

Moderating Effect of Faculty Status in the Relationship between Attitude, Perceived Usefulness, Perceived Ease of Use, Behavioral Intention, Subjective Norms on Mobile Learning Applications

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Abstract

The internet and mobile applications have added radical changes in every sphere of existence including higher education. Consequently, universities have taken the lead in harnessing the technological developments of the internet in instructional and research activities. Few empirical research, notably in the Middle East, have looked into the use of mobile applications in educational contexts. The goal of this research is to investigate the moderating effect of faculty status in the relationships between attitudes, perceived usefulness, perceived ease of use, behavioral intention and subjective norm toward using mobile learning applications in some universities in the UAE, with an understanding of mobile applications and its usage for learning. There are 141 students and 86 instructors from five selected UAE universities have been used for this research. Different criteria have been investigated to see if there is a substantial difference in attitudes between students and instructors towards the use of mobile applications. Results show that behavioral intention, subjective norms, and attitude are significant predictors of mobile applications. Faculty status moderates the link between Perceived Ease of Use ($r = .301, p = .000$), Behavioral Intention ($r = .654, p = .000$) and Subjective Norm ($r = .606, p = .000$) with mobile application, according to the findings. This study concluded that behavioral intention has the highest significant contribution to mobile application learning compared to subjective norms and attitude respectively. Faculty members are more likely to perceive ease of use and subjective norms than students, while students are more likely to have behavioral intention towards mobile application learning.

Keywords: Behavioral Intention, Mobile Learning Applications (MLA), Perceived Usefulness, Perceived Ease of Use, Subjective Nom.

I. INTRODUCTION

With the advent of internet, the online business market has grown as well and it has made another mode of instruction and preparation. E-learning is one of the most promising and developing concerns in today's information society. We are living in the midst of an extraordinary era, experiencing a phenomena of

constant and rapid rise with the use of the internet for communication and collaboration among people. (Georgescu & Popescul, 2015). The United Arab Emirates (UAE) has seen a paradigm shift in education, moving away from traditional classrooms and toward virtual classrooms, where students are actively engaged in their learning. (Taha, 2007). This transformation has been aided by generous

investments in the online education sector and related activities, as the UAE is convinced that a solid educational system is a stepping stone to the future web-based society, whose hallmark is a keen understanding of information as a strategic commodity. (Taha, 2004a). Mobile Application (MA) technologies have transformed not just how communities, organisations, and individuals connect and socialise, but also how people study, exchange knowledge, share information, and create innovative ideas. As a result, the use of these developing technologies is fast expanding among today's pupils. This is due to the next generation being attuned to web 2.0 mobile application technologies during their formative years. Because of the widespread use of these tools in students' social lives, they have been labelled as "digital natives."

The majority of mobile apps are based on Microsoft's free web-conferencing service, which allows users to participate in a completely synchronous fashion from remote locations. These programmes' live interactive features let students to share PowerPoint presentations, films, and other visual assets with the class while maintaining "face-to-face" contact and auditory conversations with the lecturer. (Faulds, 2015). More importantly, this web-conferencing application software system can enhance learning environment and contribute to total efficacy in both traditional classroom-based training and non-traditional ways of instruction such as remote learning. (Botterill, 2011; Ellis, 2009; McCrea, 2012; *Electronic Education Report*, 2009).

Mobile application technologies are a subset of the Internet's web-based apps and software that enable students to learn, exchange knowledge, participate in discussions, and collaborate with others via digital connections. The term "mobile application" is a 21st century term that refers to a wide range of technologies or networked tools that emphasize the social aspects of the Internet as a communication channel and creative expression which is often used interchangeably with the terms "web 2.0"

and "social software." (Dabbagh & Reo, 2011b).

Mobile application and internet access Web-based technologies such as YouTube, WhatsApp, and social media have played crucial roles in providing individuals with always-on communications and in assisting them in forming and maintaining relationships. Technology has an impact on learning since it allows people to learn anywhere and at any time through a variety of apps. This breakthrough technology phenomenon has resulted in the birth of new learning techniques and adaptability for all people as it allows varied learning styles through distinct visual and audio elements with numerous effects and backgrounds. Lo (2013) claimed that "YouTube allows users to share their videos and comments and is becoming a place where people find various learning opportunities". Hall and Herrington (2010) have accredited that the ability of these technologies to foster a sense of "social presence" among users, allowing participants to "comfortably and successfully communicate through the technical medium"

Prensky (2006) maintains that understanding students' attitudes towards adopting mobile learning applications might aid students' technical skills. He asserts, "Teachers must remember that they are teaching in the 21st century"; therefore, they must become proficient in all emerging technologies. Moreover, despite the difficulties of using web-conferencing with new technologies like Skype, Ellingson and Notbohm (2012) suggested, using these technologies "increased [student] motivation, preparation and participation; collaboration and community-building; use of technology; and convenience" (p. 559). The live interactive features of Skype and other programmes, which allow synchronous conversation among participants to a large extent in E-learning applications. However, synchronous web-conferencing tools such as Skype were designed to be more ideal for forging student relationships and creating a learning community than being asynchronous technologies (Parker, Boase-Jelinek, &

Herrington, 2011). Synchronous web-conferencing technologies like Skype or other programmes, encourage students to take control of their own learning and provide an environment that encourages higher-order thinking. (Garrison, 1997). Charron and Raschke (2014) state that the students who use mobile applications such as Skype to complete their classroom activities for an accounting information categorizations course demonstrated higher levels of perceived satisfaction in learning throughout the course than the other students who were not assigned to use Skype. Mobile Learning Applications are one of the prime educational technologies, have gradually grown at all levels of education, including higher education. Mobile Learning Applications have increased its value of e-learning by combining it with portable computing devices that allow learners to access knowledge regardless of their location or time constraints.

The United Nations Development Programme (UNDP) named the UAE as the Arab world's most advanced e-learning country, as evidenced by Dubai Internet City, Dubai Village of Knowledge, and Academic City's ICT infrastructure. Many e-learning companies have flocked to these locations to base their goods; for example, e-TQM, the world's first online school is dedicated to TQM e-learning (Taha, 2007). An increasing number of Australian and European universities have opened branches in the UAE or formed partnerships to provide accredited online learning (synchronous and asynchronous) at bachelor's and master's degree levels in business administration, management information systems, education, languages, and translation (Taha, 2005).

According to Ajjan and Hartshorne (2008), students no longer utilise the internet to get information, but rather to produce and distribute it. They make extensive use of web 2.0 tools such as wikis, social bookmarking, social networking, and blogging. Because there is a lack of data on the effects of mobile application technologies on students' learning and it is necessary to investigate factors that influence

UAE students' views regarding using MA to enhance their learning.

In the hands of the present generation of students, mobile application technologies have evolved into an intelligence tool. This emphasises the importance of investigating students' attitudes toward using mobile learning applications for educational reasons, as well as how they view the educational benefits of such tools and the challenges they confront when using them. This research would help lecturers in better understanding how emerging technologies such as mobile applications affect students' experiences and learning habits. According to Lohnes and Kinzer (2007), faculty members need to have a better understanding of Net Generation technology and how it affects student learning; this is a dynamic component of higher education. In this regard, the purpose of this work was to investigate the role of teacher position in the link between attitude, perceived utility, perceived ease of use, behavioural intention, and subjective norms in Mobile Learning Applications.

II. LITERATURE REVIEW

Computing technology's usage in education has been determined in a variety of ways. Electronic learning, or e-learning, has been accepted and used by public schools and university students in various parts of the world in the recent decades. They were familiar with e-learning terminology and technological know-how. But in recent years, the rapid growth of mobile technology applications has given rise to a new sector known as mobile learning apps. Mobile learning is the next generation of e-Learning, which is completely centred on mobile devices (Sharples, M.,2005).

Mobile learning applications are a new research movement that has got the attention of many researchers who want to learn more about the current technology, review and analyse its effects on students and educators, and strive to build the necessary infrastructure. Researchers working on mobile applications try to optimise the utility of mobile technology in higher education while keeping the educational objective in mind. The applications for mobile

have dealt with mobility from several dimensions such as mobility of learners, technology, educators, and learning (Al-Emran, Elsherif, & Shaalan, 2016).

The study in the field of e-learning was driven by the constant attempts to validate the appropriation of terms associated with e-delivered (electronically) education, which suggests that e-learning is an umbrella term. (Bere, & Rambe, 2016; Taha, 2006). As there are numerous components involved in building various e-courses and virtual learning environments, this phrase has a variety of connotations (Bravo et al., 2006; Kinder, 2002, Sharifabadi, 2006). Of course, such diverse understandings would result in a variety of models of coalesced components and coalescences, each of which addresses the requirements of a specific e-learning outcome. (e.g. Al-Habashi, 2004; Tegos et al., 2005; Torrisi and Davis, 2000). In academic settings, e-learning is becoming an engaging and powerful tool of effective internet-enabled instruction and training. (Charmonman, 2004). According to the Egyptian National Council (2008), electronic learning web 2.0 integrates student learning with the social components of cognition through the use of social software that promotes social connection and collaboration. It is a process in which individuals share information and media, which is then combined or created to produce incipient forms, ideas, conceptions, and services (Downes, 2005).

Sheikh Nahayan Mabarak Al Nahayan, Minister of Higher Education and Scientific Research and Higher Education Chancellor of the United Arab Emirates, encouraged and inspired the three federal higher education institutions to create functional, meaningful MA learning in and outside of the classrooms in April 2012. The Chancellor highlighted that implementation should be guided by strong pedagogical concepts. (Hargis, Cavanaugh, Kamali, & Soto, 2014). The leaders of UAE higher education have chosen several applications, such as iPad, as the MA learning platform. As of Hargis et al., (2014), the first wave of implementation was with incoming first-year English-language

students who enrol in a pre-Bachelor Substrata English Language Learner (ELL) programme to prepare for degree programmes taught in English. The Substructures programme includes rudimentary mathematics courses. As a result, teaching with digital tools and features can make learning more interesting and allow students to be more engaged in technology learning environments than in traditional learning contexts. In the presence of emerging technologies, Halverson and Smith (2009) state that inculcation has been structured around the concept of perennial learning, in which students will be the consumers of knowledge through the use of the Internet and technologies, moving away from highly structured schooling institutions.

Hargis et al., (2014) remarked that the collaborative capability of the iPad, its digital resources, and the technical infrastructure on campus integration, which is appropriate for language development and broader adult learning, is a consequential incipient affordance in the UAE's classrooms. Multiple forms of communication, interaction, and collaboration are recognised in learning theories as enhancing learning; Zurita and Nussbaum (2004) found considerable learning gains with mobile collaboration. However, this research was incomplete to assess the project's implementation in terms of the user sample and academic programme level. It has only looked at the opinions of faculty members and students, ignoring administrative and technical employees. Further, it has focused on the foundation programme and students with bachelor's degrees, while neglecting postgraduate students. On the other hand, Khaddage and Knezek (2013), have presented a comparative study that examines students' opinions toward the use of Mobile Learning Applications in the UAE and the United States. This study was also lacking because it did not take into account the attitudes of faculty members about MA learning.

Three types of applications can be used to determine the impact of web 2.0 technologies on learning. The first category focuses on

improving reading skills and indicates reciprocal and collaborative actions. Blogs and wikis are examples of this type of technology. The second category promotes learning in a complex and interactive setting. Learners must interact with other learners and the interactive system in these environments to explore and receive incipient information. Learners, in this category have a lot of power over the decision-making process; for example, web 2.0 apps like online games and immersive learning environments support this category. The third category is usually referred to as "social support" since it provides consumers with social support through a range of media representations. Social networking tools and online video sharing tools are examples of technologies that enable this category. Technology assists instructors during instructional and planning time, whereas specialised development focuses on educator/instructor preparation prior to instruction (Aifan, 2015). Large-scale studies have discovered a link between expert development and efficient classroom technology deployment (Ritzhaupt et al. 2012). Saudi students, according to Aifan (2015), are already part of these virtual communities, using online tools to interact, learn, and form relationships with others on a daily basis. Inadequate research has been done on the impact of social media technology on students around the world, specifically on Saudi pupils' academic performance and learning abilities. Elsayed claims that (2011), "Nowadays there is a change in education from formal learning (class, faculty) to e-learning, to social learning (e-learning 2.0), but still you do not find a lot of Web 2.0 in education". Shuen (2008), opined that, web 2.0 is about combining network effects and users' collective intelligence to construct mobile applications that improve as more people use such tools. Web 2.0 social networking services such as Facebook and MySpace, according to Thomas and Brown (2011), build influences among users by allowing interaction with individuals who share similar interests. These friend-to-friend

networks foster a sense of community based on the users' personal interests and opinions. According to the findings, people who use digital media are not only learning from data technology but also from one another, exchanging skills, experiences, and knowledge. Harrison (2011) argues whether involvement in a blog by college-age students helped enhance classroom learning by providing dialogue outside of class hours. The study's findings revealed that college-age students saw the usage of blogs as an avenue for thinking about class issues outside of weekly class meetings, both independently and in collaboration with peers through blog explanations. The outcomes of the findings stated that the blogging aided students in getting to their learning points faster, enhanced engagement with course materials, and facilitated the growth of informal learning networks. As a result, social web 2.0 is a stage of the World Wide Web in which learning is defined as a community of practise in which people engage and share their interests, learn together, and build affluent resources. Users/Learners are enabled to seek, generate, produce, and collaborate to fulfil essential needs to learn new information, according to Thalheimer (2008). Web 2.0 allows for dialogue, feedback, and networking in addition to social contact. According to Shittu et al.,(2011) it was developed with modularity and flexibility to facilitate collaboration

III.METHODOLOGY

Theoretical Framework and Hypothesis

For the current research, the hypotheses for interactive Mobile Learning Applications are developed based on the aspects of interactivity with the most empirical support and most solid theoretical rationale. Several theories and models, including the Gregarious Learning Theories, Theory of Reasoned Action (TRA), and Technology Acceptance Model (TAM), were used to frame this study and characterise the ideologies of essential factors .

This study is adopted the Technology Acceptance Model (TAM) by Davis, Bagozzi

and Warshaw (1989) and it was based on Theory of Reasoned Action (Fishbein & Ajzen, 1975). The Theory of Reasoned Action (TRA), as a grounded theory, was framed by Fishbein and Ajzen in 1975 and it focuses on the elements of “intended behaviors”. In Social Psychology Literature, TRA elucidates relationships between beliefs, norms, attitudes, intentions, and behavior. While TRA is used to characterise adoption behavior which is based on four basic concepts: actual behaviour, attitude, behavioural intention, and subjective norm. Masrom and Hussein (2008) stated “Attitude toward a behavior is determined by beliefs about the consequences of the behavior and the effective evaluation of those consequences.”

Conferring to TRA, Masrom and Hussein (2008), “an individual’s behavior such as use or rejection of technology is determined by one’s intention to achieve the behavior, and this intention is influenced jointly by the individual’s attitude and subjective norm”. According to Masrom and Hussein (2008), behavioural intention (BI) is “a measure of the strength of one’s purpose to achieve a specified behaviour, especially the usage of an information system”. Ajjan and Hartshorne (2008) state that, once a user has formed a stable intention to execute a certain action, behavioural intention is the most significant predictor of actual behaviour. This designates that intentions to implement a behavior are the occupation of two basic determinants, reflecting social influence (subjective norm), and the other of which is a person in nature (attitude towards the behavior). Subjective norm is an exaggeration of how a person’s willingness to execute a given conduct is influenced by whether or not those close to them believe she or he must or must not perform that behaviour. According to Fishbein and Ajzen (1980), a person’s subjective norm is described as their view of the recommendations given by those closest to them about whether or not a particular activity should be undertaken. Sets of beliefs shape attitudes and subjective norms (Ajzen, 1991). TAM as a supported framework model is

undeniably one of the most popular models which is well-established as a robust, powerful and parsimonious model for predicting users’ acceptance in the information systems and technology domain (Rose & Fogarty, 2006; Surendran, 2012) see the conceptual framework of the study (figure 1).

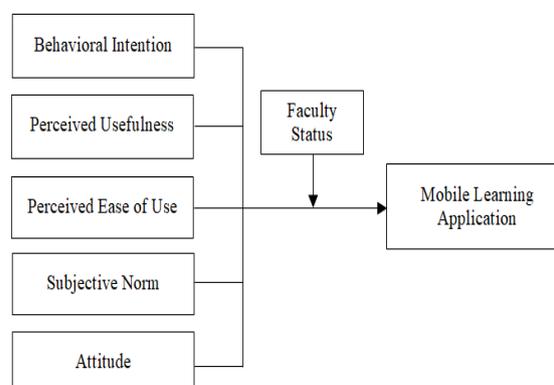


Figure 1: Conceptual Framework of the Study

Many features of the study were discovered that had never been seen before in the Arab Gulf region. his study has been conducted only because it will support in the decision-making over whether or not to use Mobile Learning Applications. It is critical to assess the beginning and end-user attitudes toward the use of any technology before developing a strategy to improve it. Students are the end-users of Mobile Learning Applications technology, while educators are at the beginning. Attitudes toward technology avail in determining strengths and impuissance, assessing technology readiness level, and facilitating the development of the required infrastructure.

In a different setting, Park et al. (2012) adopted TAM to investigate the factors affecting university students’ adoption and use of Mobile Learning Applications. A sample of 288 university students in South Korea participated in the research. The results found that perceived ease of use affects perceived usefulness which itself affects attitude towards use; however contrary to TAM, perceived ease of use did not affect attitude towards use. Both TRA and TAM, according to Masrom and Hussein (2008), have strong behavioural fundamentals, assuming that when someone has an intention to act, they would be allowed to act without

restrictions. However, Davis, Bagozzi, and Warshaw (1992) argue that there will be various barriers to new technology approval, such as low skill, environmental limits, time constraints, or unconscious habits, which will limit an individual's ability to act independently.

The TRA and TAM, on the other hand, have been successfully employed across a wide range of areas to predict and explain people's behaviour and attitudes toward a certain conduct, such as their propensity to accept a new technology. Therefore, in this study, the researcher implemented TRA and TAM to test students' and college staff intentions and attitudes to adopt mobile applications to support their learning at UAE universities.

This study aims to achieve the following research objectives based on the preceding literature review and theoretical framework:

- ❖ To determine the influence of attitude, perceived usefulness, perceived ease of use, behavioral intention, and subjective norm on mobile application learning.
- ❖ To examine the moderating effect of faculty status in the relationship between attitude, perceived usefulness, perceived ease of use, behavioral intention, and subjective norm and mobile application learning.

In line with the research objective, the researcher suggested the following hypotheses.

H1: Attitude is a significant predictor of mobile learning applications

H2: Perceived usefulness is a significant predictor of mobile learning applications

H3: Perceived ease of use is a significant predictor of mobile learning applications

H4: Behavioral intention is a significant predictor of mobile learning applications

H5: Subjective norm is a significant predictor of mobile learning applications

H6: Faculty status moderates the relationship between attitude and mobile learning applications

H7: Faculty status moderates the relationship between perceived usefulness and mobile learning applications

H8: Faculty status moderates the relationship between perceived ease of use and mobile Learning applications

H9: Faculty status moderates the relationship between behavioral intention and mobile learning applications

H10: Faculty status moderates the relationship between subjective norm and mobile learning applications

Participants

The measurements selected for this study were adapted from established and recognized sources that are relevant to the research objectives. This study examines factors influencing attitudes, perceived usefulness, perceived ease of use, behavioural intention, and subjective norms toward using mobile applications in several UAE universities, including Al Ain University, Ajman University, American University in The Emirates (AUE), United Arab Emirates University (UAEU), and Canadian University in Dubai (CUD), with the goal of determining when and how mobile applications can best support learning. The participants of this research are collected from one source (UAE).

Design

This study used a quantitative method, to investigate factors and barriers affecting the attitudes, perceived usefulness, perceived ease of use, behavioral intention, and subjective norm toward using mobile applications in several of UAE's universities and its determinants based on the conceptualized model. To obtain data from the participants, a cross-sectional web-based survey was used. A questionnaire was used as the tool for this objective. The survey can collect a huge amount of data and use proper numerical formulas to test the proposed correlations between the variables under investigation (Skaik, 2016). The web-based survey was chosen because of its advantages in terms of overcoming time and space constraints, convenience of data entry (ibid), and cost-effectiveness in terms of producing and disseminating through an

internet link (Weathington, Cunningham & Pittenger, 2010).

Instrument

A survey study was designed and questionnaires were developed along the research objectives and model discussed above. The questionnaire was developed within the framework established by TRA theory and Davis, Bagozzi and Warshaw (1989) with some minor modifications to meet the current study setting and objectives. The questionnaire comprised with four segments and the first one examined the participants' demographics according to the categories (gender, educational level, age, university name, nationality). The second section consisted of 10 items -for both students and faculty staff towards mobile applications learning. The third section inspected the perceived usefulness with 12 items for students and 9 items for faculty staff. Finally, the fourth section inspected perceived ease of use with 6 items for students and 5 items for faculty staff. The questionnaires were prepared based in a 5-point Likert scale.

The researchers shared the questionnaire items with professionals in education and instructional technology (n=5) to ensure their validity and reliability. They were asked to examine the relatedness of the items based on the variables they measure within the context of the study. Before sharing with the intended participants, the researchers tested them on a sample of (30) students and faculty members from the study population. The professionals, the students, and faculty staff's remarks were taken into consideration before finalizing the final questionnaires.

Setting and Sample

The setting of the current study took place in different universities in UAE. For students, the setting was limited to Al-Ain University of Science and Technology, Canadian University in Dubai (CUD), American University in The Emirates (AUE), Ajman University, and United Arab Emirates University (UAEU); Meanwhile, for faculty staff the setting extended these five

universities to include other universities and schools. All the universities have large numbers of students of different nationalities, which makes them an excellent environment for conducting the study and exploring the views of students and faculty staff from various backgrounds and specializations.

Additionally, the sampling method used was the "purposive non-probability sampling technique. Consequently, "The fit number of student sample comprised of 141 enrolled in bachelor's, master's, diploma and professional diploma programs at those universities. The fit number of faculty sample consisted of 68 members of staff who hold bachelor's, master's, doctorate, and post-doctorate degrees.

Measurement Instrument

The measurements selected for this study were adapted from established and recognized sources relevant to the research objectives. Internet based online survey, is one of the fastest ways to collect data (Skaik, 2016) for which the researchers chose to collect data through web-based questionnaires. The researchers designed online questionnaires using Google Drive Docs before sharing the link with the students and faculty staff. The questionnaires were distributed using technological means and channels of social communication, such as University Moodle, Emails, and social media. The students and the faculty staff were informed of the purpose of the study and were invited to voluntarily participate by filling in the questionnaires online. Anonymity and confidentiality of the participants were guaranteed during the collection period. Complete forms of the questionnaires were collected over 18 months during the COVI 19 pandemic starting the Spring semester of the academic year 2020-2021 till the Fall semester of 2021-2022.

Preliminary Data analysis

In most cases, determining normalcy and outliers is a critical step in doing high-quality research. Obviously, a normality test is performed to ensure that the data is free of any

errors (Saidu, 2014). In this regard, exploratory data analysis (EDA) was used to clean the data of errors, perform a normality test of the data distribution, determine the linearity between the independent and dependent variables, determine missing values and reliability, and determine whether inferential statistics assumptions were met. Therefore, before performing any statistical analysis for quantitative measurement, exploratory data analysis for all variables should be performed. EDA was deemed particularly important for the effectiveness of the analysis in this work, and it was tested using resistance statistics such as Skewness and Kurtosis. In this study, a normality test has been conducted on the 209 data set and it was found that there was no case of extreme outliers. As shown in Table 1, the Skewness for mobile learning applications is $-.248$ and Kurtosis is $.109$; Skewness for attitude is $-.220$ and Kurtosis is $-.108$. Similarly, Skewness for perceived usefulness is $-.295$ and Kurtosis is $.363$; Skewness for perceived ease of use is $-.314$ and Kurtosis is $-.291$; Skewness for behavioral intention is $-.470$ and Kurtosis is $-.254$; finally, Skewness for the subjective norm is $-.095$ and Kurtosis is $-.201$. Based on the reasonable and acceptable Skewness and Kurtosis values, the normality test results have shown that the data is normally distributed. This comes following what George and Mallery (2003) suggest, where a Skewness value between $+1.0$ to -1.0 and Kurtosis of between $+1.0$ to -1.0 are considered excellent for most psychometric purposes; but a Kurtosis value between $+2.0$ to -2.0 and Skewness value

between $+3.0$ to -3.0 is in many cases also acceptable for psychometric analysis.

Furthermore, the data set was subjected to a reliability test, which relates to the internal consistency of data produced by the measurement apparatus (Glasgow & Emmons, 2007). Joppe (2000), remarks reliability refers to how consistent results are throughout time for an accurate depiction of the entire population under investigation. Cronbach Alpha Coefficient is the most widely used method for determining internal consistency in social and behavioural research (Drost, 2011). According to Creswell, Plano Clark, Gutmann, and Hanson (2003), reliability analysis is used to eliminate measurement errors and increase test statistical power. The minimum acceptable reliability is $.70$ (Kerlinger & Lee, 2000). Table 1 shows the reliability tests for both the pilot and final study in which the Cronbach alpha coefficients for the pilot study were within a minimum of $.709$ to a maximum of $.812$, and the final study also has a similar range within a minimum of $.732$ to a maximum of $.821$.

A multicollinearity test was also conducted by assessing the correlation matrix in Table 3, in which Bagozzi, Fornell and Larcker (1981) and Hair et al. (2010) argued that correlation coefficient " $r > .9$ " indicates a high correlation between two constructs and thus violates the assumption of multicollinearity. Certainly, all the values in the correlation matrix table indicate no correlation coefficient " $r \geq .9$ ". In this regard, the researcher found that there is no multicollinearity among the predictor variables, indicating that both collinearity and multicollinearity assumptions were not broken.

Table 1: Reliability Coefficients for Pre-test and Final Test

Variables				Pre-test (n = 30)		Final test (n = 209)	
				Items	Alpha (α)	Items	Alpha (α)
Mobile Learning Applications	Skewness	Kurtosis	7	.760	7	.759	
Attitude	-.220	-.108	10	.812	10	.821	
Perceived Usefulness	-.295	.363	9	.774	9	.732	
Perceived Ease of Use	-.314	-.291	5	.709	5	.760	
Behavioral Intention	-.470	-.254	4	.714	4	.786	
Subjective Norms	-.095	-.201	4	.742	4	.798	

IV. RESULTS

The descriptive analysis in Table 2 below revealed that out of 209 respondents, males constitute 32.5%, while females were 67.5%. It stated that females made up the majority of the population in the study area, as the UAE population in 2019 is 9.68 million, according to World Bank data. The number of men under the age of 15 to 24, which is double that of women in the same age range, is the most significant gender gap. The most sensible explanation for this phenomenon is that most of the men may be involved in work, as UAE is a destination of global companies and commercial business, so females are more likely to outnumber males in this study. Similarly, students were the majority amounting to 67.5% while the staff was 32.5%. Moreover, the respondents also defer in terms of their education level. Those who have bachelor's degrees were the majority constituting 65.6%, followed by doctorate with 19.1%, masters and post-doctorate were 5.7% and 5.3% respectively. Lastly, the professional diploma and diploma were only 4.3%. In terms of race and region, Arabs were 91.4%, while Europeans and Americans were 6.2%, and Asian, African and Latin Americans were 1%, 1%, and 0.5% respectively.

Table 2: Demographic Profile of the Respondents (n = 209)

Variables	Frequency	Percent
Gender		
Female	126	60.3
Male	83	39.7
Faculty Status		
Staff	68	32.5
Students	141	67.5
Education Level		
Professional Diploma and Diploma	9	4.3
Bachelor	137	65.6
Master	12	5.7
Doctorate	40	19.1
Post – doctorate	11	5.3
Region		
Arab	191	91.4
Europe and USA	13	6.2
Asia	2	1.0
Africa	2	1.0
Latin America	1	0.5

To evaluate the association between independent variables i.e. attitude, perceived usefulness, perceived ease of use, behavioral intention, and subjective norm, with dependent variables, i.e. mobile learning applications., a Pearson correlation analysis was used. As shown in Table 3 below, the result indicated that there is a significant positive and strong relationship between attitude ($r = .555, p = .000$) behavioral Intention ($r = .654, p = .000$) and subjective norms ($r = .606, p = .000$) with mobile application learning. However, the results showed that there is a significant positive and medium correlation between perceived ease of use ($r = .301, p = .000$) and mobile learning applications, while perceived usefulness has a significant but weak relationship with mobile learning applications ($r = .238, p = .000$).

Table 3: Relationship between Independent Variables and Mobile Learning applications (n = 209)

Variables	Mean	SD	Y	X ₁	X ₂	X ₃	X ₄	X ₅
Y (Mobile Learning Applications)	2.95	.85	1					
X ₁ (Attitude)	2.91	.90	.555**	1				
X ₂ (Perceived Usefulness)	3.32	.80	.238**	.172*	1			
X ₃ (Perceived Ease of Use)	3.35	.95	.301**	.233**	.448**	1		
X ₄ (Behavioral Intention)	3.27	1.05	.654**	.539**	.331**	.342**	1	
X ₅ (Subjective Norm)	2.97	1.00	.606**	.526**	.325**	.382**	.622**	1

***. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

After satisfying the assumptions for linear regression analysis, hierarchical multiple linear regression analysis was used to investigate the distinctive predictors of mobile learning applications (MLA) among UAE faculties and students. Therefore, the summary of ANOVA results in Table 4 of the first model (model 1) illustrates the multiple linear regression model of MLA. The results of the multiple linear regression analysis as a whole that includes five predicting variables are statistically significant

[$F(5, 203) = 44.538, p = .000$]. This indicated that the slope of the estimated linear regression line for the first model (model 1) is not equal to zero. Moreover, the Model Summary in Table 4 below also showed the coefficient of determination (R^2) value of .523, which means 52.3% of the variance in MLA was explained by the independent variables entered into the regression model.

Table 4 shows the standardized coefficient of the associations between the independent and dependent variables from the multiple linear regression analysis in the first model in hierarchical multiple regression. The results revealed that there is a significant relationship between attitude and MLA ($\beta = .216, t = 3.582, p = .000$). This means attitude is a significant predictor of MLA. This finding is consistent with the study conducted in Sri Lanka, which found that observability and qualified advantage have a substantial impact on attitudes and intentions to use E-learning (Yatigammana et al. 2013). In the opinion of Salloum, 2019, data analysis suggests that when postgraduate students consider using E-learning, it may be challenging (complexity); as a result, there will be a failure in attitude and intent to use E-learning mode. There is a decline in adaptability and acceptance when the E-learning device is not simple and the users have not already received instruction including the use of computer systems, guide systems, and technical expertise. (Yatigammana et al., 2013).

V. DISCUSSION

The COVID-19 pandemic has drastically altered students' normalcy. Whether it's because colleges have shifted to online education or because of social distancing rules that prevent students from visiting campus as much as they used to (Alkindi et al., 2021). The results showed that there is a significant relationship between behavioral intention and MLA ($\beta = .375, t = 5.633, p = .000$). This means behavioral intention is a significant predictor of mobile learning applications (MLA). This study is in line with Park, Nam, and Cha (2012), who observed that the intention to engage in mobile learning among Oorean

college students is crucial, and that attitude was the most relevant factor in determining mobile app acceptance. Mobile application contrivances, according to Liu et al., are potential learning implements that can strengthen learners' demands and participation in unique ways (Hwang & Wu, 2014) and engage them in educational activities (Wu et al., 2012). However, Lee (2010) revealed that the desire to continue using e-learning systems is still relatively low, especially after initial acceptance of the system, and that approval was proven to be the most reliable predictor of users' intention to continue using the system. As a result, to the best of our knowledge, there has been no empirical research on the relationship between college students' acceptance of mobile learning applications and their academic achievements; most studies investigating mobile applications have rather focused on factors affecting users' intentions to adopt mobile learning applications (Cheon et al., 2012). An article released on mobile learning solitary review of learning accomplishment found no empirical data to substantiate the claim that mobile learning is favourably or adversely related to students' learning performance (Hwang & Wu, 2014). In the absence of hard evidence, research findings that contradict these studies claim that mobile devices may redirect students' attention away from learning material (Gehlen-Baum & Weinberger, 2014).

The findings revealed that there has been a significant relationship between subjective norms and mobile Learning applications ($\beta = .252, t = 3.776, p = .000$). This means subjective norm is a significant predictor of MLA. One of the most intriguing findings of the study is that e-learning self-efficacy and subjective norm both have a substantial impact on attitudes toward e-learning and behavioural intention to utilise e-learning. The Theory of Reasoned Action may provide a conceivable justification for this. This study's findings are consistent with those of Gradon, Alshare, and Kwan (2005), who discovered that subjective norm was a significant factor in determining

university students' willingness to adopt e-learning. In contrast, Ndubisi (2006) found that subjective norm had no effect on university students' intention to adopt e-learning in a research. This type of inconsistency is resolvable.

However, the results indicate no significant relationships between perceived usefulness and mobile Learning applications ($\beta = -.021$, $t = -.378$, $p = .705$). This indicated that perceived usefulness is not a reliable indicator of MLA. This conclusion contrasts with the findings of a study on the effects of perceived usefulness in the field of new technology, which found the opposite. According to certain studies, this component has a large and favourable impact on the intention to use MLA (Pham & Ho, 2015). On other hand, our study is in line with others that did not show significant results for this relationship (Li, Liu, & Heikkilä, 2014). Hence, the results showed no significant relationship between perceived ease of use and MLA ($\beta = .035$, $t = .624$, $p = .533$). This indicated that perceived ease of use is not a significant predictor of MLA. This research backs up Ho (2010), who found that perceived usefulness, attitudes, and user satisfaction play a role in predicting users' intention to continue with e-learning. Chen and Denoyelles (2013) created a model that examined at how users felt about continuing their e-learning after experiencing negative critical occurrences. Negative critical incidents, perceived usefulness, satisfaction, perceived ease of use, and attitudes, they claim, were the most important aspects influencing users' e-learning retention intentions.

Furthermore, hierarchical multiple regression in the second model (model 2) is statistically significant [$F(5, 203) = 44.538$, $p = .000$]. This shows that there is a significant moderating effect on faculty status (staff or students) in the entire model. The interaction effect of faculty status was also reflected in the model summary, which revealed a change of ΔR^2 of .074. This means there is an increase in R^2 value from .523 in model 1 to .597 in model 2, which indicated an increase of 7.4% after

establishing the moderating effect of faculty status in the hierarchical multiple regression model. Therefore, the standardized regression coefficient results in the first model (model 1) of Table 4 showed a significant effect of attitude on mobile application learning. But, after establishing the interaction effect of faculty status in the relationship in model 2, the analysis indicates no significant moderating effect of faculty status on the relationship between attitude and MLA ($\beta = .171$, $t = .652$, $p = .515$). This means there has been no moderating effect of faculty status in the relationship between attitude and MLA. This study's findings are in contrast to Al-(2018) Samarraie's findings, which revealed that users' perceptions of e-learning were once beneficial in improving their overall performance and influenced their attitude toward e-learning. It also led to their reporting greater levels of validation and attainment value.

Concerning perceived usefulness, the result in model 1 indicated no significant relationship with MLA. Similarly, after establishing the interaction effect of faculty status in the relationship between perceived usefulness and MLA, the result is found to be insignificant ($\beta = .223$, $t = .634$, $p = .527$). It shows that faculty status has no substantial moderating effect on the connection between perceived usefulness and mobile app learning. This conclusion is consistent with the fact that neither perceived utility nor perceived ease of use had a significant direct effect on behavioural intention to utilise e-learning in the setting of endogenous concepts. Perceived usefulness is hypothesised to affect intention to use in the original TAM, but perceived ease of use is not hypothesized to directly affect intention to use (Kalz, 2009).

Moreover, the finding in model 1 indicated no significant relationship between perceived ease of use and MLA. However, after establishing the interaction effect of faculty status in the relationships, the findings indicated a significant moderating effect of faculty status (staff or students) on the relationship between perceived ease of use and mobile learning applications ($\beta = -.785$, $t = -2.229$, $p = .027$).

This means staff is more likely to have perceived ease of use than students. This finding is in line with a study conducted by Chen and Tseng 2012, which stated that there are significant positive influences of perceived ease and perceived usefulness of use on E-learning acceptance, where sharing the knowledge behavior plays a serious role in E-learning system acceptance (Eid and AlJabri 2016).

The finding in model 1 showed a significant relationship between behavioral intention and mobile application learning. Likewise, after establishing the interaction effect of faculty status in the relationship, the findings indicated a significant moderating effect of faculty status (staff or students) on the relationship between behavioral intention and mobile Learning applications ($\beta = .611$, $t = 1.908$, $p = .048$). This means students are more likely to have

perceived ease of use than staff. These findings are like the study Joo et al. 2013 presented, where there is a significant association between technology perceived ease of use (EOU) and innovativeness. According to these findings, students' willingness to use technology which influences their decisions in full implementation scenarios (Tarhini et al. 2017). Consequently, the previous studies achieved on perceived ease of use and E-learning acceptance showed a positive relationship.

Additionally, the findings in model 1 showed a significant relationship between subjective norms and MLA. Also, after establishing the interaction effect of faculty status in the relationship, the finding indicated a significant moderating effect of faculty status (staff or students) on the relationship between subjective norms and MLA ($\beta = -.725$, $t = -2.167$, $p = .031$

Table 4: Hierarchical Multiple Linear Regression on Mobile Learning Applications

Model 1	B	S.E	β	t	p
(Constant)	.678	.214		3.172	.002
Attitude	.203	.057	.216	3.582	.000
Perceived Usefulness	-.022	.059	-.021	-.378	.705
Perceived Ease of Use	.032	.051	.035	.624	.533
Behavioral Intention	.312	.055	.375	5.633	.000
Subjective Norm	.213	.056	.252	3.776	.000
Note: $R^2 = .523$; adjusted $R^2 = .511$; [F (5, 203) = 44.538, $p = .000$]					
Model 2					
(Constant)	.525	.208		2.525	.012
Attitude x Status	.075	.115	.171	.652	.515
Perceived Usefulness x Status	.081	.128	.223	.634	.527
Perceived Ease of Use x Status	-.261	.117	-.785	-2.229	.027
Behavioral Intention x Status	.212	.111	.611	1.908	.048
Subjective Norm x Status	-.272	.125	-.725	-2.167	.031
Note: $R^2 = .597$; Adjusted $R^2 = .577$; [F (5, 203) = 29.352, $p = .000$]; $\Delta R^2 = .074$					

a. Dependent Variable: Mobile Application Learning

Note: B: - Unstandardized Coefficients; S.E:- Standard Error; β : - Standardized Coefficients; t:- t – value; p:- p-value; ΔR^2 :- Change in R – Square.

VI. CONCLUSION

The purpose of the study was to assess Mobile Learning Applications that created specifically for developing countries like the United Arab Emirates. Our focus was not only on MLA's ability to boost students' learning accomplishment or faculty members use, but also on learners' instructional experiences and attitudes. It is expected that learners' familiarity and experience with the MLA tool will be critical in ensuring favourable computer learning outcomes. Hence, our study explored the moderating effect of faculty status in the relationships between attitudes, perceived usefulness, perceived ease of use, behavioral intention and subjective norm toward using Mobile Learning Applications in some universities in the UAE.

According to the research's findings, the behavioral intention has the significant contribution to MLA, followed by subjective norms and attitude respectively. This is because people have more intention toward mobile Learning applications in the study area. With regards to the moderating role of faculty status, that is either respondent being a staff or student, the results revealed that staff is more likely to have perceived ease of use and subjective norms than students concerning MLA. However, the findings showed that students are more likely to have behavioral intentions toward MLA than staff in the study area. The outcomes of the study are significant both within the UAE context and globally because each institution will be capable to implement these strategies in its environment.

VII. RECOMMENDATIONS

Future research might be conducted to analyse the rating results as well as the benefits and downsides in order to encourage the use of mobile devices and apps for learning to contribute for educational innovation. Moreover, it must be encouraged to examine the collected data utilizing the usage of different subgroups such as education level, profile, age, or gender to dwell on the cultural influence of these external variables on the model, especially there were more than 200

nationalities in UAE (Zamil et al., 2017). In conclusion, university faculty members' appreciation for motivating the use of new technologies could improve the quality of the mobile Learning applications process, enable learners to gain their practicable pedagogical and educational uses, and promote and motivate the adoption of these authentic assets as innovative teaching and learning approaches.

VIII. LIMITATIONS

The scope of this research is limited to the status of teacher and student trust in the usage of mobile learning applications at five private universities in the United Arab Emirates. Despite the fact that the data analysis process yielded great results, still there is many limitations in this study. The researcher is unable to obtain an accurate representation of user perceptions over time. This prevented a comparative examination of the outcomes, which would have provided a clearer picture of the effects of online learning during the COVID-19 pandemic. Consequently, the faculty staff and students' overdue get admission to complete the questionnaire was delayed from one university to another, the data have been accrued within 18 months starting February 2020 using the Purposive Non-Probability Sampling Technique.

ACKNOWLEDGMENTS

The research team appreciates wholeheartedly those who supported for the successful implementation of the research. Hearty thanks to the editors and reviewers.

AUTHORSHIP CONTRIBUTION STATEMENT

Alkindi: Contributed to writing the manuscript, collecting the data, analyzing and interpreting the data, critical revision of the manuscript, and final approval. AbduMohamed: Technical support, supervision, data acquisition, data analysis/interpretation. Enas: Concept and design, data acquisition, data analysis/interpretation, drafting manuscript, critical revision of the manuscript. Abdalla: Assisting in constructing the theoretical

concepts and data analysis, reviewing the final manuscript. Ghadah: collecting the data, Drafting the manuscript, and critical revision of the manuscript.

REFERENCES

1. Aifan, H. (2015). Saudi Students' Attitudes Toward Using Social Media To Support Learning. PhD Proposal. <https://doi.org/10.1017/CBO9781107415324.004>.
2. Ajjan, H., & Hartshorne, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The internet and higher education*, 11(2), 71-80. <https://doi.org/10.1016/j.iheduc.2008.05.002>
3. Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
4. Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.
5. Al-Emran, M., Elsherif, H. M., & Shaalan, K. (2016). Investigating attitudes towards the use of mobile learning in higher education. *Computers in Human Behavior*, 56(December 2015), 93–102.. <https://doi.org/10.1016/j.chb.2015.11.033>
6. Al-Habashi, S.O. (2004), “Content development: the difference it offers to learning effectiveness”, *International Journal of the Computer, Internet and Management*, Vol. 12 No. 1, pp. 14-19. <https://dialnet.unirioja.es/servlet/articulo?codigo=5823397>
7. Alkindi, M., Hilal, H., & Odinaev, I. (2021). Open Access Video Games Effects On College Students In Dubai During Covid-19 Pandemic. *International Journal of Current Research*, 13(05), 17550–17557. <http://www.journalcra.com/article/video-games-effects-college-students-dubai-during-covid-19-pandemic>. DOI: <https://doi.org/10.24941/ijcr.41408.05.2021>
8. Al-Samarraie, H., Teng, B. K., Alzahrani, A. I., & Alalwan, N. (2018). E-learning continuance satisfaction in higher education: a unified perspective from instructors and students. *Studies in Higher Education*, 43(11), 2003-2019. <https://doi.org/10.1080/03075079.2017.1298088>
9. Bagozzi, R. P., Fornell, C., & Larcker, D. F. (1981). Canonical correlation analysis as a special case of a structural relations model. *Multivariate Behavioral Research*, 16(4), 437-454. https://doi.org/10.1207/s15327906mbr1604_2
10. Bere, A., & Rambe, P. (2016). An empirical analysis of the determinants of mobile instant messaging appropriation in university learning. *Journal of Computing in Higher Education*, 28(2), 172-198. <https://doi.org/10.1007/s12528-016-9112-2>
11. Botterill, W. (2011). Developing the therapeutic relationship: From ‘expert’ professional to ‘expert’ person who stutters. *Journal of fluency disorders*, 36(3), 158-173. <https://doi.org/10.1016/j.jfludis.2011.02.002>
12. Bravo, C., Redondo, M., Ortega, M. and Verdejo, M.F. (2006), “Collaborative distributed environments for learning design tasks by means of modelling and simulation”, *Journal of Network and Computer Applications*, Vol. 29 No. 4, pp. 321-42. <https://doi.org/10.1016/j.jnca.2005.01.003>
13. Charmonman, S. (Ed.) (2004), “Proceedings of the International Conference on Elearning for Knowledge-based Society”, *International Journal of the Computer,*

- the Internet, and Management, Vol. 12 No 2, special issue. https://www.academia.edu/20595407/Proceedings_of_the_Fourth_International_Conference_on_eLearning_for_Knowledge_Based_Society
14. Charron, K., & Raschke, R. (2014). Student perceptions and experiences using Jing and Skype in an Accounting Information Systems Class. *Journal of Education for Business*, 89(1), 1-6. <https://doi.org/10.1080/08832323.2012.733740>
 15. Chen, B., & Denoyelles, A. (2013). Exploring students' mobile learning practices in higher education. *Educause Review*, 7. <https://er.educause.edu/articles/2013/10/exploring-students-mobile-learning-practices-in-higher-education>
 16. Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers & education*, 59(3), 1054-1064. <https://doi.org/10.1016/j.compedu.2012.04.015>
 17. Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. *Handbook of mixed methods in social and behavioral research*, 209, 240. https://books.google.ae/books?hl=en&lr=&id=F8BFOM8DCKoC&oi=fnd&pg=PA209&dq=Creswell,+J.+W.,+Plano+Clark,+V.+L.,+Gutmann,+M.+L.,+%26+Hanson,+W.+E.+%282003%29.+Advanced+mixed+methods+research+designs.+Handbook+of+mixed+methods+in+social+and+behavioral+research,+209,+240.&ots=gWeUyzmBOj&sig=1pcPdfVylGm7fzH97oKRn8W1DhI&redir_esc=y#v=onepage&q&f=false
 18. Dabbagh, N., & Reo, R. (2011). Tracing the Roots and Learning Affordances of Social Software. *Web 2.0-Based E-Learning: Applying Social Informatics for*, 1. <https://www.igi-global.com/chapter/web-based-learning/45014>
 19. Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science*, 35(8), 982-1003. <https://doi.org/10.1287/mnsc.35.8.982>
 20. Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace 1. *Journal of applied social psychology*, 22(14), 1111-1132. <https://doi.org/10.1111/j.1559-1816.1992.tb00945.x>
 21. Downes, S. (2005). E-learning 2.0. *Elearn magazine*, 2005(10), 1. <https://doi.org/10.1145/1104966.1104968>
 22. Drost, E. A. (2011). Validity and reliability in social science research. *Education Research and perspectives*, 38(1), 105. <https://search.informit.org/doi/abs/10.3316/INFORMIT.491551710186460>
 23. Eid, M. I., & Al-Jabri, I. M. (2016). Social networking, knowledge sharing, and student learning: The case of university students. *Computers & Education*, 99, 14-27. <https://doi.org/10.1016/j.compedu.2016.04.007>
 24. Ellingson, D. A., & Notbohm, M. (2012). Synchronous distance education: Using web-conferencing in an MBA accounting course. *American Journal of Business Education*, 5(5), 555-562. <https://doi.org/10.19030/ajbe.v5i5.7212>
 25. Ellis, R. A., Ginns, P., & Piggott, L. (2009). E-learning in higher education: some key aspects and their relationship to approaches to study. *Higher Education Research & Development*, 28(3), 303-

- 318.<https://doi.org/10.1080/07294360902839909>
26. Elsayed ,Hussein Ali. Islam. (2011). E learning 2.0: Using Blogs as powerful tool to enhance and support Higher Education applied to Braunschweig University. The Conference of Electronic Learning and Distant Education. Al-Riyadh. <https://slideplayer.com/slide/3870819/>
 27. Faulds, D. J. (2015). Overcoming Geographical Obstacles: American Journal Of Business Education, 8(2), 79–95. <https://doi.org/10.19030/ajbe.v8i2.9137>
 28. Fishbein, M., & Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research.
 29. Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult education quarterly*, 48(1), 18-33.<https://doi.org/10.1177/074171369704800103>
 30. Gehlen-Baum, V., & Weinberger, A. (2014). Teaching, learning and media use in today’s lectures. *Computers in Human Behavior*, 37, 171-182.<https://doi.org/10.1016/j.chb.2014.04.049>
 31. Georgescu, M., & Popescul, D. (2015). ScienceDirect Social Media – the new paradigm of collaboration and communication for business environment. *Procedia Economics and Finance*, 20, 277–282. [https://doi.org/10.1016/S2212-5671\(15\)00075-1](https://doi.org/10.1016/S2212-5671(15)00075-1).
 32. Guriting, P., & Oly Ndubisi, N. (2006). Borneo online banking: evaluating customer perceptions and behavioural intention. *Management research news*, 29(1/2), 6-15.<https://doi.org/10.1108/01409170610645402>
 33. Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: A global perspective* (Vol. 7).
 34. Hall, A., & Herrington, J. (2010). The development of social presence in online Arabic learning communities. *Australasian Journal of Educational Technology*, 26(7), 1012-1027.<https://doi.org/10.14742/ajet.103>
 35. Halverson, R., & Smith, A. (2009). How new technologies have (and have not) changed teaching and learning in schools. *Journal of Computing in Teacher Education*, 26(2), 49-54. <https://www.tandfonline.com/doi/abs/10.1080/10402454.2009.10784632>
 36. Hargis, J., Cavanaugh, C., Kamali, T., & Soto, M. (2014). A Federal Higher Education iPad Mobile Learning Initiative: Triangulation of Data to Determine Early Effectiveness. *Innovative Higher Education*, 39(1), 45–57. <https://doi.org/10.1007/s10755-013-9259-y>.
 37. Harrison, R. (2011). Learning and development. *Development and Learning in Organizations: An International Journal*, 26(1).<https://doi.org/10.1108/dlo.2012.08126aaa.013>
 38. Ho, L. A., & Kuo, T. H. (2010). How can one amplify the effect of e-learning An examination of high-tech employees’ computer attitude and flow experience. *Computers in Human Behavior*, 26(1), 23-31.<https://doi.org/10.1016/j.chb.2009.07.007>
 39. Hwang, G. J., & Wu, P. H. (2014). Applications, impacts and trends of mobile technology-enhanced learning: a review of 2008–2012 publications in selected SSCI journals. *International Journal of Mobile Learning and Organisation*, 8(2), 83-95.<https://doi.org/10.1504/IJMLO.2014.062346>
 40. Hwang, G. J., Wu, P. H., & Chen, C. C. (2012). An online game approach for improving students’ learning performance in web-based problem-

- solving activities. *Computers & Education*, 59(4), 1246-1256. <https://doi.org/10.1016/j.compedu.2012.05.009>
41. Joo, J., & Sang, Y. (2013). Exploring Koreans' smartphone usage: an integrated model of the technology acceptance model and uses and gratifications theory. *Computers in Human Behavior*, 29(6), 2512e2518. <https://doi.org/10.1016/j.chb.2013.06.002>
 42. Joppe, M. (2000). The Research Process. Retrieved February 25, 1998, from <http://www.ryerson.ca/~mjoppe/rp.htm>
 43. Kalz, M., Koper, R., & Hornung-Prähauser, V. (2009). Technology support for self-organized learners (Guest Editorial). *Educational Technology & Society*, 12(3), 1-3. <https://www.jstor.org/stable/jeductechsci.12.3.1>
 44. Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioral research* 4th ed. Holt, NY.
 45. Khaddage, F., & Knezek, G. (2013). iLearn via mobile technology: a comparison of mobile learning attitudes among university students in two nations. In *Advanced learning technologies (ICALT), 2013 IEEE 13th international conference on* pp. 256e258. IEEE. <https://doi.org/10.1109/ICALT.2013.79>
 46. Kinder, R. (2002), "Instructional services for distance education", *Reference Librarian*, Vol. 77No. 1, pp. 63-70.
 47. Lee, M. H., & Tsai, C. C. (2010). Exploring teachers' perceived self efficacy and technological pedagogical content knowledge with respect to educational use of the World Wide Web. *Instructional Science*, 38(1), 1-21. <https://doi.org/10.1007/s11251-008-9075-4>
 48. Li, H., Liu, Y., & Heikkilä, J. (2014). Understanding the Factors Driving NFC-Enabled Mobile Payment Adoption: an Empirical Investigation. In *PACIS* (p. 231). <https://aisel.aisnet.org/pacis2014/231/>
 49. Lohnes, S., & Kinzer, C. (2007). Questioning assumptions about students' expectations for technology in college classrooms. *Innovate: Journal of Online Education*, 3(5). <https://www.learntechlib.org/p/104341/>
 50. Masrom, M., & Hussein, R. (2008). User acceptance of Information Technology: Understanding theories and models. *Venton Pub.*. <https://repository.arizona.edu/handle/10150/105584>
 51. McCrea, R. L., Berger, Y. G., & King, M. B. (2012). Body mass index and common mental disorders: exploring the shape of the association and its moderation by age, gender and education. *International Journal of Obesity*, 36(3), 414. <https://doi.org/10.1038/ijo.2011.65>
 52. Park, S. Y., Nam, M. W., & Cha, S. B. (2012). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology*, 43(4), 592-605. <https://doi.org/10.1111/j.1467-8535.2011.01229.x>
 53. Parker, J., Boase-Jelinek, D., & Herrington, J. (2011, October). Perceptions and reflections: Using Skype chat to build a community of learners. In *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 1599-1604). Association for the Advancement of Computing in Education (AACE). <https://doi.org/10.1111/j.1467-8535.2011.01229.x>
 54. Prensky, M. (2006). Don't bother me, Mom, I'm learning!: How computer and

- video games are preparing your kids for 21st century success and how you can help!. St. Paul, MN: Paragon house. <https://www.uoc.edu/uocpapers/5/dt/eng/prensky.html>
55. Ritzhaupt, A. D., Dawson, K., & Cavanaugh, C. (2012). An investigation of factors influencing student use of technology in K-12 classrooms using path analysis. *Journal of Educational Computing Research*, 46(3), 229-254. <https://doi.org/10.2190/EC.46.3.b>
 56. Rose, J., & Fogarty, G. J. (2006). Determinants of perceived usefulness and perceived ease of use in the technology acceptance model: senior consumers' adoption of self-service banking technologies. In *Proceedings of the 2nd Biennial Conference of the Academy of World Business, Marketing and Management Development: Business Across Borders in the 21st Century* (Vol. 2, pp. 122-129). Academy of World Business, Marketing and Management Development. <https://eprints.usq.edu.au/1649/>
 57. Saidu M.B., Samah A.A., Redzuan M., Ahmad N. (2014): Relationship between socio-economic factors and participation in decision making in microfinance scheme among rural farmers in Kano, Nigeria. *Life Science Journal*, 11: 342–347. <http://www.lifesciencesite.com>
 58. Salloum, S. A., Al-Emran, M., Shaalan, K., & Tarhini, A. (2019). Factors affecting the E-learning acceptance: A case study from UAE. *Education and Information Technologies*, 24(1), 509-530. <https://doi.org/10.1007/s10639-018-9786-3>
 59. Sharifabadi, S.R. (2006), "How digital libraries can support e-learning", *The Electronic Library*, Vol. 24 No. 3, pp. 389-401. <https://doi.org/10.1108/02640470610671231>
 60. Sharples, M. (2005). Disruptive devices: mobile technology for conversational learning. *International Journal of Continuing Engineering Education and Life Long Learning*, 12(5/6), 504-520. <https://doi.org/10.1504/IJCEELL.2002.002148>
 61. Shuen, A. (2008). *Web 2.0: A Strategy Guide: Business thinking and strategies behind successful Web 2.0 implementations*. " O'Reilly Media, Inc.". [https://books.google.ae/books?hl=en&lr=&id=zLiADwAAQBAJ&oi=fnd&pg=PR7&dq=Shuen,+A.+\(2008\).+Web+2.0:+A+Strategy+Guide:+Business+thinking+and+strategies+behind+successful+Web+2.0+implementations.+%22+O%27Reilly+Media,+Inc.%22.&ots=rcwKfE9mAF&sig=k58_knl7WA4wzAnK4MUCvx7b0Dw&redir_esc=y#v=onepage&q=Shuen%2C%20A.%20\(2008\).%20Web%202.0%3A%20A%20Strategy%20Guide%3A%20Business%20thinking%20and%20strategies%20behind%20successful%20Web%202.0%20implementations.%20%22%20O'Reilly%20Media%2C%20Inc.%22.&f=false](https://books.google.ae/books?hl=en&lr=&id=zLiADwAAQBAJ&oi=fnd&pg=PR7&dq=Shuen,+A.+(2008).+Web+2.0:+A+Strategy+Guide:+Business+thinking+and+strategies+behind+successful+Web+2.0+implementations.+%22+O%27Reilly+Media,+Inc.%22.&ots=rcwKfE9mAF&sig=k58_knl7WA4wzAnK4MUCvx7b0Dw&redir_esc=y#v=onepage&q=Shuen%2C%20A.%20(2008).%20Web%202.0%3A%20A%20Strategy%20Guide%3A%20Business%20thinking%20and%20strategies%20behind%20successful%20Web%202.0%20implementations.%20%22%20O'Reilly%20Media%2C%20Inc.%22.&f=false)
 62. Skaik, S., Coggins, J., & Mills, A. (2016, January). Examining the approaches to diminish judicial intervention in statutory adjudication in Australia. In *AUBEA 2016: Proceedings of the 40th Australasian Universities Building Education Association Annual Conference* (pp. 660-670). Central Queensland University. <https://dro.deakin.edu.au/view/DU:30085255>
 63. Surendran, P. (2012). Technology acceptance model: A survey of literature. *International Journal of Business and Social Research*, 2(4), 175-178. <https://ideas.repec.org/a/mir/mirbus/v2y2012i4p175-178.html>

64. Taha, A. (2004a), “‘Digitally yours’: UAEU Libraries – a proposed strategic plan to meet the challenges of digital dilemma – visions and aspirations”, Proceedings of the 1st International Conference on Digital Libraries (ICDL 2004), New Delhi, 24-27 February, Vol. 1, TERI, New Delhi, pp. 208-15. https://www.uaeu.ac.ae/en/about/uaeu_libraries.shtml
65. Taha, A. (2004b), “‘Virtually yours’: e-library information services for supporting e-learning process at UAE University”, paper presented at the IADIS E-society Conference, Avila, 16-19 July.
66. Taha, A. (2005), “UAE universities embark on web-based ETD service: vision and inspiration”, available at: <http://adt.caul.edu.au/etd2005/papers/033Taha.pdf>.
67. Taha, A. (2006), “Building e-partnership: d-library services for e-learning”, Proceedings of the 4th ACS/IEEE International Conference on Computer Systems and Applications (AICCSA’06), Sharjah, UAE, 8-11 March. <https://doi.org/10.1109/AICCSA.2006.205208>
68. Taha, A. (2007). Networked e-information services to support the e-learning process at UAE University. *The Electronic Library*, 25(3), 349–362. <https://doi.org/10.1108/02640470710754850>.
69. Tajudeen Shittu, A., Madarsha Basha, K., Suryani Nik AbdulRahman, N., & Badariah Tunku Ahmad, T. (2011). Investigating students' attitude and intention to use social software in higher institution of learning in Malaysia. *Multicultural Education & Technology Journal*, 5(3), 194-208. <https://doi.org/10.1108/17504971111166929>
70. Taleb, Z.& Sohrabi, A. (2012). Learning on the move: The use of mobile technology to support learning for university students. *Procedia- Social and Behavioral Sciences*, 69, 1102–1109. doi: 10.1016/j.sbspro.2012.12.038.
71. Tarhini, A., Masa’deh, R. E., Al-Busaidi, K. A., Mohammed, A. B., & Maqableh, M. (2017). Factors influencing students’ adoption of e-learning: a structural equation modeling approach. *Journal of International Education in Business*, 10(2), 164-182. <https://doi.org/10.1108/JIEB-09-2016-0032>
72. Tegos, G.K., Stoyanova, D.V. and Onkov, K.Z. (2005), “E-learning of trend modelling in a web environment”, *Inroad – The SIGCSE Bulletin*, Vol. 35 No. 2, pp. 70-4. <https://doi.org/10.1145/1083431.1083467>
73. Thalheimer, I. (2008). Evaluating E-Learning 2.0: Getting Our Heads Around the Complexity. *Learning Solutions Magazine*. Retrieved February 15, 2011, from <http://www.learningsolutionsmag.com/articles/84/evaluating-e-Learning-20-getting-our-heads-around-the-complexity>
74. Thomas, D., & Brown, J. S. (2011). A new culture of learning: Cultivating the imagination for a world of constant change (Vol. 219). Lexington, KY: CreateSpace. <https://www.amazon.com/New-Culture-Learning-Cultivating-magination/dp/1456458884>
75. Torrisi, G. and Davis, G. (2000), “Online learning as a catalyst for reshaping practice: the experiences of some academics developing online learning materials”, *The International Journal for Academic Development*, Vol. 5 No. 2, pp. 166-76. <https://doi.org/10.1080/13601440050200770>
76. Uzunboyulu, H., & Ozdamli, F. (2011). Teacher perception for m-learning: scale development and teachers' perceptions. *Journal of Computer*

- Assisted Learning, 27(6), 544-556. <https://doi.org/10.1111/j.1365-2729.2011.00415.x>
77. Weathington, B. L., Cunningham, C. J., & Pittenger, D. J. (2010). Research methods for the behavioral and social sciences. Hoboken, NJ: John Wiley & Sons, Inc. [https://books.google.ae/books?hl=en&lr=&id=28I09vYxeKMC&oi=fnd&pg=PA2&dq=Weathington,+B.+L.,+Cunningham,+C.+J.,+%26+Pittenger,+D.+J.+\(2010\).+Research+methods+for+the+behavioral+and+social+sciences.+Hoboken,+NJ:+John+Wiley+%26+Sons,+Inc.&ots=_Y7ek4ChWY&sig=skyDFpBtygk4GFtJ-vtEV1qqmLA&redir_esc=y#v=onepage&q&f=false](https://books.google.ae/books?hl=en&lr=&id=28I09vYxeKMC&oi=fnd&pg=PA2&dq=Weathington,+B.+L.,+Cunningham,+C.+J.,+%26+Pittenger,+D.+J.+(2010).+Research+methods+for+the+behavioral+and+social+sciences.+Hoboken,+NJ:+John+Wiley+%26+Sons,+Inc.&ots=_Y7ek4ChWY&sig=skyDFpBtygk4GFtJ-vtEV1qqmLA&redir_esc=y#v=onepage&q&f=false)
78. Yang, S. H. (2012). Exploring College Students' Attitudes and Self-Efficacy of Mobile Learning. Turkish Online Journal of Educational Technology-TOJET, 11(4), 148-154. <https://eric.ed.gov/?id=EJ989264>
79. Yatigamma, M. R. K. N., Johar, M. G. M., & Gunawardhana, C. (2013). Postgraduate students' perceived e-learning acceptance: Model validation. International Journal of Asian Business and Information Management (IJABIM), 4(3), 51-60. <https://doi.org/10.4018/jabim.2013070105>
80. Yurdagül, C., & Öz, S. (2018). Attitude towards mobile learning in English language education. Education Sciences, 8, 1-14; doi:10.3390/educsci8030142.
81. Zamil, M., Alkindi, H., Teoh, K., & Naji, A. (2017). Regional Differences in Culture among the online Gen-Y Consumers in Smart City Dubai, UAE. International Journal of Business and Management Invention ISSN (Online, 6(7), 2319–8028. www.ijbmi.org
82. Zhao, Y., & Zhu, Q. (2010). Influence Factors of Technology Acceptance Model in Mobile Learning. Paper presented in the Fourth International Conference on Genetic and Evolutionary Computing 13-15 Dec. 2010, Shenzhen, China. DOI: 0.1109/ICGEC.2010.139.
83. Zurita, G., & Nussbaum, M. (2004). Computer supported collaborative learning using wirelessly interconnected handheld computers. Computers & education, 42(3), 289-314. <https://doi.org/10.1016/j.compedu.2003.08.005>