CONCEPTUAL FRAMEWORK: THE ROLE OF COGNITIVE ABSORPTION IN DELONE AND MCLEAN SUCCESS MODEL IN ONLINE LEARNING IN UNITED ARAB EMIRATES

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ABSTRACT

As COVID-19 pandemic has taken the world by surprise, it has resulted in an alteration to human activities that have never been seen before. Among the many areas that have been mostly affected is the education industry where institutions have resorted to online learning to maintain the educational process during lockdowns and other strict measures that governments around the world have implemented. Performance impact of such technology has risen as the main concern in that context; this study is making use of Delone & Mclean information success model to examine performance impact of online learning with the addition of cognitive absorption as a moderating variable to come out with a proposed conceptual framework for future empirical undertaking. The intended context of this study will be students within the public universities in the United Arab Emirates and implications are thoroughly discussed as well.

Keywords: Online Learning, Cognitive Absorption, Public Universities, UAE

INTRODUCTION

Online learning has long been seen as an option that has the ability to serve a specific category of students who are considerably older and have more family, financial, and work-related obligations than students who are on-campus (Hussain, Daoud, Alrabaiah & Owais, 2020). However, the world has been taken by surprise by the COVID-19 pandemic where all industries are faced with existential challenge. Higher education industry is no exception, institutions around the world have resorted to online learning to ensure the continuity of the education process during lockdowns and restricted mobility (Hussein, Daoud, Alrabaiah & Badawi, 2020). In United Arab Emirates, there are many issues of concern that arises from students' use of online learning in terms of its effect on the learning performance.

It has become widely agreed that technology has a vital role within the high education institutions. Specifically, in the teaching and learning processes, in the supportive and managerial aspects alike. Innovations and technology have gained its importance due to the increased usage and number of the internet and mobile gadgets including laptops, smartphones, and electronic tabs (Aldholay, Abdullah, Ramayah, Isaac & Mutahar, 2018; Aldholay, Isaac, Abdullah & Ramayah, 2018). Prior to the covid-19 pandemic, online learning was seen as the inevitable future of education and institutions must be prepared to embrace such technology. However, among what COVID-19 has done to the world is speeding up the compulsory use of technology in education for everyone around the globe (Adnan & Anwar, 2020).

Additionally, as we are living in the COVID-19 era which has unprecedentedly altered the educational process around the world. The UAE government decided in June 2020 to apply online learning at all higher education institutions in the country, and after several months it has highlighted some areas of concern including students' performance and behaviour (UAE Government Portal, 2020). It is believed that such areas are important for academic research as online learning is set to stay beyond the COVID-19 era based on the findings of a recent global research conducted by Pearson education group (Pearson, 2020; Armin & Roslin, 2021). In line with the above, (Almuraqab, 2020) in a new study about students' preference in online learning in UAE found that 55% of respondents had a favourable view of online learning whereas 45% had unfavourable ones, besides, in another finding 49% of the respondents prefer blended mode of learning system beyond the era of COVID-19.

Furthermore, according to the world competitiveness report 2020 (IMD World Competitiveness Center, 2020), the UAE has ranked significantly well in most of the indicators among 63 countries except for training and education where it ranked 44 out of 63 (figure 1). This implies that the country faces great challenges in producing a workforce with high quality education.
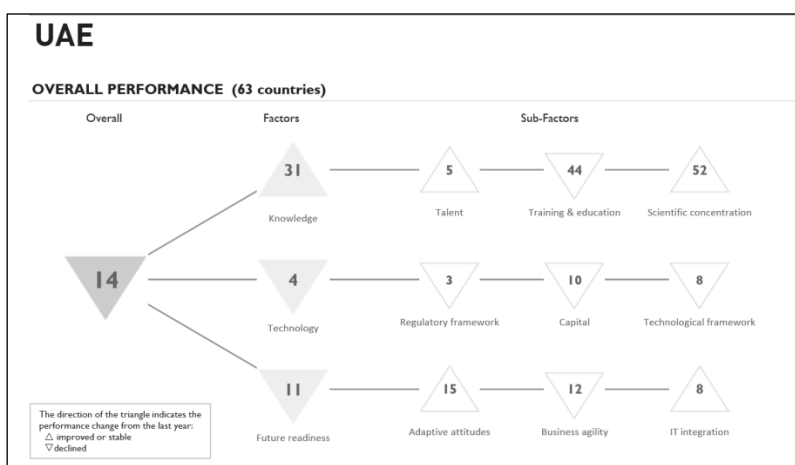

FIGURE 1
UAE'S OVERALL PERFORMANCE
(IMD WORLD COMPETITIVENESS CENTER, 2020)

Notwithstanding, theories and models to examine new technologies are numerous such as Technology Acceptance Model (TAM) (Davis, 1989), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh & Zhang, 2010), and Diffusion of Innovation (DOI) (Rogers, 1995) among many. This study will make use of Delone and Mclean information success model (DeLone & McLean, 2016) because it does not merely examine the acceptance but it goes further to examine the performance impact after the use of specific technology which is the case of online learning in the UAE. Furthermore, and based in the arguments above about the behavioural concerns, compatibility which is part of DOI will be added to the model to examine its influence on the use of online learning and its impact on students' performance. Lastly, the study will pioneer by examining cognitive absorption as a moderating variable as it was found to be influential in these types of technologies such as in (Agarwal & Karahanna, 2000).

Sadly, the number of published works in the UAE on the topic of online learning is still sparse (Daouk & Aldalaien, 2019; Thabet, Hill & Gaad, 2021). Therefore, this research is an attempt to understand online learning in UAE in the public higher education institutions through identifying the factors that influence the implementation and adoption of online learning how it affects student performance. The model will consist of 5 constructs namely overall quality, actual usage, user satisfaction, cognitive absorption, and performance impact.

Given all arguments above, having online learning mode to continue in the future and with all the efforts by UAE government to facilitate this technology in terms of connectivity and infrastructure. This study will tap into the concerns derived from the government and the findings of recent studies to examine online learning impact on students' performance.

LITERATURE REVIEW

Delone & Mclean information success model is one of the renowned theories of technology adoption that focuses on the impact of technologies (Isaac, Aldholay, Abdullah & Ramayah, 2019). The original D&M foundation was based on (Mason's, 1978) modification of (Shannon, 1948) mathematical theory of communications, it was articulated by (Delone & Mclean, 1992). The main reason was to create a body of knowledge that is coherent *via* synthesizing previous research in IS success and to provide guidance to future researchers (DeLone & Mclean, 2003).

DMISM focuses only on the technological aspect and neglected other aspects such as the individual aspect. One of the individual aspects is cognitive absorption where many scholars have indicated its significance in technology usage and impact. For instance, a recent study in Malaysia by (Masrek & Gaskin, 2016) about digital library, the data collected from 346 students and were analysed using SEM-AMOS, the result revealed that there is a significant positive relationship between cognitive absorption and user satisfaction. Similarly, (Chen, 2017) reported in a study in the USA about rating systems that cognitive effort significantly influences the intention to continue using the system. Moreover, in the online learning context, a study in Canada that collected data from 102 student and analysed using SEM-PLS reported that cognitive absorption have significant positive relationship with each of perceived ease of use and perceived usefulness (Saadé & Bahli, 2005). Furthermore, in Spain (Roca, Chiu & Martinez, 2006) found that cognitive absorption have significant positive relationship with each of perceived ease of use, perceived usefulness, and user satisfaction. Table 1 illustrates the components of the proposed model to extend DMISM with the individual aspect (cognitive absorption).

Table 1 KNOWLEDGE GAPS AND THE PROPOSED COMPREHENSIVE MODEL FOR CLOSING THE GAPS					
Variable Type	**Variable Category**	**Variable Name**	**Variable Source**	**Underpinning Theory and the gaps: The updated DMISM (DeLone & Mclean,2003)**	**The proposed model for closing the gap**
Independent Variable	Technological characteristics	System Quality	(DeLone & Mclean, 2003)	✓	✓
		Knowledge Quality	(DeLone & Mclean, 2003)	✓	✓
		Service Quality	(DeLone & Mclean, 2003)	✓	✓
Mediating Variable	Actual Usage		(DeLone & Mclean, 2003)	✓	✓
	User Satisfaction		(DeLone & Mclean, 2003)	✓	✓
Moderating Variable	Cognitive Absorption		(Agarwal & karahanna, 2000)	gap	✓
Dependent Variable	Performance Impact		(DeLone & Mclean, 2003)	✓	✓

Overall Quality

Due to increasing information systems advances' challenges and sophistication, researchers and experts are encouraged to improve the performance and quality of new systems to improve the future growth scenarios (Wang & Lai, 2014). A higher-order construct of the overall quality has been studied that contains system, information and service quality (Aldholay, Abdullah, Isaac & Mutahar, 2019). Moreover, system quality is defined as the degree to which the system users believe that a system is easy to use, learn and connect, user-friendly, and enjoyable when used (DeLone & Mclean, 2003), whereas according to (Aldholay et al., 2019) information quality is outlined as the degree to which that online learning system users think that information is current, accurate, relevant, detailed, and structured. Further, the service quality is evaluated by interactivity, responsiveness, assurance, performance, and empathy qualities (Alrwashdeh, Jahmani, Ibrahim & Yousef, 2020; Huang, Pu & Chen, 2015). This study proposes that the better the overall quality of new technology the more likely to improve the users' actual usage and satisfaction.

From various scholarly studies, the findings reveal an immediate connection between the quality of the IS system and the actual usage, and user satisfaction (Flack, 2016). For instance, (Cheng, 2019)indicated that users' perceptions of the quality of the system, and information contributed notably to their satisfaction of cloud ERP in a company that has established that system for more than a year based in Taiwan. Moreover, in a study conducted in China (Xinli, 2015) concluded that system quality contributes to the greater use of the Electronic Monitoring System (EMS), followed by information quality. Accordingly, when the agencies of supervision use the EMS, they must pay further attention to information and system quality. Furthermore, in the context of the mobile library service system in Taiwan (Huang et al., 2015) revealed that the information quality had a significant influence on system use and user satisfaction. This indicates that the college students generally felt that information quality, such as an easy interface and useful search results, would affect their degree of satisfaction and desire to continue utilizing the mobile library service system. Over and above (Ashfaq, Yun, Yu, Maria & Loureiro, 2020) have sheds new light on the role of quality of information and service delivered by chatbots in strengthening the level of satisfaction of users from the perspective of the chatbot users in the USA.

However, conflicting findings have been seen in the results of scholarly published work that overall quality substantially influences the satisfaction of users along with the actual usage (Jung, Chung & Leue, 2015; Ramirez-Correa, Rondan-Cataluna, Arenas-Gaitan & Alfaro-Perez, 2017; Tam & Oliveira, 2016). On the other hand, other scholars have argued about the inconsequence of such links (Aparicio, Bacao & Oliveira, 2017; Chang, Kao & Huang, 2016; Dokhan & Akkoyunlu, 2016; Shim & Jo, 2020). The contradictions imply the possibility of further intervening factors that depend on the research contexts and applications. Based on the aforementioned discussion following hypotheses is suggested:

H1: Overall quality has a substantial impact on actual usage.
H2: Overall quality has a substantial impact on user satisfaction.

User Satisfaction

One of the key success factors of implemnting new IS system us the satisfaction of its users (DeLone & McLean, 2016). As stated by Xinli (2015), the satisfaction of users insinuates to what degree users of the IS system perceive it to be helpful and intend to use it again and again. Moreover, (Lin & Wang, 2012) have defined the satisfaction of users as their repose to the quality, speed, design, and number of functions of the system. Additionally, user satisfaction is described as the state to which students who are employing an online learning system are satisfied with their adoption and how well it lives up to their expectancy (Roca, Chiu & Martínez, 2006; Wang & Liao, 2008). Sveral published work has asserted the substantiality of user satisfaction impact on the actual usage and performance impact. According to (Xinli, 2015),

the more satisfaction of using the EMS (Electronic Monitoring System) the more improved usage and performances of the users in supervision agencies in Chaina. Further, (Shim & Sug, 2020) confirm the importance of user satisfaction enhance the actual usage and net benefits of using online health information sites. Furthermore, (Ashfaq et al., 2020) confirmed the prominence of user satisfaction when using chatbot to enhance the usage and performance of users.

Contrariwise, a study by (Daud et al., 2011) revealed that there is an insignificant relation between user satisfaction and effect of performance. This contradictory results gives a hint to conduct the research and confirms the significance/insignificance of the user satisfaction to improve the usage and performances impact of IS systems in the context of online learning in the UAE. Based on the aforementioned discussion following hypotheses is suggested:

> H3: User satisfaction has a substantial impact on actual usage.
> H4: User satisfaction has a substantial impact on performance impact.

Actual Usage

In the IS or technology field where applications are examined in terms of acceptance, adaption, and impact, many robust theories and models have evolved with numerous factors that have been extensively utilized to study different technological applications in different settings (Jeyaraj, 2020). Actual usage is an integral element in many theories as it represents the logical necessity to study the impact of any particular technology (Kolasa, Papaj & Ziemba, 2020). As one of the main factors in Delone & Mclean success model, it is defined as the degree to which a user utilizes the facilities of an information system in terms of occurrences and amount of time of use (DeLone & Mclean, 2003). (Aldholay et al., 2018) have examined the role of actual usage in the context of online learning and affirmed its significance in influencing performance impact. Further, (Culibrk et al., 2016) in their study about e-government system in Serbia confirmed the significant impact that usage have on Net benefits, and (Aparicio et al., 2017) and after gathering data from 383 users and employing SEM-PLS to analyze it, found that usage significantly influenced individual impact. In this study, actual usage is defined as the frequency by which students use online learning and the amount of time, they spend in using it. As such and based on the above, the following is assumed:

> H5: Actual usage has a significant impact on performance impact.

Cognitive Absorption

Cognitive absorption is defined as a state of deep involvement or a holistic experience that an individual has with technology (Agarwal & Karahanna, 2000) and cognitive absorption aims at capturing the user's experience with IS (Weniger & Loebbecke, 2011) which is online learning in this study. According to (Saadé & Bahli, 2005), cognitive absorption is a reflection of the level of user involvement with internet and video games. Further, (Weniger & Loebbecke, 2011) mentioned that cognitive absorption is comprised of two elements, affective and cognitive, where control, curiosity, temporal dissociation, and focused immersion represent a cognitive dimension, while heightened enjoyment represents an affective dimension. In this study, cognitive absorption indicates a state of deep involvement and enjoyment with online learning (Agarwal & Karahanna, 2000).

Empirically, several notable studies have examined the role of cognitive absorption in the IS context and reported its significance (Chen, 2017; Lin, Yang & Huang, 2016; Masrek & Gaskin, 2016; Ozkara, Ozmen & Kim, 2017; Pallud, 2017; Zheng, Ren, Guo, Hu & Wen, 2019). Cognitive absorption has also been studied as a moderating variable (Busari et al., 2017) and also as a direct antecedent to the system outcome such as individual learning (Magni, Paolino, Cappetta & Proserpio, 2013) or technology application usage (Rouis, 2012). This study proposes to examine the moderation effect of cognitive absorption on the relationship between user satisfaction, actual usage and performance impact on the basis of the confirmed direct effect of

user satisfaction, actual usage on performance impact (Isaac, Abdullah, Ramayah & Mutahar, 2017; Stefanovic et al., 2016). Accordingly, it can be assumed that:

H6: Cognitive Absorption moderates the relation between actual usage and performance impact.
H7: Cognitive Absorption moderates the relation between user satisfaction and performance impact.

Performance Impact

Technology applications are developed to deliver a value to users and their effectiveness is defined but outcomes of its use (Tam, Loureiro & Oliveira, 2019). In the IS field, theories have addressed the different stages of technology starting from its inception to the actual use and intention to reuse. The updated Delone & Mclean success model is focusing in the evaluating the outcomes of the use of technology and it is described in multiple terminologies which are used interchangeably such as net benefits, individual impact, organizational impact, and performance impact to name a few (DeLone & McLean, 2016). Performance impact is defined as the degree to which the use of a technology application enhances the work quality in fulfilling tasks promptly, attain control over it, minimize errors, and increase job effectiveness (Aldholay et al., 2019). As for this study, performance impact is acknowledged as the extent to which the use of online learning influences the performance of students in terms of knowledge acquisition, productivity, competence, and resource savings (Isaac et al., 2019). As the ultimate objective of this study, user satisfaction and actual usage are assumed to influence performance impact with a moderating effect by cognitive absorption.

Research Conceptual Framework

These relationships of the proposed conceptual model as (shown in figure 2) are derived from (Delone & McLean, 2003), whereas cognitive absorption is adapted from (Agarwal & Karahanna, 2000; Hsu, Li, Li & Liu, 2016; Lin, Lin, Yeh & Wang, 2016; Saadé & Bahli, 2005).

It is needless to say how Covid-19 has dramatically shifted the way we conduct our lives in all aspects and have accelerated what was anticipated to happen in the medium future with digital transformation (Kundu & Bej, 2021). Moreover, future interruptions as a result of pandemics are just more likely than ever, thus it is vital to learn from 2020 mistakes and be better prepared to face challenges to come (Yousef, 2021). As the context of this study is the education sector which is one of the hardest hit and altered due to Covid-19 and due to its utmost importance for humanity future and economic progress, this conceptual study has few implication for the desired success of online learning which became indispensable in the era of Covid-19 (Alawamleh, Al-Twait & Al-Saht, 2020). This study makes use of the IS success model and conceptualizes its main dimensions including system quality, information quality, and service quality which are presented through the second order construct of overall quality, user satisfaction, and actual usage, in addition to proposing cognitive absorption as a moderating variable. Delone & Mclean success model and after around 20 years remains one of the most effective models in the IS field that evaluates technology impact (Jeyaraj, 2020).

Numerous studies have examined the success model in multiple contexts including online learning technology and have reported the significance of the different types of technologies in obtaining good outcomes in terms of students' performance (Cheng, Y. M. 2019; Guinaliu-Blasco, Hernández-Ortega & Franco, 2019; Ozkara et al., 2017). UAE Government Portal, 2020. This study is a contribution to the body of knowledge in the context of UAE, in theoretical terms, incorporating cognitive absorption and the second order construct of overall quality. The anticipated results of the proposed model can help to gain a better understanding on how to plan successful implementation of online learning during future disruptions to the educational process. The proposed model represents an integration of an individual psychological characteristic (cognitive absorption) with Delone & Mclean success model which focuses more on system characteristics (Mpinganjira, 2019).

We anticipate the examination of the proposed model would provide results that would provide decision makers in the public higher education institution in UAE with directions to

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make online learning an effective tool that will enhance students' performance by mitigating the role of the different qualities (system, information, service) besides ensuring its interface is attractive that will make students enjoy the experience. Further, making changes to public universities strategies by putting more emphasis on the proven factors that make online learning more effective.
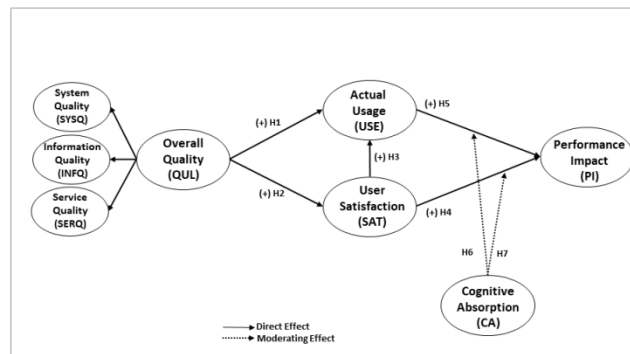

FIGURE 2
PROPOSED CONCEPTUAL MODEL

CONCLUSION

In the time if COVID 19, all sectors have been affected in a bad way that has made a paradigm shift in how business is conducted. The education sector is no exception in all aspects. This conceptual research is proposing a model that includes overall quality, actual usage, user satisfaction, and their impact on performance. In addition to the suggestion of the moderating effect of cognitive absorption that is expected to strengthen the impact of actual usage and user satisfaction on the performance of online learning users among students within public universities in the United Arab Emirates. The findings will be of great benefit to the Emirati education sector and the country as a whole. Moreover, with the scarce studies of online learning in the UAE, this study is an attempt to investigate further the performance impact of the public universities students in the UAE of using online learning system. Finally, it is believed that the whole research will be a success to explain the students' performance amidst COVID 19 when primary data is gathered.

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