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The Digital Educational Innovation In The Weather Of Covid-19 In Morocco

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Completed Research Paper

Introduction

In the educational context, many institutions have been applying - for a long time - ICT to classroom teaching and learning and have called them ICTE. For example, Alessi and Trollip, in 2001, showed that ICT-based learning offers many advantages, such as efficiency over time, greater accessibility of content and reasonable cost to obtain information. For example, advances in ICT and lower costs have encouraged educational institutions and businesses to adopt computer-assisted distance education (CADE) to take advantage of economies of scale and reach a wider and more diverse audience (Brown & Charlier, 2013). Many educational institutions are now offering innovative programs that allow them to expand their teaching territory without barriers of time and space while complementing their traditional classroom with online and distance education tools. The question of coupling distance/presence is therefore crucial !

The Kingdom's decision in 2020, following the spread of the COVID-19 pandemic, to close all schools, forced the institutions of higher education to organize themselves in an emergency knowing that classes and activities of students in the classroom have been suspended, in accordance with government directives.

Therefore, e-learning, until now considered as a complement, or even as a managerial mode, has become a necessity. The institutions that have invested most heavily in it will undoubtedly be those that can best cope with this health crisis. The new virus, whose effects have been felt throughout the world in just a few weeks, would at least have the merit of moving this project forward, but it would also take institutions out of their comfort zone, leading them to completely redefine their organization.

Many decisions have been taken, by public or private institutions, in response to such a situation. The success of e-learning depends largely on the implementation of an educational model that meets the needs and educational objectives of learners. Therefore, our main research question is the following: **What is the extent to which students in Moroccan private higher education have accepted information and communication technologies for education (ICTE) in their learning process?**

1. The use of ICT in education

E-learning has attracted considerable attention from educational institutions, software developers and commercial organizations because of its potential educational and cost advantages. These benefits include reduced cost of education, consistency, timely content, accessibility flexible and convenience (Cantoni & al. 2004; Kelly & Bauer, 2004).

The use of ICT in learning has been shown to have a significant effect on the development of teachers' pedagogical skills (Wong & Li, 2008). In addition, they found that the implementation of ICTs contributes to changes in their pedagogical skills. On the other hand, the level of teachers' competence has an impact on the learning process of students. It is therefore necessary for teachers to have skills in their professional areas related to knowledge, attitudes and professional skills (Papadakis, 2018). To promote better quality learning, the climate of organizational innovation encourages innovative behaviors through the development of formal actions and the provision of resources.

1.1. ICT and learning: from behaviourism to socioconstructivism

The purpose of learning theories is to understand better the process of knowledge capitalization. The direct application of a learning theory leads to the formulation of working hypotheses and methods for more methodical educational research.

According to (Good & Brophy, 1995), behaviorism is a theory of learning that is based on the study of observable behaviors without relying on mental processes or internal brain mechanisms that are not directly observable.

Cognitivism (or rationalism), proposed by Miller and Bruner in response to behaviourism, appeared in 1956 and focuses on ways of thinking and problem solving. Learning cannot be satisfied with conditioned recording, but rather must be considered as requiring complex processing of the information obtained. Memory has its own structure, which is based on the organization of information and use of appropriate strategies to manage it (Croizat, 2002).

Unlike behaviorists, constructivists consider that each learner constructs reality, or at least interprets it, in light of his or her perception of past experiences. The role of the teacher is to accompany the latter in his search for meaning by questioning him, arousing his curiosity, leading him to manipulate external representations and leading him towards the collaborative construction of knowledge.

Socio-constructivism asserts that meaning is constructed through dynamic interactions between learners and teachers (Palincsar 1998 ; Rogoff 1998). Socioconstructivism is a theory of learning that considers the process of cognitive development to be a social process that stems from communication with people who are meaningful to the learner (e.g., parents, teachers, and friends) or from the use of mediating aids (e.g., books, physical models, computer visualization...).

1.2. Distance learning

Cell phones (smartphones) are becoming increasingly common among university students, who use their smartphones to access learning materials or support information via the Internet, to manage group work and to interact with tutors (Anshari & al. 2017).

Some researchers consider e-learning to be the dissemination of learning materials via electronic media, such as the Internet, intranets, extranets, satellite broadcasting, audio/video tapes, interactive television and CD-ROMs (Engelbrecht, 2005). Other researchers view distance education as web-based learning that uses communication, collaboration, knowledge transfer and learning on the web to add value to individuals and organizations (Kelly & Bauer, 2004).

University students constitute the largest population of mobile electronic users, although mobile phones are considered the most frequently used devices (Crompton & Burke 2018; Lavidas & al. 2019). Students' perceptions and actual use of mobile technologies in their education should influence the direction of future developments in distance learning (Vrana, 2018).

The use of mobile devices for educational purposes (known as mobile learning) can support and enhance the learning process, anytime and anywhere, and distance learning is an emerging aspect of educational technologies at different levels of education (Nikolopoulou, 2020).

2. The technology acceptance model

The Technology Acceptance Model (TAM) that Davis proposed in 1986 in his doctoral dissertation and subsequently in two papers (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) constitutes now the dominant model for the acceptability and adoption of information and communication technologies (ICT) (Hsiao & Yang, 2011). The TAM model is based on the Theory of Reasoned Action (TRA, Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) and predicts user acceptance based on two factors: perceived utility and perceived ease of use. According to TAM, perceived usefulness and ease of use by the user determine attitudes towards the use of ICT.

2.1. The Theory of Reasoned Action

Davis (1989) was the first to present the TAM model as an extension of TRA. TRA is a familiar model in the field of social psychology, which suggests that behaviour is determined by the intention to perform a behaviour and that this intention is, in turn, a function of one's attitude towards the behaviour and his/her subjective norm. An attitude toward behaviour describes positive or negative feelings about a specific behaviour, and a subjective norm assesses the social pressures on the individual to perform or not perform a behaviour.

The theory of planned behaviour (TPB, Ajzen 1988, 1991) can be seen as an extension of TRA. It postulates that behavioural intention is determined jointly by attitude and subjective norm, as in TRA, but with the addition of perceived behavioural control. Perceived behavioural control is the "perception of the facility or difficulty of performing the behaviour of interest" of the individual (Ajzen, 1991, p. 183).

2.2. ICTE Acceptance Models and Research Hypotheses

The Technology Acceptance Model (TAM) attempts to predict and explain the adoption or non-adoption of an ICT by means of variables related to perceptions (perceived usefulness or perceived ease of use) and attitudes that will induce behavioral intentions to use (Davis, 1986). UP is "the extent to which an individual believes that use of a particular system would improve his or her performance" (Davis, 1986). PEF is "the degree to which the use of a technology will be effortless".

The UTAUT model (the Unified Theory of Acceptance and Use of Technology) has been successfully applied in studies of technology acceptance in higher education contexts (Kumar & Bervell 2019). UTAUT was validated by Venkatesh & al. (2003) with expected performance, expectation of effort, social influence and facilitating conditions as the four main determinants of intention to adopt technology, the authors confirmed the improved explanation of information technology use behavior by the UTAUT model.

Acceptance and adoption of technology-enabled learning is a growing area of research (Hao & al. 2017; Kumar & Chand 2019; Cheng & al. 2020), while the UTAUT model (Venkatesh & al. 2003) has become more credible in the field of ICT literacy (García Botero & al. 2018; Venkataraman & Ramasamy 2018), the use of the UTAUT2 model (Venkatesh & al. 2012) is still rarely used when studying the acceptance of mobile e-learning in higher education contexts (Arain & al. 2019). The objective of this study is to assess the behavioral intention of private higher education students in Morocco regarding the acceptance and use of ICT in their studies (as a supportive learning tool), applying our integrated model of both TAM and UTAUT.

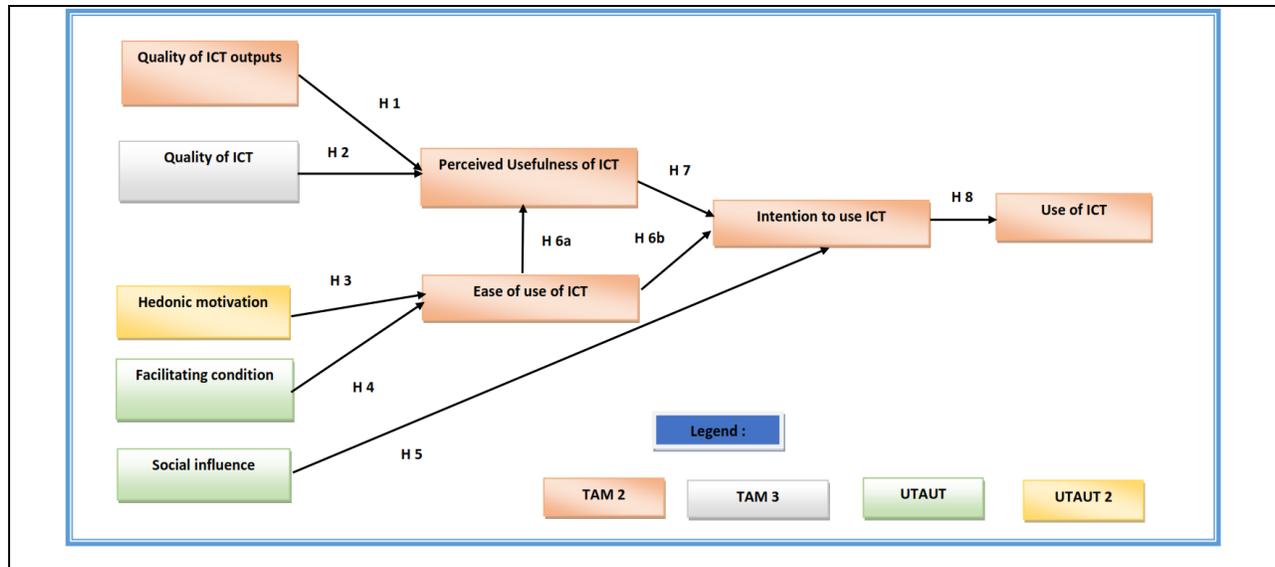


Figure 1. Integrated search model

- H1: The quality of the output has a positive influence on the perceived usefulness of ICT.
 H2: there is a positive relationship between the quality of ICT and the perceived utility of ICT.
 H3: hedonic motivation has a significant influence on the intention to use ICT.
 H4: Facilitating conditions have a positive influence on the perception of the ease of use of ICT.
 H5: social influence positively influences the intention to use ICT.
 H6a: there is a positive relationship between perceived ease of use and perceived usefulness of ICT.
 H6b: There is a positive relationship between the perceived ease of use and the intent to use ICT.
 H7: There is a positive relationship between the perceived usefulness of ICTE and the intention to use it.
 H8: There is a positive relationship between the intention to use ICT and the use of ICT.

3. Presentation and discussion of results

The Kingdom's decision, following the spread of the COVID 19 pandemic, to close all schools and institutions of higher education, forced all the schools and institutions of higher education to organize as best they could. Courses and student activities have been suspended in accordance with government directives.

The Ministry of National Education, Vocational Training, Higher Education and Scientific Research has taken all the necessary preventive measures to ensure the continuation of education in 2019/2020 and has decided to suspend courses in the various schools and universities in the public and private sectors. The objective is, indeed, to fight against the spread of the Covid-19 pandemic from March 16, 2020.

Thus, e-learning, until now considered a plus, even a trend, is becoming a necessity. The institutions that have invested most heavily in it will undoubtedly be those that can best respond to this health crisis. The new virus, the effects of which have been felt around the world in just a few weeks, would at least have the merit of moving this project forward, but it would also take institutions out of their comfort zone, leading them to reinvent their organization.

In this section, we present the results of the analysis of the data collected, with a view to testing the hypotheses presented in this research. We will present the results of the quantitative analysis of our final panel (400 respondents), including the results of the descriptive analysis using SPSS 23 AMOS 23 software, and the evaluation of the measurement and structural model. The objective is to identify the factors that influence the adoption and use of ICT by students in private higher education institutions in Morocco. The next step is the interpretation and discussion of the various results obtained.

This quantitative study should lead to two main objectives, namely the validation of the measurement scales of the different variables studied and the testing of the hypotheses of the conceptual research model.

3.1. Synthesis of Results

			Estimate	S.E.	C.R.	P
Facilité d'utilisation	<---	Motivation hédonique	,579	,134	4,306	***
Facilité d'utilisation	<---	Influence sociale	,088	,049	1,781	,075
Ease of use	<---	Enabling condition	,272	,152	1,793	,073
Perceived usefulness	<---	Output quality	,617	,095	6,494	***
Perceived use	<---	ICTE Quality	,285	,068	4,199	***
Perceived usefulness	<---	Ease of use	,313	,098	3,182	,001
Intention of use	<---	Ease of use	,524	,089	5,890	***
Intention of use	<---	Perceived usefulness	,657	,069	9,569	***
QualP_Item10	<---	Output quality	1,000			
QualP_Item9	<---	Output quality	1,378	,073	18,942	***
QualP_Item8	<---	Output quality	1,040	,064	16,182	***
QualP_Item7	<---	Output quality	1,343	,070	19,288	***
QualP_Item6	<---	Output quality	1,012	,063	16,186	***
QualP_Item5	<---	Output quality	1,331	,070	19,009	***
QualP_Item4	<---	Output quality	1,055	,064	16,567	***
QualP_Item3	<---	Output quality	1,355	,072	18,692	***
QualP_Item2	<---	Output quality	1,055	,069	15,300	***
QualP_Item1	<---	Output quality	1,371	,076	18,156	***
QualTICE_Item4	<---	ICTE Quality	1,000			
QualTICE_Item3	<---	ICTE Quality	1,037	,048	21,822	***
QualTICE_Item2	<---	ICTE Quality	,641	,042	15,126	***
QualTICE_Item1	<---	ICTE Quality	,957	,054	17,832	***
MovHéd_Item4	<---	Hedonic motivation	1,000			
MovHéd_Item3	<---	Hedonic motivation	1,369	,090	15,279	***
MovHéd_Item2	<---	Hedonic motivation	1,039	,076	13,685	***
MovHéd_Item1	<---	Hedonic motivation	1,496	,097	15,471	***
InfSoc_Item4	<---	Social influence	1,000			
InfSoc_Item3	<---	Social influence	1,040	,039	26,675	***
InfSoc_Item2	<---	Social influence	,607	,038	15,834	***
InfSoc_Item1	<---	Social influence	,952	,038	24,885	***
CondFac_Item4	<---	Facilitating condition	1,000			

			Estimate	S.E.	C.R.	P
CondFac_Item3	<---	Facilitating condition	1,388	,099	14,072	***
CondFac_Item2	<---	Facilitating condition	1,407	,098	14,327	***
CondFac_Item1	<---	Facilitating condition	1,042	,085	12,308	***
UP_Item7	<---	Perceived usefulness	1,000			
UP_Item6	<---	Perceived usefulness	,823	,050	16,444	***
UP_Item5	<---	Perceived usefulness	1,126	,059	19,015	***
UP_Item4	<---	Perceived usefulness	,857	,050	16,977	***
UP_Item3	<---	Perceived usefulness	1,125	,058	19,233	***
UP_Item2	<---	Perceived usefulness	,813	,049	16,666	***
UP_Item1	<---	Perceived usefulness	1,102	,061	18,097	***
FacUti_Item4	<---	Ease of use	1,000			
FacUti_Item3	<---	Ease of use	1,445	,094	15,312	***
FacUti_Item2	<---	Ease of use	1,043	,077	13,623	***
FacUti_Item1	<---	Ease of use	1,455	,096	15,080	***
ItenComp_Item7	<---	Intention of use	1,000			
ItenComp_Item6	<---	Intention of use	,775	,042	18,634	***
ItenComp_Item5	<---	Intention of use	,814	,044	18,494	***
ItenComp_Item4	<---	Intention of use	1,069	,051	21,125	***
ItenComp_Item3	<---	Intention of use	1,049	,048	21,959	***
ItenComp_Item2	<---	Intention of use	,728	,041	17,664	***
ItenComp_Item1	<---	Intention of use	,987	,050	19,632	***
Table 1. T-test results of the Global model						

According to the table below we can conclude which of the following :

hypotheses		Conclusion
H1	The quality of ICT output has a significant positive influence on the perceived usefulness of ICT.	Confirmed
H2	There is a significant and positive relationship between the quality of ICT output and the perceived usefulness of ICT.	Confirmed
H3	The hedonic motivation exerts a positive influence and the ease of use of ICT.	Confirmed
H4	Facilitating conditions have a positive influence on the ease of use of ICT.	Rejected
H5	Social influence exerts a positive influence on the intention to use ICT.	Rejected
H6 a	Ease of use has a positive influence on the perceived usefulness of ICT.	Confirmed
H6 b	Ease of use has a positive influence on the intent to use ICT.	Confirmed
H7	There is a positive and significant relationship between the perceived usefulness and the intention to use ICT.	Confirmed

H8	There is a positive and significant relationship between the intention to use ICT and the use of ICT.	Confirmed
Table 2. Synthesis of results and validation of hypotheses		

3.2 Discussion of the Results Collected

Learning has been a central topic of psychological research almost since the conception of psychology as an independent science. Even today, learning issues are still addressed in virtually all areas of psychology. Thus, learning theories have been most often applied in educational institutions. The relationship between cognitive science and education has benefited both scientists and practitioners. Scientists have used educational frameworks to develop and test their theories, and practitioners have used new knowledge about learning to design more effective learning.

Our research is, to our understanding, the first to take into account the intention of students to fully integrate the different functionalities of ICT in higher education institutions in Morocco into their study habits and routines, rather than focusing on the mere intention to use ICT.

The primary objective of our research is to examine the main factors that can foster or hinder the adoption of ICT as an e-learning tool in private higher education institutions in Morocco. To do so, a conceptual framework has been developed using the TAM model with its extensions and the Unified Theory of Technology Acceptance and Use (UTAUT₂). This study has successfully supported, both theoretically and empirically, the ability of UTAUT₂ to be a useful theoretical framework for better understanding the student's intention to use e-learning technology in the Moroccan context. In particular, the results showed that learners' intention to use ICT for e-learning was strongly influenced by perceived usefulness, quality of ICT production, quality of ICT, hedonic motivation, and ease of use. Contrary to our expectations, facilitation conditions and social influence did not influence the intention to use.

In particular, his results indicate that perceived usefulness was a key determinant of the intent to use ICTs for e-learning. Therefore, we believe that students who found ICT useful in their learning process will be more likely to adopt the e-learning system. According to the literature on acceptance of primary technologies (Davis, 1989 ; Davis & al., 1989 ; Venkatesh & al., 2003, 2012). Learners in Moroccan private higher education institutions intended to use ICTs for e-learning because they felt that ICTs were useful for achieving their goals.

Therefore, in order to attract more e-learning users, educators should improve the quality of their ICT content by providing adequate and up-to-date content that can meet the needs of learners. The characteristics of ICTE and learning materials are positively related to perceived usefulness. The characteristics of learning content are positively related to perceived usability. These results indicate that as the quality of ICT outcomes improves, learners tend to be more positive about e-learning. Compared to traditional teaching, the use of ICT offers many opportunities for learning development. Like Web-based technologies, private higher education institutions in Morocco can improve e-learning services at no additional cost by taking advantage of the lower cost of the technology, leading to greater adoption by learners. In addition, those responsible for ICT and e-learning need to improve the features of the target system. For example, the quality of information should be considered an important issue when designing ICTE, as users are more likely to use it when they perceive that the information provided by the system is clear, understandable and relevant to their learning activity.

The results also showed that ease of use influences students' intentions regarding the acceptance and use of the e-learning system. According to the literature, ease of use has a significant influence on students' willingness to use ICT (Alalwan & al., 2015). Therefore, in order to promote the use of e-learning, system designers must provide a system that is easy to use.

This research tests hedonic motivation to see if it has a significant impact on the intention of ICT users to use ICT for e-learning. Hedonic motivation refers to the pleasure and entertainment perceived by the user. This variable is central to the determinants of ICT usage intention, which is consistent with the findings of (Masa'deh & al., 2016) and also consistent with the proposal of UTAUT and UTAUT₂.

Moreover, the quality of service, the quality of the system and the perception of ease of use are important. Thus, managers should design an ICTE that provides a fast and reliable service with a consistent user

interface. This suggests that a user-friendly system should encourage learners to reuse it, because when technologies are visually appealing and accessible, users tend to experience the cognitive process.

Social influence refers to the extent to which a person feels the importance of the fact that "other people" believe they should use a technology. In the context of ICT, the opinions of colleagues and instructors can affect other opinions and beliefs. The results suggest that social influence does not necessarily influence a learner's intention to use ICTs for their e-learning habits. Indeed, the effects of social influence on an individual may vary depending on different factors such as culture, age and education.

However, the results show that the degree of facilitation of the conditions of use of a distance learning system did not have a significant influence on the behavioural intention of learners to use the distance learning system. The explanation of students' behavioural intention to use ICT in their pedagogical practices is not supported by a very low estimate, which is in contradiction with some (Bakar & Razak 2014 ; Masa'deh & al., 2016). (Bakar & Razak 2014) have confirmed that there is a positive impact between self-efficacy and the intention to continue using e-learning. There is evidence that users with greater self-efficacy induce more active learning (Chung & al., 2010). Consequently, it is necessary for IT managers to provide online and offline support in learning, which is critical to increasing the effectiveness of e-learning. Education is very useful in building confidence in the use of technology and, ultimately, learners who demonstrate greater confidence in the use of technology are more likely to use ICT.

Conclusion

ICT in Moroccan higher education institutions is a pedagogical and learning instrument whose acceptance and use simply accelerated - but did not emerge - with the pandemic and the closure of institutions. These digital tools have been enriched and adapted thanks to the increasingly intuitive (and free) offer of publishers, especially American. They are based on content management, homework management and videoconferencing platforms (camera, microphone and screen sharing) and are designed to be used by both the learner and the teacher. Their use paves the way for hybrid courses that accommodate a small number of students in face-to-face sessions and a larger number of students at a distance, with the possibility of "revolving" the learners face-to-face with the teacher.

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