# The Impact of Mobile Learning to Develop the Educational Video Production Skills and to Enhance the Self-Efficacy among Postgraduate Students in the Kingdom of Saudi Arabia

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**أثر التعلم المتنقل في تنمية مهارات إنتاج الفيديو التعليمي وتعزيز الكفاءة الذاتية لدى طالبات الدراسات العليا في المملكة العربية السعودية**

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# The Impact of Mobile Learning to Develop the Educational Video Production Skills and to Enhance the Self-Efficacy among Postgraduate Students in the Kingdom of Saudi Arabia

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## Abstract:

Modern technologies and globalisation have led to rapid changes in the majority aspects of human life, with mobile technologies being an essential part of these changes. The educational process has begun to include mobile technologies, resulting in the concept of mobile learning. This small, handheld form of technology allows learners to gain information quickly and to overcome the barriers of time and place to receive learning instructions and guidance, as well as seek information. This paper aims to investigate the effects of using mobile learning (ML) to develop educational video production skills and to enhance the self-efficacy of postgraduate female students at a leading university in Saudi Arabia.

The theoretical framework for this study is based on the Technology Acceptance Model (TAM). A pragmatic research paradigm and a mixed research approach were employed with a quasi-experimental, multi-method design. The control group and the experimental group, each with 30 postgraduate female students. Online questionnaires were distributed before and after the experiment and evaluation cards were used by the researcher to compare the educational video production skills of each group.

Overall, the findings indicate that both groups agreed that mobile learning improves postgraduate female students' educational video production skills by 87 percent versus 71 percent for traditional learning. The findings also show that mobile learning increases the self-efficacy of postgraduate female students by 90 percent.

The results presented here may facilitate those working in educational technologies, specifically mobile learning (ML), to improve the technology, and thus educational process performance. Moreover, this research will assist academic staff at Umm Al-Qura University (UQU) and the Ministry of Education of the Kingdom of Saudi Arabia (KSA). The implications of the results and recommendations for future research directions will contribute to further investigations in this field, too.

**Keywords:**

ML, mobile learning, higher education, self-efficacy, educational video production skills, Technology Acceptance Model.

# أثر التعلم المتنقل في تنمية مهارات إنتاج الفيديو التعليمي وتعزيز الكفاءة الذاتية لدى طالبات الدراسات العليا في المملكة العربية السعودية

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**الملخص:**

أدت التقنيات الحديثة والعولمة إلى تغيرات سريعة في معظم جوانب حياة الإنسان، حيث أصبحت تقنيات الهاتف المحمول جزءًا أساسيًا من هذه التغييرات. وقد بدأت العملية التعليمية في تضمين تقنيات الهاتف المحمول، مما أدى إلى ظهور مفهوم التعلم المحمول. تتيح هذه التقنية الصغيرة والمحمولة للمتعلمين بالحصول على المعلومات بسرعة والتغلب على حواجز الزمان والمكان. لذا، تهدف هذه الورقة البحثية إلى معرفة أثر استخدام التعلم المتنقل (ML) في تطوير مهارات إنتاج الفيديو التعليمي وتعزيز الكفاءة الذاتية لدى طالبات الدراسات العليا في إحدى الجامعات الرائدة في المملكة العربية السعودية.

يعتمد الإطار النظري لهذه الدراسة على نموذج قبول التكنولوجيا (TAM). تم استخدام نموذج بحث عملي ونهج بحثي مختلط بتصميم شبه تجريبي ومتعدد الأساليب. عدد المشاركين في كلا من المجموعة الضابطة والتجريبية 30 طالبة دراسات عليا. تم توزيع الاستبيانات الالكترونية قبل وبعد التجربة. كما واستخدمت الباحثة بطاقات التقييم لمقارنة مهارات إنتاج الفيديو التعليمي لكل مجموعة.

بشكل عام، تشير النتائج إلى أن كلا المجموعتين اتفقتا على أن التعلم المتنقل يحسن مهارات إنتاج الفيديو التعليمي لطالبات الدراسات العليا بنسبة 87 بالمائة مقابل 71 بالمائة للتعلم التقليدي. وتظهر النتائج أيضًا أن التعلم المتنقل يزيد من الكفاءة الذاتية لطالبات الدراسات العليا بنسبة 90 بالمائة.

النتائج المعروضة هنا قد تسهل على العاملين في مجال التقنيات التعليمية، وخاصة التعلم المتنقل (ML) في تحسين أداء العملية التعليمية باستخدام التكنولوجيا المتنقلة. إن الآثار المترتبة على النتائج والتوصيات المتعلقة باتجاهات البحث المستقبلية سوف تساهم في إجراء مزيد من التحقيقات في هذا المجال أيضًا.

**الكلمات المفتاحية:**

تعلم الآلة، التعلم المتنقل، التعليم العالي، الكفاءة الذاتية، مهارات إنتاج الفيديو التعليمي، نموذج قبول التكنولوجيا.

## I. INTRODUCTION

Developments in technologies witnessed in the 21st century, including touchscreens and wireless, are having an impact upon the teaching and learning processes (Henderson et al., 2017; Hernández-Lara et al., 2019; Lacka & Wong, 2019). The consequence is that education is affected by these new technologies, which has led to new learning paradigms (Koehler & Mishra, 2009; Ozuorcun & Tabak, 2012), such as virtual learning (VL), electronic learning (EL) and mobile learning (ML)

Mobile devices provide users with several social media applications (apps) such as Twitter, which allows users to send immediate messages to a wide audience. Also, mobile devices are wireless devices, which make the cost of communication with teachers and other learners free. As a result, learners and teachers in the 21st century can do work easily and quickly, anywhere and anytime, while maintaining a sense of comfort and well-being (Traxler, 2009; Greener, 2012; Rimale et al., 2016).

Milošević et al. (2015) predicted that future students will increasingly use technology for educational purposes and as part of their daily activities. Thus, it is worth asking ourselves what are the potential effects of the educational technology used by the students on the students themselves? Given the ubiquity of mobile devices, ML can potentially help improve students' skills in producing useful educational videos. Bayazid (2015) pointed out to the high usage of mobile devices in the Kingdom of Saudi Arabia (KSA) is evidenced by the number of Internet users (about 24 million), which means that more than half the population of KSA (estimated at 32.6 million) had Internet access (Sabq, 2019.(

In contrast, Bayazid (2015) thought that educators may fail to exploit the high usage of devices in the educational process due to the absence of discussions on this topic. In addition, ML is a new concept related to the integration of technology in higher education (HE) in KSA (The National Centre for eLearning and Distance Education, 2021). Wu et al. (2012) suggested that teaching and learning processes should be supported by encouraging all educators to use educational applications located in their mobile devices.

Hur and Suh (2012) indicated that visual and audio tools may support students in acquiring learning. Armstrong et al. (2009) also supported this idea previously. However, not all videos have good content, displays or output. Therefore, it is necessary to educate teachers and students to produce educational videos that are appropriate for delivering information. Moreover, learners' motivation and self-efficacy will increase when they learn through interesting experiences (Dornyei et al., 2006). It is evident, thus, that mobile devices are interesting tools for daily life. Furthermore, self-efficacy is the highest ranked factor associated with students' acceptance of ML (Lu & Viehland, 2008).

The acceptance of ML among HE students in the KSA is reasonably high, according to Al-Naseer (2008). He suggested that 95.3 percent of students accept the use of ML. This result was later supported by Cheon et al. (2012) and Almaiah and Jalil (2014).

Saudi students are accustomed to using mobile devices in their daily activities; thus, they are ready and eager to participate mobile learning (Almutairy et al., 2014). Saudis represent the greatest number of Internet users among the Arabic population, with around 200,000 users in 2000 and nearly 24 million users in 2017 (Sabq, 2019). Furthermore, the equivalent of two billion US dollars has been invested in improving Saudi higher education (Onsman, 2010). Finally, the KSA is one of 50 nations with massive opportunities to build digital ability, and it can overcome its challenges through the appropriate management of smart innovations (Chakravorti et al., 2015).

To the writer's knowledge, this is the first study that has examined the effect of ML on educational video production skills in the Arabic region, or indeed the whole world. Thus, this research will contribute to the domain of educational technology. It will address several gaps by identifying whether there is a positive or negative trend in ML use among postgraduate female students with regard to the development of educational video production skills and self-efficacy within the KSA.

Therefore, the main aim of this paper is to gain a better understanding of the effects of ML on postgraduate female students, specifically in terms of educational video production skills. In addition to investigating the effects of ML on students' self-efficacy. So, in order to accomplish these objectives, this study addresses the following research questions (RQ):

RQ1: Does the use of mobile learning affect the production quality of educational videos among postgraduate female students at Umm Al-Qura University?

RQ2: Does the use of mobile learning increase the self-efficacy of female students at Umm Al-Qura University?

## II. LITERATURE REVIEW

### *A. Mobile Learning Definition*

Mobile learning (ML) was founded on the basis of electronic learning (EL) (Kukulska-Hulme & Traxler, 2005; Kadirire, 2009), with the similarity between these two approaches being their ability to obtain information at any time, while the difference being that ML makes use of small wireless devices (Kukulska-Hulme & Traxler, 2005; Kadirire, 2009). Kukulska-Hulme and Traxler (2005) and Greener (2012) stated that ML is learners' engagement with others in educational activities and communications via wireless technologies on mobile devices, without any specific location. Maxwell (2015) summarised the existing viewpoints by stating that ML is learning that gives learners the freedom to learn via wireless technologies anywhere and at any time with immediate feedback. There are many abbreviations of mobile learning: ML, m-learning, ubiquitous learning, u-learning, learning while mobile, handheld learning, personalised learning, and anytime/anywhere learning (Crescente & Lee, 2011; Razek & Bardes, 2011).

### *B. Mobile Learning and Skills*

The results of Cavus and Uzunboylu's questionnaire (2009) suggested which conducted on 41 undergraduate students that ML can improve learners' critical thinking

skills and collaborative work. Similarly, Guerrero et al. (2010) conducted an experiment with 32 school students and found that ML improved their grammar skills. Furthermore, Lee and Kim (2013) studied the effect of ML on improving the writing skills of English foreign language students. Their findings were positive. In addition, Chen (2015) used surveys and interviews to examine students' use of the Aural book app to examine the learning of aural skills among 196 students. The results were also positive. Moreover, the participants described ML as 'learning through a game'. Liu et al. (2015) conducted a case study using iPads among 47 postgraduate students to study the effects of ML in improving receptive language skills (reading and listening) and the results were positive .

Regarding to the impact of mobile learning on the educational video production skills is a topic that has not been discussed previously. Generally speaking, the study of each Hofstetter (1995); Copley (2007); Armstrong et al. (2009); and Kemp et al. (2012) have concentrated primarily on the skills required to produce educational videos. Based on these studies, 10 basic skills were extracted, including:

1. The skill of choosing sound effects appropriate to the video content;
2. The skill of adding video appropriate to the video content;
3. The skill of choosing images appropriate to the video content;
4. The skill of changing the colours of the pictures;
5. The skill of determining the appropriate font type;
6. The skill of determining the appropriate font size;
7. The skill of adding effects to the text (e.g., text shadow).
8. The skill of showing the contrast in colour between the text and the background;
9. The skill of determining the scientific content of the video; and
10. The skill of finalising the video.

*C. Mobile Learning Effectiveness*

Wu et al. (2012) noted that 86 percent of ML studies suggest that ML has a positive effect on the learning process. Motiwalla (2007) experimented with ML applications among undergraduates and postgraduates at the University of Massachusetts, U.S.A by used surveys and interviews. The findings indicated that students are able to gain a comprehensive understanding of mobile technology. Evans (2008) as well investigated the effectiveness of ML by producing podcasts to teach 200 undergraduate students on a business and management course at the University of London, UK. He used observations and online questionnaires to collect his data. The results showed that students preferred podcasts to lectures, notes and textbooks because podcasts are a more effective way to learn. In addition, Al-Fahad (2009) conducted a survey about the attitudes and perceptions of undergraduate female students at King Saud University, KSA. He found that ML could develop students' retention of information and support their communication with teachers. Given these findings, Taleb and Sohrabi (2012) used a questionnaire to survey 289 undergraduate students of psychology and

educational science in Iran. The study sought to determine the extent to which ML improves learning, and the results showed that ML has a positive effect on students .

On the other hand, negative results have also been found regarding the effectiveness of ML. Ketamo (2003) improved a learning environment to facilitate access via personal computers or mobile devices at the Tampere University of Technology, Finland. The results suggest that students prefer to use computers, rather than their mobile devices, as an educational platform. Furthermore, Doolittle and Mariano (2008) considered the effects of individual differences in working memory capacity on ML environments and learning through a multimedia tutorial on historical inquiry in a stationary environment. The study found that students performed better in a stationary instructional environment than in a mobile instructional environment.

*D. Mobile Learning and Self-efficacy*

Bandura (2006) defined self-efficacy as a person's belief in his/her ability to organise and implement a range of required actions to achieve a specific objective. Schunk (2008) defined self-efficacy as a person's feeling of being capable of learning and operating specific behaviours. In this study, self-efficacy will refer to students' belief in their own abilities to integrate ML to replace traditional learning processes. The results of several surveys examining self-efficacy in the context of mobile technology, including surveys by Lu and Viehland (2008), Tsai et al. (2010) and Kenny et al. (2011) refer to participants having very high levels of self-efficacy in relation to mobile device usage.

## III. THE THEORETICAL FRAMEWORK

This section discusses the theoretical framework to know to what extent that this technology intervention is to be accepted among learners. The theoretical framework of this study is the Technology Acceptance Model (TAM), which was designed to model user acceptance of information systems (see Figure 1). The TAM was adapted from the Theory of Reasoned Action (TRA), which was developed in 1975 by Ajzen and Fishbein (1980, as cited in Alomary and Woollard, 2015: 1). The TRA considers a collection of attitudes, perceptions and norms of individual intentions to make decisions that shape behavioural intentions. The TAM, in contrast, interprets technology usage behaviours. It also determines the factors related to technology acceptance or rejection (Davis et al., 1989). Davis (1989) also suggested that several external variables, including usefulness and ease of use, affect the acceptance of an information system. He defined usefulness as the level at which a person imagines the use of specific technology will support performance and ease of use relative to the degree to which a person thinks that the use of specific technology will not be stressful.

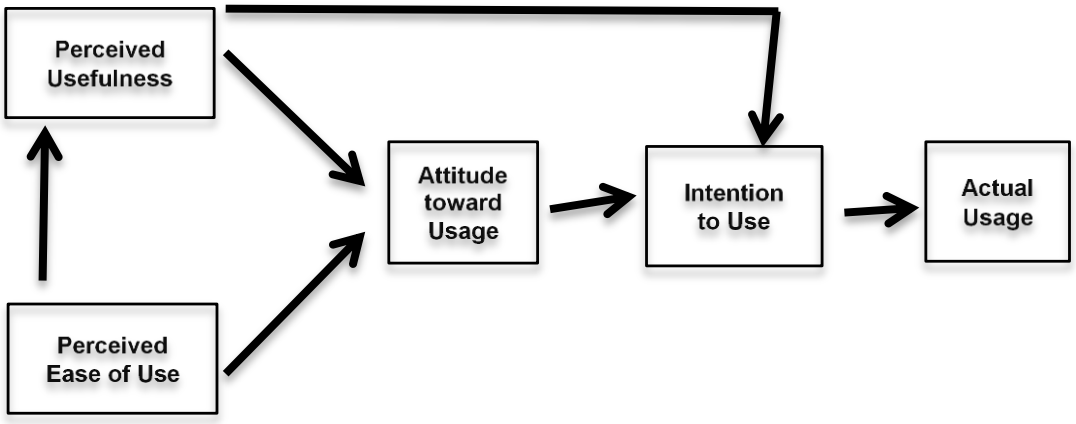


Figure 1: Technology Acceptance Model (TAM) [Adopted from Davis et al., 1989]

The TAM has been used by researchers studying the adoption of new technologies. On the one hand, Chen et al. (2011) stated that the TAM is a fundamental theory for understanding ICT usage and acceptance behaviours. However, the TAM has also been criticised for its failure to include subjective norms. Davis et al. (1989) and Wu et al. (2011) explained that the reason for this omission was the weakness of the psychometric results produced. Bogozzi (2007) argued that the TAM is a simple theory that ignores important variables. Finally, the TAM has also been criticised for failing to discover whether there are any impediments precluding the use of certain technologies.

Despite these criticisms of the TAM, many studies have used it to make clear that ML achieves usefulness and ease of use. Regarding usefulness, Brown et al. (2006) confirmed that ML encourages contextual awareness and presents appropriate information to learners anywhere and at any time. Markett et al. (2006) indicated that the use of mobile devices in education increases communication among students and between students and instructors. Regarding ease of use, Clark (2000) determined that ease of use is one of the significant factors affecting the use of wireless handheld devices.

Furthermore, Chanchary and Islam (2011) found that 75 percent of undergraduate students in the KSA have positive attitudes toward ML. This view was confirmed by Nassuora (2012), who demonstrated that higher education students have high levels of ML acceptance. These studies confirm that the TAM theory applies to ML.

## IV. METHODOLOGY

This research study uses a pragmatic research paradigm, which suggests that reality comes not from antecedent conditions but, rather, from work, situations and results (Creswell, 2013). Pragmatic paradigms centre on the ‘what’ and ‘how’ of a research problem and attempt to use all approaches to achieve understanding (Mackenzie & Knipe, 2006; Creswell, 2013). The pragmatic paradigm does not adhere to any specific system of philosophy or reality, as pragmatists do not see the world as an absolute (Creswell, 2013). According to this view, researchers do not follow a single direction of

data (e.g., quantitative or qualitative); instead, they use mixed methods for data collection and analysis (Creswell, 2013). For these reasons, this study uses the pragmatic research paradigm with mixed methods approach to obtain practical effects (i.e., the development of educational video production skills) in order to determine the sincerity of knowledge (i.e., the positive impact of ML).

This study used a quasi-experimental study methodology because the participants were not randomised. Thus, a before-and-after design (called a pre-test and post-test design) was applied. Oppenheim (2000) and Cohen et al. (2011) defined this design as a set of measures taken by participants who are exposed to independent variables, following which the difference between the before and after situations is measured; this is called the effect of the independent variable. Regarding this study, ML acted as the independent variable, and educational video production skills and self-efficacy served as the dependent variables. Gender and education level were controlled variables. To avoid type I errors and increase study validity, the control variables of gender and education level were used (Field, 2009; Cohen et al., 2011).

*A. Participants*

The primary data were collected from the Education College of Umm Al-Qura University (UQU) in Makkah City in the KSA. The sample comprised postgraduate students, who had taken at least two technology or computer modules in either their undergraduate or postgraduate coursework. Due to there is broad agreement that 30 participants per variable is the minimum number for sample size; thus, this study selected 60 participants and divided into two groups. (1) A control group of 30 participants, who learned traditionally (i.e., face-to-face via traditional lectures), and (2) an experimental group of 30 participants, who learned solely via a Facebook application accessed through their mobile devices and who had no access to traditional lectures. These 60 participants represented a large enough sample size to give not only perfectly descriptive, but also rich information for qualitative data (Punch, 2009; Cohen et al., 2011). In addition, the large sample size of the quantitative data facilitated developed statistics and a higher level of reliability (Cohen et al., 2011).

This study used a mixed research approach because this approach allows the collection of both quantitative and qualitative data (and, thus, requires diverse data collection instruments). It also combines the advantages of both quantitative and qualitative methods. In other words, the mixed approach combines generalisation, depth, words, and numbers.

*B. Data Collection Instruments*

This project used a multi-method design, which included a pre-questionnaire, a post-questionnaire, and an evaluation card.

*1. Pre-questionnaire*

The purpose of the pre-questionnaire was to determine the level of educational video production skills among the participants before the intervention. The questions were closed-ended questions, and thus participants were allowed to select one of several

answers. The participants were given 5 to 10 minutes to complete the pre-questionnaire, and they were asked to answer all of the questions accurately. The pre-questionnaire included three sections: the first covered (4 questions) general information about the participants, the second (8 questions) covered their backgrounds in ML and educational video production skills and the third (10 questions) was about self-efficacy. The ten significant items were drafted onto a Likert scale of 5 points, ranging from 1 (none) to 5 (excellent). Likert scales are used to measure attitudes or opinions (McLeod, 2008). Oppenheim (2000) recommended the use of five-point Likert scales to collect exact findings. Cohen et al. (2011) noted that researchers using Likert scales can achieve a degree of data sensitivity that closed-ended questions cannot afford.

*2. Post-questionnaire*

The purpose of the post-questionnaire was to determine the level of educational video production skills among the participants after the intervention. The questions were open-ended questions and close-ended questions. Open-ended questions are used to gain qualitative data and to give participants an opportunity to write their own answers (Taylor-Powell, 1998), encouraging in-depth responses (Cohen et al., 2011). However, because open-ended questions result in multiple responses about a phenomenon, they are difficult to analyse and take up a large portion of the questionnaire. Furthermore, the answers given may be irrelevant to the questions (Taylor-Powell, 1998; Lawrence, 2007).

The post-questionnaire has been adapted from Kenny et al. (2011), which consisted of ten items, and one from Mahat et al. (2012), which consisted of six items. Both of these studies drew on Compeau and Higgins (1995). The post-questionnaire included three parts. The first and second parts were concerned the effect of using ML to develop educational video production skills. The questions were open-ended in the first part, while it was close-ended in the second part. The significant items in the questionnaire were drafted onto a Likert scale of 5 points, ranging from 1 (none) to 5 (excellent). The participants were given 10 to 15 minutes to complete the post-questionnaire and asked to answer all of the questions accurately.

The last part of post-questionnaire concerned the effect of using ML to increase self-efficacy and the questions adapted from Kenny et al. (2011) and Mahat et al. (2012). A total of eight significant items were used in the research. These eight questions were drafted onto a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

*3. Evaluation Card*

The Evaluation Card is a list of educational video production skills and were used by the researcher for both groups to evaluate the videos produced during the experiment and to measure the effect of ML on the development of educational video production skills. As well, it was used to verify whether the participants had mastered the 10 measured skills or not. The evaluation card included ten closed-ended questions of a two-option response type with no and yes responses.

*C. Data Collection Procedures*

The pre-questionnaire link has been sent to all of the participants and give them a week to answer. Teaching times for the educational video production content were arranged such that both groups could be taught the same subjects separately but simultaneously. The Facebook page link entitled 'Mobile Learning' was sent to the experimental group (see Figure 2). The following step required the participants to produce a short educational video of two minutes about a subject they chose using any video production app. The video did not include the participants themselves, but could include general images, texts, sounds, and effects. The experiment was conducted over the course of five sessions. In the final session, the participants simply delivered their videos by uploading them to the Facebook page (for the experimental group) or delivering via e-mail (for the control group). The last step was to send the post-questionnaire link to all of the participants and give them a week to answer.


Figure 2: ML Facebook page

*D. Data Analysis Methods*

The data in this study were prepared for input into the Statistical Package for Social Sciences (SPSS) program. The reliability index for each object was determined, and the Cronbach's alpha reliability measure was calculated using SPSS. According to Nunnally (1979) and George and Mallery (2003), a coefficient of the α value suggests that it is located between 0.8 and 0.7. All values in this study at least 0.70, indicating that the items in the instruments were linked. Whereby, 0.70 is considered an acceptable reliability coefficient .

In this study, the evaluation card and the pre- and post- questionnaires were piloted by some experts in the education technology field. This step was important because if the questions had not been right, the tools would not have obtained the desired information (Taylor-Powell, 1998). All of the instruments changed between the Arabic and English versions, in terms of both the number of items and the formulation of

phrases. Due to that the questionnaire had been approved by previous research and had already been edited and evaluated prior to the present study, it can be considered a strong questionnaire with good reliability (Cohen et al., 2011). In this research, the length of time between the pre- and post-questionnaires was one month, this in order to increase validity. Whereby the statistical regression is affected by the length of time between the pre- and post-questionnaires. Cohen et al. (2011) declared that the length of time increases the statistical regression, and that the statistical regression increases the validity of the data and instruments.

The ethical consideration was carried out and then the relevant documents reviewed by both Ethics and Research Governance Online (ERGO) and the University of Southampton's ethical board (Ethics ID: 15227). This study respects its participants' rights to privacy, anonymity, confidentiality and a pressure-free environment with regard to answers (Oppenheim, 2000; Cohen et al., 2011).

## V. FINDINGS

The research questions have been answered by collecting mixed data (qualitative and quantitative).

### *A. Participants' opinions about the use of ML*

The participants' answers to open-ended questions in post-questionnaire were as follows. The participants noted that they faced some difficulties which could impact on their usage of ML in the production of an educational video. One of these difficulties was the fact of that used apps to create an educational video were in English was considered a challenge by 28 percent of participants, as not all Saudi students know English. Furthermore, the small screen size of the students' mobile devices was another difficulty for 17 percent of participants. Around 13 percent of participants were frustrated that they were needed to use another program to modify the images. As well, 13 percent of them said that studying and teaching at the same time prevented the use of ML. The weakness of the Internet connection in some regions of the KSA was another barrier by 12 percent of participants. Finally, 10 percent of participants expressed about their frustrated due to they did not have the appropriate sounds for educational videos and this forced them to additional download which affected on their devices memory space and reduced its speed. All participants agreed on the use of free apps, therefore there were not any financial barrier preventing the use of ML. Finally, 37 percent acknowledged a skills barrier, while 63 percent acknowledged no skills barrier.

### *B. The effect of ML on the development of educational video production skills*

To quantitatively measure the educational video production skills of both groups of postgraduate students, it was important for the postgraduate students to have a high level of belief in the use of mobile devices in the learning process. For the purposes of this study, a pre-questionnaire, a post-questionnaire, and an evaluation card were used. The findings of the questionnaires will be presented first. Data coding and statistical processing were conducted using the paired sample t-test (the dependent t-test) in SPSS. This test is used to compare the means of two groups with the same situation and dependent variable (Field, 2009).

Table 1 demonstrates the gain in the relevant skills for control and experimental group. The skill of choosing a video appropriate for the educational video content is the most skill improved in the control group (1.27) more than it did in the experimental group (1.00). On the contrary, the skill of identifying colour contrast between the text and the background developed in the experimental group (1.33) was more than in the control group (1.20). However, the skill of determining the appropriate type of font is the least skill developed in the control group (0.77) and also was less than in the experimental group (1.17). The skill of finalising the educational video is the least skill improved in the experimental group (0.73) and also was less than in the control group (0.93). Generally speaking, given the means of all of the skills and the directions of the t-values, it can conclude that the participants who learned via their mobile devices experienced statistically significant improvements in their educational video production skills, with an overall mean improvement of 10.13.

*Table 1: The gains in the control and the experimental groups*

| Items | Mean for control group | Mean for experimental group |
|---|---|---|
| The skill of choosing appropriate sound effects for the educational video content | 1.20 | 0.93 |
| The skill of choosing a video appropriate for the educational video content | 1.27 | 1.00 |
| The skill of choosing images appropriate for the educational video content | 0.50 | 0.77 |
| The skill of changing the colours of the pictures | 0.87 | 0.93 |
| The skill of determining the appropriate type of font | 0.77 | 1.17 |
| The skill of determining the appropriate size of font | 0.87 | 1.07 |
| The skill of adding effects to the text | 1.03 | 1.23 |
| The skill of identifying colour contrast between the text and the background | 1.20 | 1.33 |
| The skill of determining the scientific content of the educational video | 1.03 | 0.97 |
| The skill of finalising the educational video | 0.93 | 0.73 |
| **Total** | **9.67** | **10.13** |

Regarding the analysis of the results of the evaluation card, which was used by the researcher to evaluate the videos produced in the experiment. The data were coded and statistically processed. Because the data in the evaluation card were dichotomous data, either the McNemar test or the Chi-square test could be used. Since there was only one independent variable (ML), the McNemar test was used to analyse the evaluation card findings in SPSS (Field, 2009). Table 2 demonstrates the extent to which the students in each group mastered the various educational video production skills. The skills to master included: choosing sound effects, choosing images, adding effects to text and determining scientific content. The results for each of these skills were equal for both

groups. All of the participants (100 percent) mastered the skills of choosing images and determining scientific content.

Clearer differences were evident for the other six skills, in which the experimental group outperformed the control group. All of the ML participants mastered the skill of finalising, compared to 93.3 percent of traditional learners. ML learners exhibited significant mastery of the skill of showing the colour contrast between the text and the background (86.7 percent, compared to 66.7 percent of traditional learners). Regarding the skills of determining the appropriate font type and font size, 80 percent of ML participants achieved mastery, compared to 73.3 percent of traditional learners. Furthermore, 60 percent of ML participants mastered the skill of changing the colours of pictures, while only 46.7 percent of traditional learners mastered this same skill. Only a few students from each group mastered the skill of adding video; however, this set was larger in the experimental group than in the control group (33.3 percent versus 13.3 percent). Generally speaking, the findings indicate that both groups agreed that mobile learning improves postgraduate female students' educational video production skills by 87 percent versus 71 percent for traditional learning.

Table 2: Cross-tabulation between the two groups and their educational video

| **Skills and groups** | | | | | |
|---|---|---|---|---|---|
| ***Items*** | ***Groups*** | ***Frequencies*** | | ***Percentages*** | |
| | | ***No*** | ***Yes*** | ***No*** | ***Yes*** |
| The skill of choosing appropriate sound effects for the educational video content | Control | 4 | 26 | 13.3 | 86.7 |
| | Experimental | 4 | 26 | 13.3 | 86.7 |
| The skill of choosing a video appropriate for the educational video content | Control | 26 | 4 | 86.7 | 13.3 |
| | Experimental | 20 | 10 | 66.7 | 33.3 |
| The skill of choosing images appropriate for the educational video content | Control | 0 | 30 | 0 | 100 |
| | Experimental | 0 | 30 | 0 | 100 |
| The skill of changing the colours of the pictures | Control | 16 | 14 | 53.3 | 46.7 |
| | Experimental | 12 | 18 | 40 | 60 |
| The skill of determining the appropriate type of font | Control | 8 | 22 | 26.7 | 73.3 |
| | Experimental | 6 | 24 | 20 | 80 |
| The skill of determining the appropriate size of font | Control | 8 | 22 | 26.7 | 73.3 |
| | Experimental | 6 | 24 | 20 | 80 |
| The skill of adding effects to the text | Control | 12 | 18 | 40 | 60 |
| | Experimental | 12 | 18 | 40 | 60 |
| The skill of identifying colour contrast between the text and the background | Control | 10 | 20 | 33.3 | 66.7 |
| | Experimental | 4 | 26 | 13.3 | 86.7 |
| The skill of determining the scientific content of the educational video | Control | 0 | 30 | 0 | 100 |
| | Experimental | 0 | 30 | 0 | 100 |
| The skill of finalising the educational video | Control | 2 | 28 | 6.7 | 93.3 |
| | Experimental | 0 | 30 | 0 | 100 |

### *C. The effect of ML in increasing self-efficacy*

To quantitatively measure postgraduate students' self-efficacy in ML (for both the control group and the experimental group), it is necessary to ensure the possibility of success in ML. In other words, it is fundamental for postgraduate students to have a high level of belief in the use of mobile devices as part of the learning process. Therefore, it has been classified the postgraduate students' levels of self-efficacy in ML, the results (i.e., the mean) were split into three levels based on the research of Mahat et al. (2012): 1–2.33 = low, 2.34–3.67 = moderate, and 3.68–5.00 = high. Generally speaking, Table 3 shows that 90 percent of the participants believed that ML increases self-efficacy, while 5.4 percent disagreed, and 4.6 percent were neutral.

Table 3: Students' responses concerning self-efficacy in ML

| *Items* | *Strongly Disagree* | *Disagree* | *Neutral* | *Agree* | *Strongly Agree* | *Mean* | *Level of self-efficacy* |
|---|---|---|---|---|---|---|---|
| Desire to use new technology to learn | 0 | 3.3 | 0 | 10 | 86.7 | 4.8 | High |
| Ability to use ML even though I did not know how it works | 0 | 3.3 | 3.3 | 50 | 43.3 | 4.3 | High |
| Ability to use ML even though I have never used | 0 | 3.3 | 10 | 46.7 | 40 | 4.2 | High |
| Ability to use ML if I had seen someone else using it before trying it myself | 3.3 | 3.3 | 6.7 | 56.7 | 30 | 4.1 | High |
| Ability to use ML in the event of another person helped me to start it through the training course or workshop | 0 | 13.3 | 0 | 36.7 | 50 | 4.2 | High |
| Ability to use ML if someone will help me when I encounter any difficulties | 0 | 6.7 | 0 | 43.3 | 50 | 4.4 | High |
| Ability to use ML if I had used similar devices before this one to do the same task | 0 | 3.3 | 6.7 | 53.3 | 36.7 | 4.2 | High |
| Ability to use ML in discussing any topics with my colleagues | 0 | 3.3 | 10 | 50 | 36.7 | 4.2 | High |
| ***Total*** | ***0.4%*** | ***5%*** | ***4.6%*** | ***43.3%*** | ***46.7%*** | | ***High*** |

## VI. DISCUSSION AND LIMITATIONS

Several conclusions can be drawn from the above analysis. Firstly, this study revealed that ML enhances the educational video production skills of postgraduate female students, where the results refer to the fact that mobile learning improves postgraduate female students' educational video production skills by 87 percent versus 71 percent for traditional learning. The finding of this research agreed with numerous studies have measured the effects of ML on skills development and have found positive effects. These include studies by Cavus and Uzunboylu (2009), Guerrero et al. (2010), Davis et al. (2012), Lee and Kim (2013), Chen (2015) and Liu et al. (2015.(

Secondly, this study findings add to a growing body of literature showing that ML increases the self-efficacy of female postgraduate students by a high score, with 90 percent agreement of the participants. The finding of this research idented to previous studies which suggested that ML increases learners' self-efficacy – this measure was scored as 'high' by Lu and Viehland (2008), Tsai et al. (2010) and Kenny et al. (2011). Respondents also assigned a 'moderate' score for this measure in a study by Mahat et al. (2012).

The limitations faced in this study were numerous. There was a language problem, in that the majority of the apps are in English and not all Saudi students, including postgraduates, know English well. In additional to that, the withdrawal of some of the participants in the middle of the experiment forced the experiment to stop for a period of time to allow the researcher time to connect with the other students. After this, the experiment proceeded for all of the participants at the same time.

## VII. RECOMMENDATIONS AND FUTURE RESEARCH

The researchers recommend that further experimental investigations are needed to estimate the maximum benefit of education technology in solving the problems of HE. Furthermore, Arabic apps for educational video production should be designed. These apps should be characterised by ease of use and a variety of modification options (e.g., for images and texts)

This research also has raised many questions that are in need of further investigation. Further work needs to be done to establish whether ML positively affects the development of several skills among both teachers and students. Thus, this research should be conducted again in one of the more remote areas of the KSA. Furthermore, future research should explore the impact of ML on employment .

## VIII. CONCLUDING

This study is important in activating an area of development to improve the educational process. The findings of this research will focus on educators, those working in the field of educational technologies and HE, not only in the KSA, but also around the world. The major barriers faced by postgraduate female students can be eliminated through the future implementation of ML. The findings of this study could encourage educators who have previously rejected technologies to reconsider, since this research indicates that ML can be effective in improving educational video production skills and increasing self-efficacy. The study may also promote the use of ML to improve the success of the learning process.

ML is related to a series of technologies that support learning. Determining the best technology requires implementing ML in education in general, and in HE in particular. ML will break barriers related to the need for funds to construct educational buildings. Furthermore, efforts related to scheduling and organising teaching places will be eliminated. To sum up, ML will be easier for learners and more informal for learners to use and more effective in giving learners the freedom to learn.

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