, communicate and learn together, bridging formal and informal learning.

A qualitative study of teachers' adoption of iPod and iPad smart devices was conducted in Australia by Pegrum et al. (2013). Mobile devices were seen as enhancing student motivation and engagement, with empirical evidence of improved student learning. Teachers perceived the potential of these devices to be used for both organizational and pedagogical purposes. There were particular benefits for students with special needs, including those requiring early intervention or struggling with the curriculum, and those with visual impairments or dyslexia, who could resize and reformat text, as well as using voice recognition and text-to-speech apps. Participants in a study by Handal et al. (2013) perceived the greatest potentials of mobile technology as facilitating anywhere-anytime learning, improving students' communication beyond the university walls and enhancing autonomous learning. Marinakou & Giousmpasoglou (2014) investigated the adoption of mLearning at four universities in the Kingdom of Bahrain. Most respondents (84.4%) found that mobile devices were very important in facilitating collaborative learning and information retrieval, and in sharing resources, whereas the least important function was assessment.

A mixed-methods study by Bansavich (2011) investigated attitudes towards the potential use of iPads in HE. Forty faculty members at the University of San Francisco indicated that key advantages included the e-reader and electronic textbook capabilities, annotating and note-taking for meetings and classes, multimedia viewing and interactivity, mobile learning inside and outside the classroom, high levels of engagement in language learning, use in clinical settings, apps for the sciences, and strong potential for teacher-student and student-

student interactivity. Walters (2011) suggests that portability and kinesthetic interaction help students to develop visual and spatial skills, boosting creativity, while teachers can easily use iPads collect assignments.

Şad & Göktaş (2013) surveyed 1,087 pre-service teachers regarding their perceptions of the instructional value of laptops and mobile phones. Participants did not perceive mobile phones to be effective instructional tools, whereas Thomas et al. (2013) found that a slight majority of teachers did support the classroom integration of mobile phones, stating that they engage and motivate students. Further, Thomas & O'Bannon (2013) found that more than half of pre-service teachers identified anywhere-anytime learning opportunities, increased student engagement, opportunities for differentiation of instruction, increased communication, and increased student motivation as benefits of using cell phones in the classroom.

Alongside these advantages, challenges to the integration of mobile technologies in teaching must also be considered. Many researchers indicate specific physical limitations of SMDs, such as small screens, limited battery time and frustratingly small keypads (Bansavich, 2011; Pegrum et al., 2013; Marinakou & Giousmpasoglou, 2014). Furthermore, the bring-your-own-device (BYOD) model presents a challenge of a different kind in terms of the standards and specifications of the devices permitted to be used in class and, in particular, to log into an institution's network, with all of the attendant implications for institutional policies as well as IT support (Traxler, 2010). Here, network speed, capacity and security are likely to become increasingly important (e.g. Melhuish & Falloon, 2010; Traxler, 2010). Khaddage (2013) argues that mLearning should not be restricted by brand, device or operating system; yet most apps currently in use are pure native apps developed for a particular device and operating system, thus unusable across multiple platforms. Moreover, according to Pegrum et al. (2013), the many available apps are often underpinned by information-transmission or behaviorist drill-and-practice approaches, thus of limited value in social constructivist classrooms oriented towards problem solving and critical enquiry.

According to MacCallum & Jeffery (2009), although today's educators may be more familiar with technology in general, they still may not be fully prepared or able to integrate newer mobile technologies into their teaching. Various studies of mLearning implementation (e.g. Handal et al., 2013; Pegrum et al., 2013; Crompton, 2011) highlight educators' attitudes towards the use of mobile technology and their ability to understand its functionalities and affordances as significant constraints to its meaningful pedagogical integration. Educators see mobile technology as an inappropriate distraction for learners, promoting disruption and cheating (Thomas et al., 2013; Thomas & O'Bannon, 2013; Khaddage & Lattemann, 2013). Other ethical issues concern digital safety, privacy and surveillance, and the blurring of public-private boundaries (e.g. Pachler et al., 2010; Traxler, 2010).

METHODOLOGY

Research questions

The main aim of this paper is to investigate faculty's perceptions of the value of integrating smart mobile devices into their teaching. The main research questions are:

1. What do faculty perceive as the pedagogical affordances of smartphones/tablets in enhancing teaching and learning?
2. In the context of Palestine, what do faculty perceive as the challenges to integrating smartphones/tablets into their teaching?

METHOD

A quantitative descriptive method was used to investigate the perceptions of faculty members regarding the integration of smart mobile technologies in their teaching activities. A questionnaire was developed, based on literature related to mLearning. In addition to personal information, the questionnaire items addressed perceptions of, pedagogical affordances and challenges. There was a mix of question types, including four- and five-point Likert-scale items, checklists and an open-ended question. The content validity of the questionnaire was assessed by two experts in the field of educational technology. Positive feedback was received and some changes were made to the instrument according to their suggestions. The reliability of the constructs was examined using Cronbach's alpha.

RESULTS AND FINDINGS

A total of 56 faculty members at PTUK participated in this study: 30% females and 70% males, representing various disciplines: 63% in sciences and 37% in humanities, agreed to participate in this study. Three-quarters were between the ages of 25 and 45. Older individuals tended to decline to participate, perhaps being less attracted to technology and having less dependency on it. The majority of the 56 participants (91%) owned a

smartphone and only 9% owned a basic cell phone. Half had tablets and 43 owned multiple devices, including smartphones, iPads and digital cameras.

Participants identified several pedagogical affordances of SMDs that would be useful to enhance their teaching practices. It is widely believed that by generating content from real-world contexts, SMDs provide learners with authentic tasks, keep them active and support teachers in creating more engaging experiences (Pegrum et al., 2013). Half of participants agreed that SMDs helped them to engage students in exploring real-world issues and solving authentic problems. Smartphones/tablets offer learners various ways to connect the curriculum with real life and to engage through text, voice, image, and video. For example, teachers of English as a second language can ask learners to use their mobiles to access various news sites or podcasts, to listen or read current reports of global interest on e.g. Ebola, sport, economics, finance, technology, science or education, then to prepare a two-minute talk using the VoiceThread app to express their own opinions. This encourages higher-level thinking skills and improves students' reading, listening and speaking skills. Thus, SMDs support teachers in ways consistent with the above assertion of Pegrum et al. (2013), creating a more meaningful learning experience because learners take more responsibility for their learning and feel as though they are contributing in unique ways.

Mobile devices can play an important role in the informal learning environment, as they can be used for communication, collaboration, gathering and sharing of information (Khaddage & Lattemann, 2013). 72% of participants agreed that SMDs help to link formal learning into the informal learning spaces; portability and internet connectivity are significant in creating "ubiquitous learning" (Murphy, 2011). The slim, lightweight devices are easily carried anywhere, while Internet connectivity through built-in Wi-Fi and 3G/4G networks allows learning content to be accessed anywhere at any time (El-Hussein & Cronje, 2010). Learners in the digital mobile world stay connected with their peers and teachers. A teacher can ask learners to collect information using the SMD's camera/microphone, write notes, discuss findings through instant messaging or share them on social apps. 71% of participants found built-in cameras useful. Teachers can motivate learners to take still and video images of real life in diverse locations and to share this user-generated content digitally with their peers. This affordance is particularly important given the political restrictions on movement in Palestine, whereby many young people are unable to visit e.g. Jerusalem or Gaza. SMDs can help teachers to overcome such limitations and to bridge formal and informal reality for students who value anytime, anywhere, on-demand, flexible learning.

Personalized learning environments are important for a generation who expect learning to be "just in time, just enough, and just for me" (Rosenberg 2001). Half of participants agreed that SMDs helped them to personalize learning activities and differentiate their lessons to address students' diverse learning styles. Teaching materials can be customized to learners' learning style, location, time and activity (Isabwe, 2014). Portability, connectivity and social networks allow learners to access material and learn individually, at their own pace and style, "just in time". Another important aspect of personalized student learning is the wide choice of apps and resources available to learners via their SMDs. Students come to the university with these devices; therefore, unlike centrally provided laptops or computers, the BYOD model creates personalized learning on different platforms, rather than a one-size-fits-all roll-out of a particular device (Isabwe, 2014).

Three-quarters of respondents agreed that SMDs help faculty to develop further interest in subject matter, make learning more enjoyable, meaningful and accessible. Features of mobile technology affect content delivery, time and location of engagement, and collaborative opportunities (Crompton, 2013b). Teachers can deliver learning material in different formats and learners can interact with it more easily and enjoyably, using e.g. highlighting, bookmarking or note-taking, then share with peers using touch, movement and even facial expressions. Over half of participants considered smart screens useful for interaction, visualization, annotation and zooming. According to Johnson et al. (2010), human-computer interactions are moving away from the standard keyboard and mouse, towards more intuitive, gesture-based communication systems responsive to natural human movements. To improve learning and maintain motivation, activities should be fun; Isabwe (2014) refers to the "gamification" of mobile learning. Games were considered useful by 43% of participants. Mobile devices have multiple features to support gaming applications; this opportunity should be seized, especially for less motivated students.

A specific affordance of mobile devices is to help faculty to provide a dynamic visualization of concepts to better communicate ideas to students. More than 62% of respondents agreed. Many apps for analyzing and visualizing complex datasets are becoming more readily available. Educators see great potential for apps that allow science students to manipulate data and process statistics, deepening their understanding of complex relationships and concepts (Johnson et al., 2010). For example, infographic apps are increasingly important, combining different types of video and audio to capture rich experiences. It is widely believed that visualization gives a better representation of data that enables learners to better understand and interpret information than inputs in figures and words; this can improve both attention and comprehension.

Nearly two-thirds of participants highlighted the usefulness of SMDs in facilitating educational management of grades, attendance, calendars, reminders, registration etc. This result is consistent with other research including Pegrum et al. (2013), who found that mobile technology could be used to monitor individual progress by keeping track of which courses had been administered to particular students.

A significant affordance of SMDs, perceived by only 25% of participants, is to provide students with varied formative and summative assessments aligned with learning outcomes. Various mobile apps can support formative assessment by means of frequent multiple choice tests of students' performance and progress, enabling teachers to make changes in instruction for those experiencing difficulty. For example, teachers can use i>clickers (a remote device or a web-based multiple choice voting system) and Poll Everywhere (a web-based multiple choice voting system) to assess students' understanding in real time, analyzing misconceptions, displaying responses instantly for discussion, providing formative data to guide instruction, and efficiently administering and scoring quizzes. Teachers can also present a problem or case study to the class, followed by multiple-choice answers using i>clickers. This affordance was perceived as valuable by relatively few respondents, not only because assessment apps are more appropriate for formative than summative assessment, but perhaps also because of institutional policy: security, access control and privacy issues arise, as mobile devices may use a multitude of network access technologies. Assessment must change, along with teaching methods, tools and materials.

The affordances of mobile technology facilitate communication and interaction in the community of learners. Synchronous and asynchronous collaboration is achieved through many communication apps such as email, SMS, file sharing, and social networking (Isabwe, 2014). Communication by texting was perceived as useful by around of 63% of participants, being simple, cheap and almost universally accessible. SMS applications can help faculty to engage learners anywhere and anytime, encourage interaction, and facilitate social learning (Elias, 2011). Although they are limited to 160 characters, SMS applications can work on any mobile device almost instantaneously (e.g. for sending timely alerts). Learners may also interact with each other using instant messaging programs on SMDs. By contrast, Thomas & O'Bannon (2013) found that texting was perceived as least useful, perhaps because their respondents associated it with classroom distraction. Only 27% of PTUK participants saw voice and video calls as a useful means of communication between staff and students. This may be because voice calls are expensive in Palestine, while free calls through social networking apps need an Internet connection, which is not always available.

Mobile learning supports a social-constructivist pedagogy, with emphasis on students' responsibility and ownership of learning. Students working in collaborative groups are more active learners and more accountable to the group for learning (Pegrum et al., 2013). Only 35% of participants agreed that mobile technologies help faculty to promote student reflection using collaborative tools to clarify students' conceptual understanding, thinking and generating content. There are many apps that can help students reflect on their learning, such as VoiceThread and Asana. Students are often strongly motivated to post their reflections, encourage collaborative learning, and build skills in higher-level thinking, oral communication, self-management and leadership. The low score may reflect teachers' concerns about Arab culture regarding female privacy.

Perceived challenges

Mobility needs reliable networks, but 93% of participants expressed concerns with the limited connectivity and unreliability of Wi-Fi and 3G/4G networks in Palestine. While the Internet is commonplace in developed countries today, access remains patchy in developing countries. In Palestine, for example, free 3G/4G web-browsing is not available, due to Israel's refusal to release the frequencies required. 3G/4G is an important requirement for the successful implementation of mobile learning, which is difficult to meet at present (Shraim, 2014).

While almost all respondents used SMDs in daily life, most lacked experience and knowledge of integrating them into their teaching activities. This finding is consistent with many studies of mobile learning implementation (Handal et al., 2013; Pegrum et al., 2013; Yang 2012; Şad & Göktaş, 2013). Faculty still did not understand the concept of mLearning and the pedagogical and technological considerations of integrating mobile technology into their teaching. This indicates that academics need to know when to use mobile technology, when mobile apps are suitable for integration into specific activities, and which content is most effectively presented to learners on small mobile screens. They must also understand the just-in-time nature of mLearning. According to Stayton (2011), mobile solutions are appropriate in creating bite-sized chunks of information, which is especially critical when using devices with very small screens. Therefore, it is important to train faculty in how to integrate these devices, in terms of both content and pedagogy (Mishra & Koehler, 2006). The TPACK framework in teacher training programs is suggested by many studies (Crompton et al., in press; Handal et al., 2013; Pegrum et al., 2013).

82% of participants expressed concerns with finding the time to design and implement their plans. Teaching load in the Palestinian universities is 12 credit hours and majority of teachers prefer to take overload due to the low salary. It is time-consuming to develop new approaches and resources, explore appropriate apps, and keep up-to-date with innovations, adding to teachers' workload. This result is consistent with Handal et al. (2013) and Pegrum et al. (2013), who emphasize the importance of networking as a platform for professional development. This is a sustainable model which could encourage collaboration, save time and energy, and alleviate academic workload (Oakley et al., 2012; Handal et al., 2013).

A perceived challenge for 80% of participants was selecting apps appropriate to the content being taught. Numerous apps are available, but academics need to understand whether to use a native app or a web app, and at what level; to use apps in content transmission, behaviorist apps to reinforce learning, or constructivist apps to promote students' creativity and higher-order thinking (Oakley et al., 2012). Pegrum et al. (2013) conclude that it is important that teachers have access to valid and usable criteria by which to evaluate educational apps for a range of purposes, and access to a database of quality apps, checklists or rubrics; such tools need to be developed and widely disseminated to help teachers to judge quality and appropriateness.

Another widely perceived challenge was getting adequate technology support. Faculty still lack confidence, such as in using mobile apps to construct multimedia objects embedding pictures and animations, or in connecting their mobile devices to projectors. The necessary training should be easy to provide, as unlike computers, mobile devices are readily used without advanced technological skills. According to Khaddage & Zeidan (2012), the rapid development of mobile devices and their applications can simplify the process of integration into teaching and learning for non-technical users of all educational backgrounds. Pegrum et al. (2013) report that in some schools, teachers and other staff have successfully learnt SMD competence alongside and from students.

Institutional support is important to successful implementation of mobile learning. Two-thirds of participants perceived poor institutional support as a barrier to adopting mLearning. Similarly, Marinakou and Giousmpasoglou (2014) highlight the need for institutional support including investment in infrastructure, promoting the adoption of new teaching practices, training staff, and developing clear policy. The use of SMDs in the classroom is banned in Palestine. To be widely adopted, mobile technology must be part of a comprehensive and systematic effort to change education policy (Handal et al., 2013).

The cost of SMDs and apps was of concern to 64% of participants. Although device costs have dropped dramatically and penetration among students and teachers is very high, it is difficult for academics to keep up with their rapid evolution. According to Handal et al. (2013), the new generation of tablets is still too expensive for many students. In addition, most apps are not free. Khaddage et al. (2011) propose that the use of mobile apps to deliver learning content should not impose additional costs on students. However, while some apps are completely free, others are not fully functional unless a subscription is purchased. Sometimes, the teacher should seek a pedagogically and financially effective combination (Oakley et al., 2012).

Half of participants perceived a technological challenge in the limited usability and physical attributes of mobile devices, such as screen size, memory, battery life and storage capacity, especially for basic devices. This finding is supported by other research. For example, Pegrum et al. (2013) found that screens can be too small, especially for reading pages of text. Similarly, Archibald et al. (2014) report negative perceptions of typing data into small devices; they suggest that any electronic data-input form should be designed to collect the most valuable information with minimal effort. According to Texlar (2010), these devices are not designed for educational purposes. However, technical specifications change rapidly and the new generation of SMDs have many refined functionalities (Shraim, 2014).

BYOD was perceived as a constraint to effective integration of SMDs by three-quarters participants. Implementing different apps on different devices and platforms (e.g. iOS and Android) is difficult and requires careful planning. Similarly, Pegrum et al. (2013) found that mobile devices available among students varied from SMDs to non-smart mobiles. Quinn (2000) suggests that a mobile learning solution must work for a wide range of devices. Mobile learning models should be capable of device-independent delivery of learning content and learning management.

A final challenge, identified by 71% of participants, was teachers' own beliefs. Resistance to changes in teaching practice was observed by Khaddage and Zeidan (2012), who reports that older teachers lack confidence in using these devices, seeing them as a distraction (Thompson, 2013), or as potential tools for cheating (Şad & Göktaş, 2013). Teachers need both the pedagogy and the time to think about how to change their practices to incorporate SMDs. Technology provides both a challenge and an opportunity for us to rethink what we are doing and how we are doing it.

CONCLUSION

With the growing use of SMDs among educators and learners, this study has investigated faculty perceptions of using these devices for meaningful instruction. The findings show that while mobile learning (mLearning) is still at an experimental stage in Palestine, respondents had positive perceptions of the affordances of SMDs in their teaching. SMDs offer much functionality and new opportunities in the evolution of technology-enhanced learning, their most useful features being mobility, their use in communication and providing anytime-anywhere access to course material, thus making learning "just in time, just enough, and just for me" (Ref). In order to take full advantage of SMDs in their teaching, faculty must be familiar with how to use them and must understand their affordance and how to incorporate their functionalities into teaching activities, through the use of the TPACK framework. The results also identify various challenges and the need for institutional support to invest in academics' professional development and training in technology, in order to enhance the perception of mLearning in higher education in Palestine.

The limitations of this study include the small and limited sample of faculty from a single Palestinian university. Further research might focus on using the TPACK model to provide faculty with an understanding of the integration of subject content, pedagogical techniques, and mobile technological affordances. There is also a need to develop a set of principles to guide faculty in selecting appropriate apps while designing and applying mobile technologies.

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