MODELING ONLINE STUDENT ENGAGEMENT USING SOCIAL COGNITIVE THEORY

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UNIVERSITI SAINS MALAYSIA

2021

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by

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Thesis submitted in fulfilment of the requirements
for the degree of
Doctor of Philosophy

November 2021

ACKNOWLEDGEMENT

In the name of Allah, the Most Gracious and the Most Merciful.
All praises to Allah and His blessing for giving me the blessing, strength, and the chance to complete this PhD dissertation.
I would like to express my sincere gratitude to my supervisors Dr. Nor Hasliza and Professor Ramayah for their inspiration, precious guidance, support, patience, generosity, and encouragement throughout the whole dissertation journey, from which I have learnt a lot. I have acquired much experience during this journey, not only from the academic aspect but also from personality aspect.
I could not have finished this study without the full support of my beloved family. My deepest gratitude goes to each one in my family members, especially my husband who encouraged me to complete my PhD journey and was so patient. It would not be possible to accomplish this journey without this positive support.
Last but not least, I want to extend my deepest appreciation to all the staff of Universiti Sains Malaysia, who contributed to improve this great educational institution and were so care for its development.
May God shower those cited personalities with success and honor in their life.

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LIST OF SYMBOLS

R^2	predictive power
f^2	effect size
Q^2	predictive relevance
α	Cronbach's alpha
X	Independent variable
Y	Dependent Variable
M	Mediator Variable
$a \times b$	Indirect effect of X on Y through M
c'	Direct effect of X on Y
$CI_{.90}$	Bias-Correlated 90% Confidence Interval
t	t-statistics
p	Significance and Relevance
β	Path Coefficients

LIST OF ABBREVIATIONS

ICT	Information Communication and Technology
MENA	Middle East and North Africa
MICT	Ministry of Communication and Information Technology
NELC	National E-Learning Center
SCU	Supreme Council of Universities
MOOCs	Massive Open Online Courses
SCT	Social Cognitive Theory
TAM	Technology Acceptance Model
CoI	Community of Inquiry
IS	Information Systems
LMS	Learning Management System
MSLQ	Motivated Strategies for Learning Questionnaire
CMV	Common Method Variance
SEM	Structural Equation Modeling
PLS-SEM	Partial least squares based on Structural Equation Modeling
CMB	Common Method Bias
MLMV	Measured Latent Marker Variable
CLC	Construct Level Correction
ILC	Item Level Correction
SPSS	Statistical Package for the Social Sciences
CB-SEM	Covariance Based-Structural Equation Modeling
GoF	Goodness of Fit
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis

AVE	Average Variance Extracted
HTMT	Heterotrait-Monotrait ratio
VIF	Variance Inflation Factor
ASE	Academic Self-Efficacy
TSE	Technological Self-Efficacy
MSR	Metacognitive Self-Regulation
SI	Situational Interest
TP	Teaching Presence
SSI	Student-Student Interaction
SII	Student Instructor Interaction
BE	Behavioral Engagement
EE	Emotional Engagement
CE	Cognitive Engagement
PL	Perceived Learning
SS	Student Satisfaction
CR	Composite Reliability
LOCs	Lower-Order Constructs
HOCs	Higher-Order Constructs
BCa	Bias-Corrected and Accelerated

PEMODELAN PENGLIBATAN PELAJAR DALAM TALIAN BERASASKAN TEORI KOGNITIF SOSIAL

ABSTRAK

Pembelajaran dalam talian telah mengalami perkembangan yang luar biasa dalam sektor pendidikan, terutama pendidikan tinggi, kerana fleksibilitinya dalam mengakses sumber pendidikan tanpa mengira waktu atau lokasi geografi. Penglibatan pelajar merupakan masalah utama yang mempengaruhi keberkesanan pembelajaran dalam talian. Kajian ini menerapkan teori kognitif sosial untuk menyelidik pengaruh faktor peribadi dan persekitaran terhadap penglibatan pelajar (melibatkan dimensi perilaku, emosi, dan penglibatan kognitif) dan, pada gilirannya, pembelajaran dan kepuasan pelajar (sebagai hasil) yang dilaksanakan dalam persekitaran pembelajaran dalam talian. Kajian ini meneroka persepsi pelajar pendidikan tinggi Mesir mengenai penglibatan, pembelajaran, dan kepuasan mereka dengan pengalaman belajar dalam talian mereka. Dengan menggunakan skala laporan diri yang disahkan, sejumlah 950 pelajar sarjana yang mendaftar dalam kursus dalam talian di dua universiti awam di Mesir terlibat dalam kajian ini. Secara keseluruhan, 732 responden sahih dianalisis menggunakan partial least square berdasarkan structural equation modeling (PLS-SEM). Hasil kajian menunjukkan bahawa efikasi kendiri akademik, minat situasi, tanggapan kebergunan , interaksi pelajar-pelajar, dan interaksi pelajar-pengajar mempunyai pengaruh positif yang signifikan terhadap tingkah laku dan keterlibatan emosi pelajar dengan pembelajaran dalam talian. Selanjutnya, minat situasional, peraturan diri, interaksi pelajar-pelajar, dan interaksi pelajar-pengajar mempunyai pengaruh positif yang signifikan terhadap penglibatan kognitif pelajar dengan pembelajaran dalam talian. Kehadiran pengajar mempunyai pengaruh positif yang

signifikan terhadap penglibatan tingkah laku pelajar sahaja. Walau bagaimanapun, efikasi kendiri teknologi mempunyai pengaruh yang tidak signifikan terhadap tiga dimensi penglibatan pelajar melalui pembelajaran dalam talian. Hasil kajian ini juga menunjukkan bahawa perilaku, emosi, dan penglibatan kognitif mempunyai pengaruh positif yang signifikan terhadap persepsi pembelajaran dan kepuasan pelajar dalam persekitaran pembelajaran dalam talian. Di samping itu, kajian ini memberikan bukti empirikal mengenai peranan pengantara yang dimainkan oleh setiap dimensi penglibatan dalam hubungan antara peramal penglibatan pelajar dan hasilnya. Secara keseluruhan, kajian ini memberikan model teori berdasarkan SCT yang akan membantu penyelidik dan pengamal dalam memahami dengan lebih baik bagaimana memupuk penglibatan, pembelajaran, dan kepuasan pelajar dalam persekitaran pembelajaran dalam talian.

MODELING ONLINE STUDENT ENGAGEMENT USING SOCIAL COGNITIVE THEORY

ABSTRACT

Online learning has experienced phenomenal development in the sectors of education, notably higher education, due to its flexibility in accessing educational resources regardless of time or geographic location. Student engagement is a key problem that influences the effectiveness of online learning. This study applied social cognitive theory to investigates the influence of personal and environmental factors on student engagement (concerning the behavioral, emotional, and cognitive engagement dimensions) and, in turn, perceived learning and student satisfaction (as outcomes) in the online learning environment. The study explored the perceptions of Egypt's higher education students with regard to their engagement, learning, and satisfaction with their online learning experience. Using validated self-reported scales, a total of 950 undergraduate students who were enrolled in online courses at two public universities in Egypt were included in this study. Totally, 732 valid responses were analyzed using the partial least squares based on structural equation modeling (PLS-SEM). The findings indicated that academic self-efficacy, situational interest, perceived usefulness, student-student interaction, and student-instructor interaction have significant positive influences on students' behavioral and emotional engagement with online learning. Furthermore, situational interest, self-regulation, student-student interaction, and student-instructor interaction have significant positive influences on students' cognitive engagement with online learning. Teaching presence has a significant positive influence on students' behavioral engagement only. However,

technological self-efficacy has an insignificant influence on the three dimensions of student engagement with online learning. The results of this study also indicated that behavioral, emotional, and cognitive engagement have significant positive influences on perceived learning and student satisfaction in the online learning environment. In addition, this study provides empirical evidence of the mediating role played by each engagement dimension in the relationships between student engagement predictors and outcomes. Overall, this study provides a theoretical model based on SCT which would help researchers and practitioners in better understanding how to foster students' engagement, learning, and satisfaction in the online learning environment.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

By the remarkable evolution in the technology field, the expansion of internet usage, and the rapid development in information and communication technologies (ICT), significant developments have been occurred in various industries, specifically in the field of education. One result of these developments in the education field is online learning. Governments have been investing in their ICT infrastructure in order to develop and improve their education systems, specifically in the higher education system, through including online learning systems in the teaching and learning processes (C. T. Chang et al., 2017; El-Khouly, 2018; Thongsri et al., 2019; A. S. Weber & Hamlaoui, 2018). In the last two decades, the Middle East and North Africa (MENA) have shown a gradual growth in using online learning systems (A. S. Weber & Hamlaoui, 2018). More specifically, the Arab countries such as Egypt, Jordan, Lebanon, Bahrain, Saudi Arabia, Palestine, Yemen, and United Arab Emirates, show much interest in infiltrating online learning into their higher education system (Adel, 2017; El-Khouly, 2018). However, online learning in these countries still remains at an initial stage compared to the Western countries (Adel, 2017). This research focuses on infiltrating online learning in the higher education system of Egypt as a developing country that involves the largest number of populations in comparison to the neighbor Arab countries in specific, and to the MENA region in general.

1.1.1 Higher Education in Egypt

Egypt has the largest population of over than 90 million, with high percentage of tertiary students which causes huge stress on its education system (Ramage et al.,

2019). The Egyptian higher education system is considered one of the oldest education system in the world which has been established in 988 AD since the construction of Al-Azhar University (El-Khouly, 2018). It includes two types of higher education institutions: public (governmental) and private (non-governmental) institutions. Recently, the higher education system of Egypt comprises 24 public universities, 26 private universities, and 158 special high institutes (MOHESR, 2017). This extended higher education system faces a gradual increase of enrolled students over time (MOHESR, 2016).

Despite that the enrolment fees of higher education is increasing globally, the Egyptian public universities offer a free-of-fees opportunities to tertiary students in comparison to the private ones (El-Khouly, 2018). Hence, public universities encounter a remarkable increase in the number of enrolled students every year (El-Khouly, 2018; El Sebai, 2006; Holmes, 2008; MOHESR, 2016). This increase causes an over-crowded students problem in some lecture halls which, consequently, results in obvious limitations in fulfilling student needs and, generally, in the quality of the teaching and learning processes (El-Khouly, 2018; El Sebai, 2006; Holmes, 2008). In other words, this over-crowding produces a difficult learning environment either for students or instructors themselves (Holmes, 2008). On one hand, students can be easily distracted and cannot receive the required interactive learning environment in such learning environments (Holmes, 2008). On the other hand, instructors encounter a difficulty in fulfilling students' needs in a lecture hall that includes hundred numbers of students at the same time (Holmes, 2008). Thus, the Egyptian government looks at online learning which can help in solving the existing problems in higher education, and as a method to develop and improve the higher education system of Egypt (SCU, 2018).

1.1.2 State of Online Learning in Egypt

The infrastructure of the ICT in Egypt encounters a continuous development since 1985 (Kamel & Hussein, 2002). Internet users in Egypt have significantly increased over the six years from 2013 to 2019 to reach approximately 51 million users, as shown in Figure 1.1. In 2020, internet users have also increased to reach 55 million users (MCIT, 2020). The proportion of individuals who use the internet in daily basis is 66.4%, while 17.3% use it weekly, and 16.2% use it irregularly (MCIT, 2018a). According to a report issued by the ministry of communication and information technology (MCIT (2018b)), for measuring the digital society in Egypt, the percentage of governmental and public sector enterprises using websites for online learning is 23.3%. In addition, the proportions of individuals who access the internet at home and the educational places are 94.6% and 37.6%, respectively (MCIT, 2018a). To be more specific, 73.81% of internet users are tertiary students and 44.3 % of their internet activities are for educational and learning purposes (MCIT, 2015).

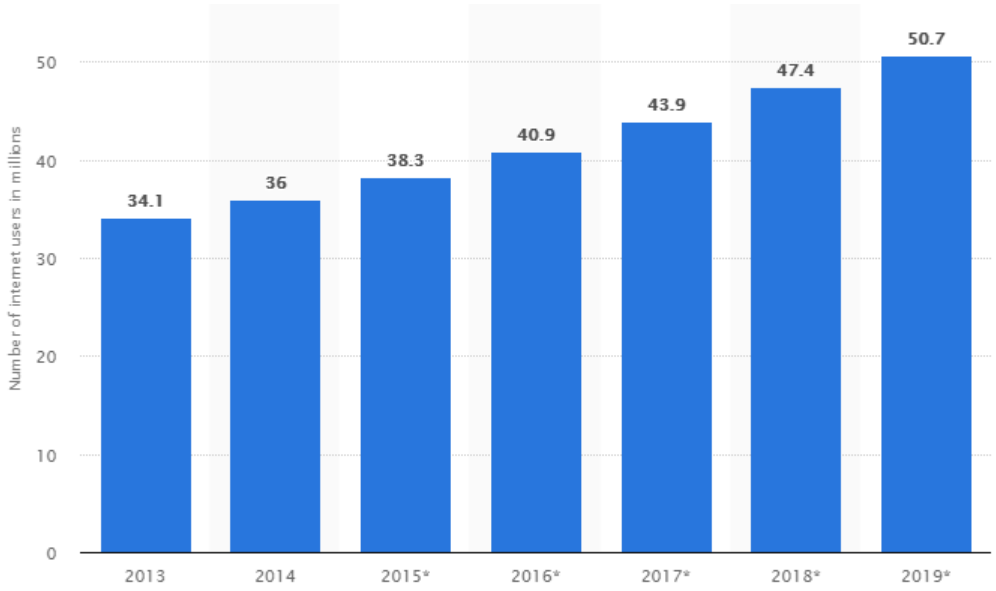

Figure 1.1 Numbers of internet users in Egypt from 2013 to 2019 (in millions)

Source: Statista (2019)

The Egyptian government exploits the ICT to promote the Egyptian education system – especially the higher education system – in order to foster instructors' and students' motivation to learn (El-Khouly, 2018). The proportion of higher education institutions offering online learning facilities in their education process are 22 public and 12 private institutions. Each educational institution has different faculties (e.g., faculty of Engineering), with different disciplines (e.g., Architecture Engineering). Due to the inaccessible data of the state of online learning in the private higher education institutions and the specific higher institutes of Egypt, this research focuses on the state of online learning in the Egyptian public universities.

The ministry of higher education of Egypt has invested in online learning system projects since 2004 (SCU, 2018). One of these projects is the national e-learning center (NELC), which was established in 2005 (SCU, 2018). The ministry has created 22 sub-centers among 22 public universities which are located across different governorates to monitor and guarantee the implementation of online learning systems in these universities (NELC, 2020d; SCU, 2018). These centers are also responsible for producing the electronic courses, tracking and monitoring the online learning process, evaluating it, and applying the required improvements (if needed) (NELC, 2020d). The NELC aims to improve the education in the Egyptian higher education through combining the ICT applications with the face-to-face learning process (blended learning) to support the teaching and learning strategies (NELC, 2020b). The online learning system includes synchronous and asynchronous communication means such as instant messages, e-mail, discussion boards and forums, and chat rooms. NELC offers more than 700 electronic courses in different disciplines among the various faculties of the Egyptian public universities (NELC, 2020a, 2020c). To date, these

courses have been used by more than 309,000 students, with more than 95,000 students per year (NELC, 2020d). More specifically, the NELC provides an electronic repository that includes the educational electronic courses in different disciplines (NELC, 2020a). This repository is available for faculties' staff and students of the 22 public universities.

Through an unstructured interview (See Appendix A) which was conducted with the director of the NELC, Dr Iskandar reported, "The national e-learning center (NELC) is responsible for setting pedagogical and technical standards for each electronic course based on its field. It also monitors the development life cycle of the electronic course production and evaluates the final output during its usage to apply any modifications, if needed. Therefore, these standards allow the NELC to improve and enhance the quality of the electronic course. Besides, an online survey is offered on NELC website to be filled by students for evaluating their perceptions of learning in, and satisfaction with the online learning process, and of the online learning system itself as well. This helps in providing students with the required support, improving their online learning processes, and tracking and guaranteeing the quality of online learning in Egyptian public universities."

The technique of flipped classrooms is offered at the Egyptian public universities to improve the online learning process and to support students understanding of their courses. In addition, the ministry of higher education, the supreme council of universities (SCU), and the MICT have cooperated to establish the EGYMOOCs website (http://egymoocs.nelc.edu.eg/courses) which offers fully-free online courses to facilitate student learning using the massive open online courses (MOOCs) technique (MOHESR et al., 2018). Dr Iskandar reported, "The

EGYMOOCs website has been working since February 2019. It offers more than 16 electronic courses in the fields of information technology, medicine, and human rights. To date, the proportion of the Egyptian users who are using these courses has reached 52,875 users."

1.1.3 Benefits of Online Learning to the Egyptian Higher Education

Egyptian public universities suffer from the increasing number of enrolled students every year, which leads to lack of communication between educators and students, obstructs fulfilling student needs, and threats the quality of the educational process (Afifi, 2011; Elkhateeb et al., 2019; Holmes, 2008). Dr Iskandar reported, "Egyptian public universities include large number of students who are coming from different governorate to complete their higher education studies, so that online learning allows those students to track their learning process and access the learning materials if they could not attend their lectures because of any reason". As a result, such a learning environment produces unprepared workers for the job market which, consequently, influences the society and the economy in general. Hence, to solve this problem, the Egyptian ministry of higher education has invested in online learning, as a digital transformation strategy, and has infiltrated it in the Egyptian universities in order to develop and improve the higher education system of Egypt (Afifi, 2011; Elkhateeb et al., 2019; Holmes, 2008).

The internet breaks the barriers of time and place and provides students with various leaning resources and tools which facilitate their learning process. Online learning is considered as one of the solutions of the educational problems which are existed in the higher education of Egypt (Adel, 2017; Afifi, 2011; El Gamal & Abd El

Aziz, 2012). Through online learning facilities, student needs can be effectively met, due to its flexibility which breaks the time and distance between students and instructors. Furthermore, online learning systems provide important analysis of students' learning behaviors and patterns which allow instructors to support the most struggling students (Adel, 2017; Schumacher & Ifenthaler, 2018; Thongsri et al., 2019). Therefore, online learning provides different advantages for students. Firstly, online learning is available to students at any time, and they can access it from any convenience place. Secondly, it is a learner-centered learning environment which allows students to study and learn at their own pace. This advantage allows students to enhance and improve their ability to acquire new knowledge and skills by themselves (Afifi, 2011). Besides, students can apply their preferences into their online learning process for achieving a personalized learning environment (Afifi, 2011). Thirdly, online learning facilitates delivering an interactive learning environment, in which students can easily interact with their fellow students and with their instructors. Interactive learning environments contributes to increasing students' knowledge and skills as they exchange them during their discussions during their learning process (Liaw & Huang, 2013).

Online learning is also considered beneficial for the Egyptian higher education institutions. First, online learning is a solution for student distraction caused by the overloaded lecture halls which can be frequently found at the Egyptian universities (Afifi, 2011). Through online learning, instructors can support the classroom learning through delivering the needed learning material to many students. Second, it considers an effective method of information retention, as learning materials can be offered in different learning styles, for longer periods of time. Besides, these learning materials can be accessible for students at any convenient time and place.

According to previous discussions, through online learning systems, higher education institutions can address the existing problems in their education system which hinder its development. Furthermore, student needs can be effectively met as each student can be treated individually which cannot be achieved in a classroom that includes large number of students at once. The successful completion of online courses motivates the interaction across students, builds student's self-confidence, helps students in better plan for their study, and improves student's ability to network more effectively (Adel, 2017).

1.1.4 Challenges of Online Learning in the Egyptian Higher Education

Egyptian public universities have shown much interest in including online learning in the educational process (Adel, 2017; Elkhateeb et al., 2019). However, student engagement, learning, and satisfaction in the online learning environment are key challenges (Adel, 2017; Tanta University, 2018). Dr Iskander reported, "Undergraduate students in the Egyptian public universities are satisfied with their online learning experience, with 65%."

Through an unstructured interview (See Appendix B), a preliminary study was conducted with 15 undergraduate students who were enrolled in online courses at Alexandria and Cairo universities to better understand their perceptions of their online learning experience. The findings of this preliminary study have confirmed that student engagement behavior is challenging in the online learning environment which, consequently, affect their learning and satisfaction because of many reasons. Firstly, student interest with the online learning environment contributes to increasing their engagement and, in turn, increasing their learning and satisfaction perceptions in the

online learning environment. Student reported, “the interesting and meaningful learning materials make the online course more interesting which encourage me to be more engaged” and “the online course gives new opportunities and new ways to learn. Besides, the technology makes learning more interesting and valuable because it allows me to communicate with course instructor directly and easily, which I cannot do in the classroom due to the large number of students attending at once.”

Secondly, although many students may perceive usefulness of the online learning process, the lack of interactions with their fellow students and course instructor may contribute to low degrees of motivation and engagement. Students reported, “Without the interactions between students together and students with the instructor, it would be a difficult and bored learning process. If the instructor facilitates teamwork or collaborative work which allows students to work on assignments or study within a group, it would be more motivated because I prefer to learn from the experience of others.”

Thirdly, students emphasized the importance role of online course instructors in facilitating their online learning process, understanding course topics, and promoting their engagement. Student engagement with online learning can be encouraged through instructors’ usage of the effective learning strategies that promote delivering an interactive and a collaborative learning environment (F. Martin et al., 2018). Furthermore, it was added that instructor’s feedback is very important for them to realize whether they are aligned with the desired learning progress, and consequently, to apply the proper interventions- if needed. Students reported, “The role of online course instructor is mostly important for providing the needed support if I am struggling, whether in understanding the lecture, the learning material, or the

assignment" and "course structure would affect my intention to continue studying through the online learning system. Additionally, instructors' feedback makes me aware of my progress. However, if I received negative feedback from the instructor, I would be less motivated to continue".

Fourthly, the findings of the preliminary study also demonstrated that not all students are skilled in using the technology in their learning. In other words, some students lack the technological skills, justifying the reason of showing less engagement behavior with online learning. One student reported, "I feel worried using the computer technology or any other technologies for learning, thus I am not sure that I can perform computer-based tasks as well". Lastly, many interviewed students articulated that they may feel isolated in their online learning process if they lack the interaction together and with their instructors which would negatively influence their engagement, learning, and satisfaction. "Feeling isolated in the online learning environment significantly would affect my engagement and learning. So that, my interaction with fellow students and with the instructor is important to learn from others' knowledge and, in turn, feeling sociable would increase my satisfaction with my online learning experience."

The online learning environment is a learner-centric environment in which students experience more autonomous than they experience in the face-to-face learning environment (Hannafin & Hannafin, 2010). More specifically, online learning allows students to choose what, how, and when to learn, and to select the proper methods for assessing their own learning. Therefore, students in online learning environments are isolated, encounter more independency to track and monitor their learning process, may lack the interaction with their peers or instructors, may lack instructor's presence,

may not be interested in the online learning environment, and may not perceive usefulness of online learning systems (Sun & Rueda, 2012; Vayre & Vonthron, 2017, 2019). Besides, motivational factors such as students' academic and technological self-efficacies are essential for the students who encounter the online learning process in order to guarantee their confidence in performing the online learning tasks using computer technologies (T. M. Kuo et al., 2021). In other words, self-self-efficacious students are more committed to spend more effort for mastering difficult tasks rather than avoiding them (Alqurashi, 2019; T. M. Kuo et al., 2021). That is why online learning presents unique challenges which may hinder delivering a successful online learning process (Hannafin & Hannafin, 2010; Muir et al., 2019; Wong et al., 2019).

Previous studies have demonstrated that student engagement, learning, and satisfaction are considered main challenges in online learning environments (Alqurashi, 2019; Henrie et al., 2015; Jung & Lee, 2018; Muzammıl et al., 2020). Student engagement describes the physical and psychological energy which students invest in their learning experience (Astin, 1984; M. T. Wang & Degol, 2014), perceived learning reflects students' acquisition of knowledge and understanding after their learning experience (Rovai, 2002; Zhang, 2003), while student satisfaction refers to students' positive feelings toward their educational experience (Shin, 2003).

Students' engagement, perceived learning, and satisfaction are considered crucial elements for evaluating their online learning experience (Alqurashi, 2019; Robinson & Hullinger, 2008). Consequently, because undergraduate students are influenced by various internal and external factors which may affect their engagement, it is important to investigate these factors to foster student engagement, learning, and

satisfaction in online learning environments and to take them into account in the educational process (Gunuc & Kuzu, 2015; Kahn et al., 2017; Muzammıl et al., 2020).

Student engagement, perceived learning, and satisfaction allow higher education institutions to spotlights important areas and insights for the improvements and developments of online learning (Kuo, Walker, Schroder, & Belland, 2014; Robinson & Hullinger, 2008), and for improving student's learning experience as well. Therefore, it is important to understand the factors influencing student engagement with online learning which, in turn, influences their learning perception and satisfaction. For this reason, this research aims to: first, provide a theoretical-based framework to explain how to engage students with online learning environments in a meaningful way; and second, examine the consequences of student engagement behavior through examining its effect on perceived learning in, and student satisfaction with online learning.

1.2 Research Problem

Online learning has become a main trigger for the Egyptian higher education institutions in order to solve the existing educational problems, improve and develop the higher education system, and attain positive outcomes (Adel, 2017; El Gamal & Abd El Aziz, 2012; SCU, 2018). Hence, the Egyptian ministry has invested in online learning systems since 2004 (SCU, 2018). It has established 22 sub-centers of the national e-learning center among 22 public universities to ensure the implementation of online learning systems and support the face-to-face learning environment at these universities. Despite these developments, online learning environments are more challenging. One of the main challenges of online learning in Egyptian higher

universities is student engagement with online learning (Adel, 2017; Tanta University, 2018).

Keeping students engaged with online learning is considered a key concern (Adel, 2017; Henrie et al., 2015; T. M. Kuo et al., 2021; Molinillo et al., 2018; Muir et al., 2019; Yousuf et al., 2020) which is, consequently, may affect the attainment of positive outcomes, namely perceived learning and student satisfaction (Bolliger & Halupa, 2018; T. K. F. Chiu, 2021; Henrie et al., 2015; F. Martin & Bolliger, 2018; Muzammıl et al., 2020). Hence, it is important to investigate how to foster student engagement, learning, and satisfaction in online learning environments (Alqurashi, 2019; Jung & Lee, 2018; Muzammıl et al., 2020; C. C. Robinson & Hullinger, 2008). Studying these variables is important to guarantee delivering an effective online learning process, improve students' experience of online learning, and promote their success (Alqurashi, 2019; Muzammıl et al., 2020; C. C. Robinson & Hullinger, 2008).

Student engagement has been defined as the "holy grail of learning" (Sinatra et al., 2015). It describes students' physical and psychological energy which are invested in their learning experience (Astin, 1984; M. T. Wang & Degol, 2014). Student engagement is a multidimensional construct that comprises behavioral, emotional, and cognitive aspects (Fredricks et al., 2004, 2005). It is a malleable behavior which is affected by the changing learning contexts (Manwaring et al., 2017). Furthermore, it is an important indicator for evaluating the effectiveness of online learning in which it reflects the quality of student's learning experience and it contributes in student success (Muzammıl et al., 2020; C. C. Robinson & Hullinger, 2008).

Furthermore, student engagement receives strong attention in online learning literature because of its contribution to attaining positive outcomes in the context of higher education (Kahu, 2013; Schindler et al., 2017; Trowler, 2010). More specifically, previous studies have revealed the significant role played by student engagement behavior in attaining positive cognitive learning outcomes such as learning persistence, grades, and learning performance in online learning contexts (Blasco-Arcas et al., 2013; Fisher et al., 2018; Jung & Lee, 2018; Tsai et al., 2018). However, it is equally important to take into account the affective outcomes (student outcomes) such as perceived learning and student satisfaction (Y. C. Kuo et al., 2014).

Zhang (2003) and Alqurashi (2019) have articulated that perceived learning and student satisfaction are important indicators of student outcomes in online learning environments. Furthermore, online learning studies indicated that student engagement behavior have a significant effects on student outcomes, with regard to perceived learning and student satisfaction (Bolliger & Halupa, 2018; Gray & DiLoreto, 2016). In other words, perceived learning and student satisfaction are a consequences of student engagement with online learning.

Few studies revealed the relationship between student engagement and student outcomes, namely perceived learning and student satisfaction, in online learning at the higher education context (Bolliger & Halupa, 2018; Gray & DiLoreto, 2016; Muzammıl et al., 2020). However, these studies have examined student engagement with online learning as a sum (as a single construct). Consequently, there is a little understanding of the unique effect of each engagement dimension on perceived learning and student satisfaction (student outcomes) in the online learning environment. In addition, the mediation role of each engagement dimension on the

relationships between the predictors and consequences needs more investigation (Manwaring et al., 2017).

Concentrating on the context of higher education in Egypt, there is limited literature, knowledge, and investigation of student engagement, perceived learning, and student satisfaction perceptions in online learning environments. Thus, this research aims to rely on SCT, which illustrates that individual's behavior as well as its consequences can be shaped and anticipated through the interaction with personal and environmental factors, to address these gaps.

1.3 Research Questions

The preceding discussions spotlight the importance of studying student engagement behavior and its outcomes (namely perceived learning and student satisfaction as consequences of student engagement behavior) in the online learning environment. Thus, this research relies on the SCT, which illustrates how personal factors (such as, emotions, cognition, skills, and beliefs) and environmental factors (such as, the social and contextual environment) can shape individual's behavior (the action) and the corresponding behavioral outcomes.

This research introduces four personal factors (academic self-efficacy, technological self-efficacy, situational interest, and self-regulation) and four environmental factors (perceived usefulness, teaching presence, student- student interaction, and student- instructor interaction), and proposes their impact on student's behavioral, emotional, and cognitive engagement, perceived learning, and satisfaction. To clearly guide the research process, the following general question is proposed for addressing the problem of this research:

How can student engagement, learning, and satisfaction be fostered in the online learning environment?

For addressing the research question, the following sub-questions are outlined:

RQ1. To what extent does academic self-efficacy affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ2. To what extent does technological self-efficacy affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ3. To what extent does situational interest affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ4. To what extent does self-regulation affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ5. To what extent does perceived usefulness affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ6. To what extent does teaching presence affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ7. To what extent does student-student interaction affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ8. To what extent does student-instructor interaction affect students' behavioral, emotional, and cognitive engagement with online learning?

RQ9. To what extent do students' behavioral engagement, emotional engagement, and cognitive engagement affect perceived learning in, and student satisfaction with online learning?

RQ10. To what extent does behavioral engagement mediate the effect of academic self-efficacy, technological self-efficacy, self-regulation, perceived usefulness, situational interest, teaching presence, student-student interaction, and student-

instructor interaction on perceived learning in, and student satisfaction with online learning?

RQ11. To what extent does emotional engagement mediate the effect of academic self-efficacy, technological self-efficacy, self-regulation, perceived usefulness, situational interest, teaching presence, student-student interaction, and student-instructor interaction on perceived learning in, and student satisfaction with online learning?

RQ12. To what extent does cognitive engagement mediate the effect of academic self-efficacy, technological self-efficacy, self-regulation, perceived usefulness, situational interest, teaching presence, student-student interaction, and student-instructor interaction on perceived learning in, and student satisfaction with online learning?

1.4 Research Objectives

According to the mentioned research questions, the research objectives are as follows:

RO1. To examine the impact of academic self-efficacy on students' behavioral, emotional, and cognitive engagement with online learning.

RO2. To examine the impact of technological self-efficacy on students' behavioral, emotional, and cognitive engagement with online learning.

RO3. To examine the impact of situational interest on students' behavioral, emotional, and cognitive engagement with online learning.

RO4. To examine the impact of self-regulation on students' behavioral, emotional, and cognitive engagement with online learning.

RO5. To examine the impact of perceived usefulness on students' behavioral, emotional, and cognitive engagement with online learning.

RO6. To examine the impact of teaching presence on students' behavioral, emotional, and cognitive engagement with online learning.

RO7. To examine the impact of student-student interaction on students' behavioral, emotional, and cognitive engagement with online learning.

RO8. To examine the impact of student-instructor interaction on students' behavioral, emotional, and cognitive engagement with online learning.

RO9. To examine the impact of students' behavioral engagement, emotional engagement, and cognitive engagement on perceived learning in, and student satisfaction with online learning.

RO10. To investigate whether behavioral engagement mediates the effects of academic self-efficacy, technological self-efficacy, self-regulation, perceived usefulness, situational interest, teaching presence, student-student interaction, and student-instructor interaction on perceived learning in, and student satisfaction with online learning.

RO11. To investigate whether emotional engagement mediates the effects of academic self-efficacy, technological self-efficacy, self-regulation, perceived usefulness, situational interest, teaching presence, student-student interaction, and student-instructor interaction on perceived learning in, and student satisfaction with online learning .

RO12. To investigate whether cognitive engagement mediates the effects of academic self-efficacy, technological self-efficacy, self-regulation, perceived usefulness, situational interest, teaching presence, student-student interaction, and student-instructor interaction on perceived learning in, and student satisfaction with online learning.

1.5 Significance of the Study

This research has theoretical, methodological, and practical significance, each is illustrated in detail in the following sections.

1.5.1 Theoretical Significance

This study contributes to online learning literature in five ways. First, this study relies on SCT, to examine the personal and environmental factors that influence student engagement (considering the behavioral, emotional, and cognitive), perceived learning, and satisfaction in the online learning environment. The correlation between personal and environmental factors on student's engagement, perceived learning, and satisfaction in online learning environments have been studied in a partial way, but not through a multivariate model (Gutiérrez & Tomás, 2019). Hence, providing a theoretical and multivariate framework will improve the robustness of the literature and will expand the understanding of how to shape student engagement behavior and predict its corresponding outcomes, namely perceived learning and student satisfaction in the context of online learning.

Second, the current study focuses on examining student engagement with online learning as a multidimensional construct, by considering the behavioral, emotional, and cognitive dimensions. These dimensions are separated but interrelated within the individual, and they are the most prevalent dimensions in the literature (Fredricks et al., 2004). Few studies have examined student engagement with online learning with the behavioral, emotional, and cognitive dimensions (Jung & Lee, 2018; Manwaring et al., 2017; Pellas, 2014; Peng, 2017; Sun & Rueda, 2012). Instead, it is noted that recent online learning studies have shown different perspectives when they

measure student engagement construct (Peng, 2017). For the first perspective, some studies used different dimensions such as skills, performance, participation, and emotions (Bolliger & Halupa, 2018), active involvement and following the module (Molinillo et al., 2018), and accomplishment, learning joyfully, and level of effort (Zhang Tao et al., 2018) rather than the behavioral, emotional, and cognitive dimensions. In addition, one study has used the dimensions of employee's work engagement for measuring student engagement with online learning (Mäenpää et al., 2018). However, Fredricks, Filsecker, & Lawson (2016) stressed on the importance of examining the degree to which the different proposed dimensions are unique dimensions to measure student engagement.

For the second perspective, some online learning studies have focused on only one dimension to examine student engagement. For example, various studies have examined the behavioral engagement dimension through the number of page views, the number of accomplished tasks, activity views, and by the interactions which are occurred for learning (Hu & Hui, 2012; Hui et al., 2019; Ma et al., 2015). Another studies have considered whether only the emotional engagement dimension (Molinillo et al., 2018) or the cognitive engagement dimension (Thongmak, 2018). However, it is argued that ignoring the multidimensionality of student engagement construct is articulated as a central concern (Fredricks, 2015). These variability has caused a difficulty for authors to compare their findings with previous studies (S. L. Christenson et al., 2012). According to this, the present study provides an extended comprehension of student engagement in the online learning context based on a theoretical foundation, considering the three interrelated dimensions of student engagement (behavioral, emotional, and cognitive).

Third, many online learning studies have examined student engagement with online learning as sum without studying student engagement dimensions separately (Bolliger & Halupa, 2018; Gray & DiLoreto, 2016; Jung & Lee, 2018; Mäenpää et al., 2018; Zhang Tao et al., 2018; Tsai et al., 2018). In other words, the effects of student engagement predictors on the behavioral, emotional, and cognitive engagement dimensions, as well as the unique effect of each dimension on the outcomes (namely perceived learning and student satisfaction) in the online learning context need further investigation. Therefore, the current research will fill this gap.

Fourth, few studies examined the mediation role of each engagement dimension on the relationships between student engagement predictors and outcomes in the online learning environment (Molinillo et al., 2018). Hence, there is a little understanding of the extent to which each engagement dimension separately influences the consequences of student engagement with online learning. Consequently, the current study will fill this gap by adding new empirical evidence of the unique impact of behavioral engagement, emotional engagement, and cognitive engagement on each student outcome, namely perceived learning and student satisfaction.

Lastly, previous studies which were conducted in Egypt have focused whether on the contribution of online learning to improve the higher education system (Afifi, 2011; El Gamal & Abd El Aziz, 2012; Holmes, 2008) or on the adaption of online learning in higher education (Abbas, 2017). However, there are little knowledge and understanding regarding student's engagement, perceived learning, and satisfaction perceptions in the online learning environment at the Egyptian higher education context. Thus, the current study will add to literature new research, understanding, and

knowledge of how to foster students' behavioral, emotional, and cognitive engagement with online learning and, in turn, perceived learning in, and student satisfaction with online learning.

1.5.2 Methodological Significance

The current study also provides a methodological contribution to literature. More specifically, this study utilizes the PLS-SEM approach to validate the measurements of study variables in online learning and Egyptian higher education contexts. Accordingly, it provides methodological contribution by adding validated measurement to the literature of students' engagement, perceived learning, and student satisfaction in the online learning environment at the higher education context.

1.5.3 Practical Significance

Besides the theoretical implications, the present study also purses to provide meaningful practical implications to higher education institutions, online course instructors, and instructional designers who seek to develop their educational process by providing an effective online learning that improves students' online learning experience. The findings of this study have three practical implications.

First, the current study demonstrates the personal factors that underlie student engagement behavior in the online learning environment. The specified personal factors in this study are academic self-efficacy, technological self-efficacy, situational interest, and self-regulation. Such specifications allow online course instructors to figure out the most influential students' personal factors that contribute to fostering their behavioral, emotional, and cognitive engagement with online learning. More

specifically, the findings of this study will help online course instructors to define the strategies needed to increase student's cognition, skills, and interest which, in turn, increase their engagement with online learning. Moreover, this study will also help online course instructional designers in defining the required tools (e.g., digital badges, progress reports, e-schedule etc.) that help instructors in motivating students during their online learning process when designing the curriculum of online courses.

Second, this study examines the effect of some environmental factors (namely perceived usefulness, teaching presence, student-student interaction, and student-instructor interaction) on students' behavioral, emotional, and cognitive engagement with online learning. Therefore, its findings will help online course instructors in better understanding how to conduct an effective online learning process that contribute to increase students' performance in learning and build online learning community for the purpose of encouraging student engagement with online learning. The findings of this study will also help online course instructional designers to recognize the technological features which are required for designing an effective online learning systems that improve students' performance and provide instructors with the technological tools (e.g., discussion forums, e-content, e-quiz etc.) needed to practice their role in the online learning environment.

Third, this study would help in understanding the importance of encouraging students' engagement with online learning in order to develop their learning, and satisfaction in online learning contexts. More specifically, it provides meaningful insights regarding the unique contribution of students' behavioral, emotional, and cognitive engagement with online learning to increase their learning and satisfaction, highlighting their mediation roles. This will provide valuable insights that would help

online course instructors in defining which actions can be taken to deliver an effective online learning process that results with positive outcomes.

To sum up, this study synthesizes the essential components of online learning–students, instructors, and the learning system–to develop an integrated model that illustrates students' behavioral, emotional, and cognitive engagement with online learning. Its findings highlight actionable recommendations for online course instructors, and online course instructional designers in terms of fostering students' engagement, learning, and satisfaction in online learning environments. In turn, higher education institutions can allocate the required resources to promote enhancing students' experience of online learning, ensuring the effectiveness and the quality of online learning in Egyptian public universities and, consequently, improving the quality of higher education in general.

1.6 Scope of the Study

The present research is motivated to address the question "how to foster student engagement, learning, and satisfaction in the online learning environment?". Therefore, this study examines (1) how personal factors (academic self-efficacy, technological self-efficacy, situational interest, and self-regulation) and environmental factors (perceived usefulness, teaching presence, student-student interaction, and student-instructor interaction) jointly determine students' behavioral, emotional, and cognitive engagement with online learning; (2) how each engagement dimension contributes to produce students' perceptions of learning in, and satisfaction with online learning (as outcomes); (3) whether each engagement dimension mediates the relationships between student engagement predictors and outcomes in the online learning environment.