Sustainable Engagement of University Students in E- Learning during the Post-pandemic of Covid-19: Evidence from Faculty of Commerce and Management Studies, University of Kelaniya, Sri Lanka

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Abstract: Bridging the lacuna in the context of higher education in Sri Lanka and up-to-date research literature, this study was carried out to recognize the key determinants of sustainable engagement of university students in e-learning during the post-pandemic of Covid-19. This was carried out as a cross-sectional field study, predominantly applying the hypothetico-deductive approach, in which the researchers' interference on the study sample was minimal. Final sample consists of 590 respondents selected randomly from the Faculty of Commerce and Management Studies, University of Kelaniya, Sri Lanka. Primary data were collected through a survey questionnaire developed based on the standard measurement scale; 'sustainable engagement in e-learning' which was administered to the respondents directly via on-line mode, as a google form. Data analysis were done with the aid of Statistical Package for Social Sciences (SPSS) and Excel employing descriptive statistics, Exploratory Factor Analysis (EFA), and One-way ANOVA. Moreover, semi-structured interviews were conducted with five senior lecturers randomly selected from each academic department in the Faculty. Students in the sample have shown a higher degree of engagement in e-learning. Among them, 87.8% of the respondents were highly engaged in e-learning during the post-pandemic of Covid-19. Except the academic department to which the student is attached, relationship of other factors with engagement in e-learning were found to be statistically not significant. Further, it is found that number of assignments per course, nature of those assignments, online lecture time, learning activities designed for students other than lecturing and the level of monitoring of student engagement through LMS are different among the academic departments. Further, the conduct of live-lectures via zoom or any other possible virtual platform is emphasized more effective to get a higher level of student engagement than merely uploading a recorded lecturer into LMS. Building on such, the present study strongly suggests to re-install a *'hybrid mode of blended learning'* to get the engagement of students in the long-run instead of mere concept of *'learn from home'.*

Keywords: *E-learning, Sustainable engagement, University students, Post-pandemic of Covid-19, Learn from home, Hybrid mode of blended learning*

Introduction

With the rapid changes in today's context, the dynamic world has become a technology driven icon. Also, with the existing and ever changing technology, the sector of education has experienced a vast number of changes where it has created a need for individuals to re-think and review on everything in education industry [knowledge industry] in an innovative way than ever before. Internet is serving as the foundation which strengthen and pushes the entire sector of education into a virtual world where the processes as if knowledge creation and dissemination are being facilitated within an e-learning environment as a result.

The term e-learning is being used quite a lot in recent years with the advancement of technology with the support of many virtual platforms; however many are still unaware about the significance of it to achieve the individuals' personal and professional goals and objectives especially in the field of education. Today, e-learning has fixed its roots in the sector of education with its supportive environment which encompasses speed internet connections and virtual interfaces with various effective multimedia channels.

Because of these technological advancements and the benefits that technology can cater to the sector of education; especially to the academics and learning partners, most of the institutions have shifted their teaching-learning strategy towards online [distance learning] from the traditional face-to-face learning. Students in today's context have started enrolling with online courses than earlier (Katuk, 2013). Most importantly, the use of e-learning has become significantly widespread in higher education than primary & secondary education (Rodgers, 2008). The practice of e-learning has been identified as an extremely critical factor that generates a lot of favorable outcomes as if high-level of learning outcomes and high-order thinking abilities. Especially, as it allows the individuals to engage in learning anytime and anywhere (Chen et al., 2010; Robinson & Hullinger, 2008, as cited in Lee, Song, & Hong, 2019). It allows the learing partners to gain the benefit of attending to the classes at their convenience and in a felxible manner at the times and locations they prefer with potentially rich multimedia materials (Sun & Rueda, 2012).

Despite the mode of delivering the lectures, whether it is through face-to-face interactive sessions or through virtual platforms, a high level of student engagement has been identified as a critical factor which ensures the effectiveness of learning sessions. Further, the same has been identified as a challenge for academics and administrators. Most of the studies have confirmed that the learning achievement of students is powered by the student engagement and hence, it can be identified as an imperative factor which nurtures the students' development. At a glance, the term engagement encompasses a meaning of a high degree of student participation. However, most of the studies have focused on to study about the feelings and emotions surrounding

the process of engagement. According to Harper and Quaye (2009) student engagement is something more than just involvement or the participation. For a student to be fully engaged, it requires a positive frame of mind, in other words, moods and the sense making apart from the mere involvement in different academic activities (as cited in Shah & Barkas, 2018).

Anyway, less engagement is a problem. As mentioned above, the student engagement has become a challenge, not only in traditional face-to-face classroom environment, but also in the online learning environment (Khan, Egbue, Palkie, & Madden, 2017). According to Angelino et al. (2007) it is apparent that in spite of the growing usage and the popularity of e- learning systems, most of the researchers could able to show an increasing rate of student attrition in online courses than the face-to-face learning sessions. Moreover, as revealed by Patterson and McFadden (2009), compared to face-to-face lectures, students are more likely to withdraw from online courses (as cited in Katuk, 2013). Especially because, the existence of the distance in the learning process between the instructors and learning partners creating huge barriers in ensuring the richness of communication which serves as the base that makes the individual participation continuously and efficiently in online learning (Leeds at al., 2013, as cited in as cited in Lee et al., 2019). According to Tuckman (2007), the instructors and peers are not physically present and engaged in an e-learning environment compared to the traditional set-up where this situation leads the students to experience lack of opportunities to interact & give productive feedbacks and social supports and less colloborative opportunities which create a less engagement in leaening activities (as cited in Sun & Rueda, 2012).

As mentioned, most of the sectors strive harder to get along with the emerging technology including education sector all around the world. Compared to the institutions or the schools which focus on the primary education, the institutions or the universities who serve as the focal points in strengthening the higher education consider more in using virtual platforms in learning and teaching. Despite the fact that the technologies are campus-based, hybrid or fully online environments, web-based learning technologies might have a strong impact on learning environment at higher education (Czerkawski & Lyman, 2016). As stated, since the universities play a huge role in dissaminating knowledge to many national and international students in offering a portforlio of study programs, and because of the heavy marketization and internationlization of the higher education, these institutions have to ensure that they go hand in hand with new technology with improved communication as well as nurtured student engagement (Shah & Barkas, 2018). Even though the sustainability of universities requires productive student engagement especially in e-learning, yet the levels and determinants of student engagement in e-learning is not fully examined across

the needed contexts (Shah & Barkas, 2018).

Research Gaps

According to Kim et al. (2017), even though, the individuals can gain a lot of favorable outcomes from e-learning, the increasing number of dropouts of the students can be identified as one of the critical problem. Cho and Cho (2014) stated that this less student engagement compared to the traditional environment in e-learning happens mainly because of the less interactions between the learning partners and instructors due to the physical proximity (as cited in Lee et al., 2019). It was found that the students' dropout rates for online courses have been significantly increasing due to less engagment compared to conventional face-to-face cources (Angelino et al., 2007, as cied in Leeds et al., 2013) and this can create a huge adversarial effect on the university, faculty and the students as a whole. Even though the students enjoy a high level of freeedom and flexibility through online education, with a well-designed-and- taught course content and a structure, less student engagement can be observed compared to the face-to-face interactions (Li and Guo, 2013, as cited in Li & Guo, 2015).

With the emergence of Covid 19 pandemic, educational sector has focused the attention on to embrace the modern technology than ever before as a mean of ensuring the continuation of teaching, learning, researching, academic evaluations, consultation and publications. As a developing nation, Sri Lanka has been practicing the learning process in the form of face-to-face in physical learning environments over the last decades. However, during the post-pandemic of Covid-19, as many other nations in the world, Sri Lanka has embraced new virtual platforms in teaching and learning in higher education. Basically, all the government universities began to continue their academic semesters in on-line mode for all the types of learning partners including undergraduates, diploma students and postgraduate students.

Among those national universities in the country, university of Kelaniya was at the forefront encouraging on-line teaching and learning in all the possible atmospheres since March 2020. In the university, Faculty of Commerce and Management Studies seems to be exceptional in its continuation of two academic semesters of teaching via various effective on-line platforms linked with the Learning Management System (LMS) of the university. Further, the Faculty of Commerce and Management Studies successfully conducted all the inauguration events of postgraduate courses via on-line. Currently, the faculty is identified as at the leading laps in on-line evaluations, examinations and even for the on-line conference; International Conference on Business and Information - ICBI 2020.

However, except some department level surveys, there is no systematic examination has been done so far in the faculty to ensure the ***sustainable engagement*** of students in all these

on-line teaching and learning endeavors. Also, no recent study was found in the said domain conducted for the same purpose in Sri Lanka, especially, during the post-pandemic of Covid-19. Hence, bridging the identified lacuna in the context and up-to-date research literature, this study was carried out to recognize the significant determinants of sustainable engagement of university students [except external degree students] in e-learning during the post-pandemic of Covid-19.

Significance of the Study

As sustainable engagement of university students is considered one of the expected critical outcomes of e-learning, there is a need for more empirical studies on this aspect of e-learning in different universities and faculties as it provides insights into the unexplored facets of e-learning in higher education. Moreover, as today, every stakeholder in university education [higher education] is keen on decision making relating to the continuation of on-line teaching and learning modes and introducing the hybrid mode of learning *[which is a combination of on-line mode and face-to-face mode]*, insights of the current study would be useful from many perspectives. For academics to design and deliver their study programs and courses; for policy makers and academic administrators to modify/initiate teaching and evaluations in higher education; for students to adapt the landscapes of on-line learning, insights of the current study would be reasonably useful.

Objectives of the Study

Below mentioned are the established objectives to achieve in the current study.

- To discuss the ***significance of e-learning*** in higher education during the post-pandemic of Covid-19.
- To discuss the ***importance of sustainable engagement*** of university students in e-learning during the post-pandemic of Covid-19.
- To ***identify the significant determinants*** of sustainable engagement of university students in e-learning during the post-pandemic of Covid-19.

The rest of this paper proceeds as follows: In the following section, literature pertaining to the sustainable engagement in e-learning followed by relevant theoretical explanations and empirical findings are reviewed. Next, the methodology of the current study is outlined and the findings are also presented. In the final section, findings are discussed, delineating the conclusion and implications along with the limitations and directions for future research.

Literature Review

World in the 21st century has been witnessing surprising developments, especially in the field of Science and Technology. It has stated that these developments have generated many revolutionary changes in every fields including education. With the advancements in the Information and Communication Technology (ICT)

embedded, educational sector has shifted the ***teacher-centric learning*** environment into the ***student-centric learning*** environment while posing many new challenges to the prevalent education system all over the world (Dwivedi, Dwivedi, Bobek & Zabukovšek, 2019; McBrien, Cheng & Jones, 2009). Not only in other sectors, the advancements in technology is considered being a tremendous impact on teaching and learning as well (Sahni, 2019). Online learning has proven its significance in the domanin of higher education which is growing dramatically (Li & Guo, 2013, as cited in Li & Guo, 2015). It is observable that the students' motivation and their satisfaction are considered being decreasing in higher education in all around the world and hence the attention towards the student engagement in learning process has taken a mounting importance. As mentioned by Kuh (2001), student engagement is considered to be one of the critical factors in students' development and their progress of success in higher education (as cited in Delialioğlu, 2012).

E-learning

As an effective way of delivering the academic content to the learners, e-learning has gained a significant attention of the researchers (Dwivedi et al., 2019). During the last couple of years, e-learning has evolved with the aid of Computer Aided Instructions. Through Intelligent Tutoring Systems to Smart Class rooms, then to Mobile Classrooms which are powered by different mobile devices with all of these changes, e-learning has become a practice which is heavily learner-centered (Shen, Wang, & Shen, 2009). Because of the advancements in Information Technology, access to online marials has become easier and common especially with the devices such as desktops, laptops, and smartphones. However, this situation has improved evenmore since the enhancement of new technological devices in time which serve as a basis to create a successful e-learning environment (Shaha & Barkas, 2018).

The frequent innovations in technology and the development of Learning Management Systems (LMS), make it easier to provide a supportive learning environment to the learners who are actively engaged in online courses (Rennie and Morrison, 2012, as cited in Chakraborty & Nafukho, 2014). This has been identified as a fast growing segment especially in today's post-secondary education (Chen, Gonyea, & Kuh, 2008) which has been exploded in last 15 years (Chen, Lambert, & Guidry, 2010). According to Wentling et al. (2000), e-learning [distance learning] involves the acquisition and the use of knowledge distributed and facilitated primarily by electronic means (as cited in Kisanjara et al., 2017). It is a process which utilizes the electronic technologies to access the education curriculum which strives to conduct the course, program, and degree via online. Herein, it can be stated that there is a visible inspiration that has been come towards the societies at large (Salamat, Ahmad, Bakht, & Saifi, 2018). E-learning especially through World Wide Web has become the most possible and the common method because of the advancement of

new broadcasting technologies, communication and networking (Flavin & Quintero, 2018, as cited in Shah & Barkas, 2018).

Significance of moving forward with e-learning in the 'new-normal'

As an emerging tool of the modern technology, e-learning can be identified as an imperative component in most of the university settings today (Selim, 2007). Most importantly the instructors and facilitators have identified the the importance of designing and delivering the courses in a virtual environment in an attractive way as a mean of gaining the interest of the learners (Chakraborty & Nafukho, 2014). E-learning system has created an opportunity to entertain much more freedom in deciding how and when they have to interact (Sun & Rueda, 2012). Since the e-learning does not require a specific time or a place, the online courses are considere being attractive for students and for teachers as well. Thus, it ensures the ease of engagement (Lee & Choi, 2010).

Herein, it is significant to study the use of e-learning in today's context with relates to the educational institutions. In a context where the world has turned towards the emerging technologies in this ***'new-normal'***, most of the academics and the institutions have faced the challenge of implementing and the make the best use of the most suitable technologies. Because such kind of decisions should be taken more carefully as they directly impact on the effective interactions between the teachers and the students to improve the students experience (Little et al., 2009, as cited in Wdowik, 2014). According to Bates (2005), online learning represents the convergence of major advances and trends as if learning in non-traditional settings, widespread access to computing devices and telecommunication technology, which are fundamentally contributing to shape the modern society (Toro-Troconis, Alexander, & Frutos-Perez, 2019).

Student Engagement

Student engagement can be identified as a critical aspect that has been taking a growing importance in higher education literature. Further, it has been identified as the students' study patterns, the way they utilize their time, resources and relationships, and the way they communicate with their tutors, peers and organizations (Kahn, 2014, as cited in Shaha & Barkas, 2018). It is all about the time and efforts students devote for educationally purposeful activities (ACER, 2010, as cited in Shah & Barkas, 2018). Coates (2007) provided an aggregative view and defined: *"the inclusion of active and collaboratively learning, involved in challenging academic activities, meaningful interactions with teachers, involved in enriching educational experiences and feeling part of a learning community"* as the students' engagement (as cited in Wdowik, 2014). The engagement has been identified as a single dimension of behavioral aspect. But, according to the definition given by Natriello (1984), the student engagement is the students' participation in various

activities relating to learning where Mosher and MacGowan (1985) defined it as the attitudes of the learners towards the learning program or participatory behavior. Those definitions has basically focused on emphasizing the behavioral characteristics of engagement only.

In psychological perspective, the individual characteristics which are incorportaned with cognition, as if motivation, self-efficacy and expectations are also considered being a part of student engagement (Jimerson, Campos, and Grief, as cited in Shah & Barkas, 2018). According to Hu and Kuh (2002), student engagement is *"the amount of effort dedicated to educational activities that bringout the expected performance"* where Lewis et al (2011), defined it as *"the extent to which the learners' thoughts, feelings, and activities are actively involved in learning"* (as cited in Lee et al., 2019). Student engagement encompasses three major categoris as: behavioral - the consistancy in learning and effort with sustained concentration in learning; emotional - the interest in learning with excitement; psychological - preferences for challenges, independence and involvement in studies (Connelle et al., 1995, as cited in Lee et al., 2019). Considering the above definitions, it can be stated that both behavioral and emotional dimensions are included in the concept of engagement (Lee et al., 2019). However, when it comes to the psychological perspective, student engagement is about the extent of their motivation, self-efficacy and the expectation (Jimerson, Campos, and Grief, 2003, as cited in (Shaha & Barkas, 2018). In addition, the studies have provided explanations on the level of engagement as well. The level of engagement has been explained using the ***Model of Engagement (ME) developed by O'Brien and Toms (2008),*** especially use to assess the engagement with technology where it was suggested four main stages including: *point of engagement, engagement, disengagement, and re-engagement* (Katuk, 2013).

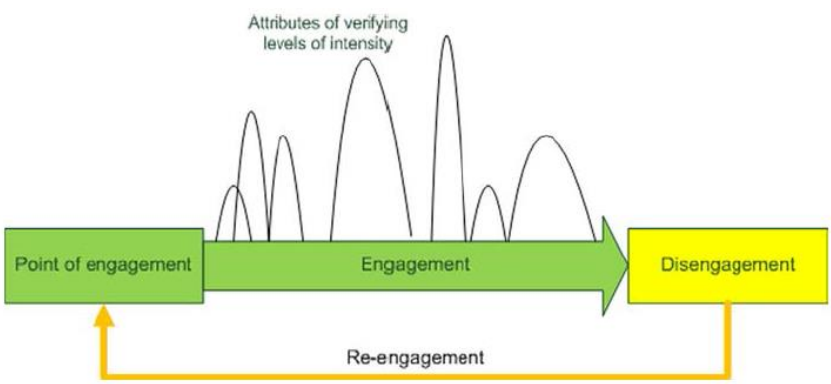

Figure 01: Model of Engagement (ME)
Source: Adopted from O'Brien and Toms (2008)

Despite the advantages of e-learning, less supervision and monitoring of the students' progress and because of lack of opportunities to provide feedbacks, it is alsways better for the academics and academic administrators to undertand what factors effect student engagement. Empirical evidence have suggested that the learning factors as if interest of the learners towards learning activities, self-efficacy and self-regulations are considered being possesing a positive relationship with student engagement (Bates & Khasawaneh, 2007; Dembo, Junge, & Lynch, 2006, Kanuka, 2005, as cited in Sun & Rueda, 2012). Chakraborty and Nafukho (2014) identified the factors as if creating and maintaining positive learning environment for the learners, building an effective learning community, providing a consistent feedback in timely manner, and using the most applicaple and productive tecnhonoly to deliver the right content. Moreover, Katuk (2013) suggested that the student engagement is a phenomenon which is changing over time in a positive or a negative way and most impotantly, he revealed that the pattern is directly influenced by the students' background of knowledge. However, it was found that to imrpove the academic achievement, teaching effectiveness, it is always important to develop more effective learning strategies that encourage student engagement (Rodgers, 2008). Furthermore, according to the framework of Chickering and Gamson (1987); ***'Seven Principles of Good Practices in Undergraduate Education'***, some more crucial aspects can be identified in which it was stated the student engagement is higher in the presence of these elements such as: increases the contacts between student and faculty, provide sufficient opportunities for students to work in coorporation, encourage students to use active learning strategies, provides timely feedbacks on students academic progession, requires students to spend quality time on academic tasks, establishes high stadards for acceptable academic work, and addresses different learner needs in the teaching process (as cited in Delialioğlu, 2012).

Dimensions of Student Engagement

Student engagement in higher education is recognized in three dimensions. According to Shah and Barkas (2018) they are: ***behavioral engagement, emotional engagement and cognitive engagement.***

Behavioral Engagment

Fredricks, Blumenfed, and Paris (2004), stated that the students who demonstrate the behavioral engagement would typically obey to the behavioral norms, as if involvement while teaching and daily attendance with less or absense of destruptive or negative behaviors (as cited in Shah & Barkas, 2018). According to Marks and Newmann (1992), all the observable behavioral characteristics are included in the behavioral engagement such as the level of effort dedicated by a student towards own learning. In other words, it is the extent of someone's learning achievement. But, when it comes to the emotional engagement it encompasses the emotions of a person

with relates to learning as if interest, boredom, and happiness (as cited in Lee et al., 2019). As explained by Finn (1989), student engagement includes behavioral factors such as participation and emotional factors like identification (as cited in Lee et al., 2019).

Emotional Engagement

According to Appleton et al. (2006) emotional engagement is similar to psychological engagement (as cited in Lee et al., 2019) where as explained by Fredricks, Blumenfed, and Paris (2004), the students who are engaged emotionally with the academic activities would experience some sort of affective reactions as if interest, sense of belonging, and enjoyment (as cited in Shah & Barkas, 2018).

Cognitive Engagment

As stated by Fredricks, Blumenfed, and Paris (2004), cognitively engaged students tend to invest more on their learning and strive harder to go beyond the requirements and would relish the challenges (as cited in Shah & Barkas, 2018). According to Lewis et al. (2011) and Fredricks et al. (2004), cognitive engagement encompasses the learners' thoughts towards learning, the effort they give mentally and the strategies they use to achieve the goals in their life (as cited in Lee et al., 2019).

Furether, ***performance engagment*** also identified as a dimension of student engagement in higher education apart from the aforesaid three dimensitons.

Performance Dimension / Perfromance Engagement

According to Lewis et al. (2011) academic engagement encompasses the activities which instigate an individual to invest in the learning tasks, tasks performance, and the grades. Further, Handelsman et al. (2005) indicated that the level of confidence an individual posses about the learning, grades, and test scores are related to the academic engagement and its further improvements (as cited in Lee et al., 2019).

Student Engagement in e-learning

It is extremely significant to identify the types of behaviors of the engaged individuals especially with relates to e-learning environments. According to Golladay et al. (2000) effective and successful online learners strive harder to discuss their learning with peers as they are highly motivated to learn, make a productive investment in terms of time and effort with the view of preparing for the lessons and are being able to utilize the technology more efficiently which is needed for their online learning. Further, as explained by Dabbagh (2004), effective online learners prepare the concepts relating to learning by themselves as they are able to use the online learning technologies, communicate with their peers. They also learn in a self-directed manner, and they possess a sense of belongingness to the learning community (Lee et al., 2019).

Engagement in e-learning is all about the subjective experiences that a

perosn gain or undergo during the interactions with e-learning environment (O'Brien and Toms, as cited in Katuk, 2013). Hence, it is important to focus on the empirical evidence which emphasize the significance of e-learning on the students' engagement. It was found that e-learning assist the students to enjoy a high level of flexibility to the learner with enhanced motivation to carry out their work without others' support. Additionally, it was found that the students feel more comfortable in using internet (Salamat, Ahmad, Bakht, & Saifi, 2018).

According to Lewis et al., (2011), level of efforts or interactions between the time or the resources used in learning that nurtures and develop the learning outcomes and experiences is known as student engagement. Murray (2018) stated that the students are being able to enhance their academic achievements as if their academic grades and critical thinking while applying the acquired knowledge into their life especially if they are highly engaged in their e-learning (as cited in Lee et al., 2019). Robinson and Hullinger (2008) conducted one of their studies focusing on student engagement in online learning declaring it as a new benchmark in higher education. Further, it was found that the quality of education and to ensure an active learning in the vietual class room can be assesed based on student engagement in the e-learning process (as cited in Lee et al., 2019). As explained by Allen and Seaman (2008), it is important for the students' success and to their progress. According to Topper (2007), the students' motivation is increased in time and they will possess a positive perception regarding the courses they are going through online modes (as cited in Leeds et al., 2013). According to Han and Johnson (2012), compared to the traditional education environment, the use of online learning has been identified as cost effective and convenient. It provides more opportunities to the learners to continue their studies (as cited in Chakraborty & Nafukho, 2014).

Similarly, as explained by Baker et al. (2009), the students who are far away from the university premises are being able to access the class content any time from any place via online modes. Most importantly the international students get an effective opportunity to take part in the courses of their choices (as cited in Chakraborty & Nafukho, 2014). The students' IT skills and their basic knowledge regarding the sector of IT are improving with the frequent of online learning process such as e-mailing, exploring softwares, chatting, taking part in the discussions, and the ways available to upload the assignments (Robinson & Hullinger, 2008, as cited in Chakraborty & Nafukho, 2014). According to Chen (2007), since the learners are required to use more time to think in certain aspects relating to subject matters, their critical thinking skills, expertize in judging, anaytical skills, and the ability to apply their knowledge into practical scenarios are being nurtured (Chakraborty & Nafukho, 2014).

Most importantly, the online claases help to overcome the challenges in front of the face-to-face class setting

as if manging complex class environments (Chakraborty & Nafukho, 2014). Student engagement strengthens the student satisfaction, student motivation to learn, reduce the sense of isolation, and the student performance; especially in online courses and classes (Martin & Bolliger, 2018). The interactions between the instructor and the learner in out side the classroom are connected with a number of positive outcomes as if academic success of the students, leaning and personal development and sense of belongingness (Johnson et al., 2007; Meeuwisset et al., 2010; Young & Sax, 2009, as cited in Wdowik, 2014). However, because of all these benefits, in today's' context, most of the higher education institutes strive harder to become sustainable enterprises and it was stated that the students' active involvement and their engagement in the academic activities are crucial in achieving the stated objective (Lee, Song, & Hong, 2019); especially during the post-pandemic of Covid-19.

Hong (2009) conducted a study focusing on the e-learners based in Korean context and identified certain types of behaviors as if the effort of planning a learning schedule, productive interactions with the instructors, colloborative learning, buildig knowledge, possessing the abilities of applying what they have learnt in the real life, and enlarging their own learning strategies while being more motivated to learn. According to Dixon (2015), most of the engaged learners possess skills like; regular studying, careful listining and reading while taking own notes, emotions as if effective efforts or the desigre of the individuals to learn. Moreover, such leaeners demonstrate participation by chatting, discussing, holding conversations and performing; especially by obtaining better grades by doing extremely well in the tests (Lee et al., 2019). Dwivedi et al. (2019), conducted a study focusing on the student engagement with online content in bleded learning and found that, the students' engagement is being increaesed if the online course is related to their syllabus. However, a significant difference was found among online learning process and face-to-face convensional learning interactions with facilitators.

Previous scholars have suggested a number of positive outcomes relating to the effects of online technologies on student achievement, learning and other educational outcomes with its unique benefits (Chin & Carroll, 2000, as cited in Wdowik, 2014). The informal communication between the learner and the instructor has been positively linked and strengthen the student satisfaction and retention (Cotten & Wilson, 2006; Nadler & Nadler, 2000, as cited in Wdowik, 2014).

Challenges of e-learning

It is apparent that, there are a number of challenges exist with the e-learning systems. It was identified that the lack of student motivation as one of the most critical challenges (Hussain, Zhu, Zhang, & Abidi, 2018). Another major challenge in e-learning was found to be the disconnection of students with their classmates and the lecturers (Shearer, 2003, as cited in

Gray & DiLoreto, 2016). It was stated that the level of engagement can be differ among individual learners, even when they carry out the same activity. Therefore, Macey and Schneider (2008) described it as a variable which can be characterized either as a behavior or a state where it was also stated that the level of engagement can also be changed as positive or negative during an online learning interaction (as cited in Katuk, 2013).

However, online learning environments reduce the interactions between students and instructors (Bullen, 1998 as cited in Chakraborty & Nafukho, 2014). Moreover, when it comes to the factors as if teamwork and team-spirit, it was found that within an e-learning environment, less attraction towards teamwork can be expected. In opposition, it was found that higher level of teamwork and self-efficacy can be observed in such an environment (Konak, Kulturel-Konak, & Cheung, 2019). Because of all these challenging outcomes, some researchers have concluded that there is an apparent dropout expect in future; especially in higher education systems of developing countries as one of the major concerns in front of the online interfaces (Lee & Choi, 2010).

Methodology

Participants and Procedures

This study was carried out as a cross sectional field study, predominantly applying the hypothetico-deductive approach, in which the researchers' interference on the study sample was minimum. The population of the current study comprises all the learning partners [undergraduates, diploma students and postgraduate students] of the Faculty of Commerce and Management Studies of University of Kelaniya who experienced online teaching & learning in the academic semester [March/April 2020 - July/August 2020] during the first wave of COVID-19 pandemic in Sri Lanka. Therefore, the unit of analysis is at the individual level. As the total number of observations in the population is known, random sampling was applied to select the study sample (as recommended by Saunders et al, 2011).

According to Gaskin (2010), the general rule is, for a good sample, it should have at least 50 + 15X number of observations; where X is the total number of items in the measurement scale anchored on Likert scale. Hence, in the current study, sample size would be [50 + 15*25] 425 observations. However, exceeding the required number of observations (425), 590 responses were received.

Survey questionnaire was adopted using the 'measurement scale; sustainable engagement in e-learning' developed by Lee, Song and Hong (2019). It was administered to the respondents directly via on-line mode, as a google form. They were assured that the results would be reported in aggregate to ensure their anonymity. Collected primary data via the survey questionnaire were analyzed with the aid of Statistical Package for Social Sciences (SPSS) and Excel employing descriptive statistics, Exploratory Factor Analysis (EFA), and One-way

ANOVA. Moreover, five individual interviews [over the phone] were conducted with five senior lecturers randomly selected from each academic department in the Faculty to identify the causes for the difference of students' engagement in e-learning among five departments.

Measures

Sustainable Engagement in e-Learning

The construct 'sustainable engagement in e-learning' was assessed using the measurement scale extracted from Lee, Song and Hong (2019). Twenty five (25) items were used to assess the construct which was anchored on a five-point Likert scale as in the original scale. Sustainable engagement in e-learning was operationalized through six dimensions; psychological motivation, peer collaboration, cognitive problem solving, interactions with instructors, community support, and learning management. Sample items include: 'Online classes enhance my interest in learning' (psychological motivation), 'I study the lesson contents with other students' (peer collaboration), 'I can derive new interpretations and ideas from the knowledge I have learned in my online classes' (cognitive problem solving.

Data Analysis and Results

Out of 900 questionnaires distributed, 645 respondents returned the filled questionnaires. However, out of those, 55 responses were discarded. Only 590 fully completed responses were entered into SPSS, and check for missing values and outliers. The effective rate of response after discarding ineligible responses from the sample (Saunders, Lewis & Thornhill, 2011) was 65.55%. Hence, the final sample of the current study consisted of 590 observations. Composition of the study sample is depicted in table 01.

Table 01: Composition of the sample [N=590]

Gender	Male	215	36.44%
	Female	375	63.56%
Category	Undergraduate	406	68.81%
	Masters	118	20.00%
	Diploma	66	11.19%
Academic Year [for Undergraduates]	1st Year	25	6.16%
	2nd Year	131	32.27%
	3rd Year	144	35.47%
	4th Year	106	26.11%

Department	Department of Accountancy	44	10.84%
	Department of Finance	80	19.70%
	Department of Marketing Management	39	09.61%
	Department of Human Resource Management	190	46.80%
	Department of Commerce and Financial Management	53	13.05%
District from which connected with the e-learning process	Ampara	03	0.51%
	Anuradhapura	12	2.03%
	Badulla	23	3.90%
	Batticaloa	01	0.17%
	Colombo	110	18.64%
	Galle	40	6.78%
	Gampaha	147	24.92%
	Hambantota	18	3.05%
	Jaffna	01	0.17%
	Kalutara	34	5.76%
	Kandy	29	4.92%
	Kegalle	22	3.73%
	Kurunegala	42	7.12%
	Matale	06	1.02%
	Matara	36	6.10%
	Monaragala	07	1.19%
	Nuwara Eliya	07	1.19%
	Polonnaruwa	08	1.36%
	Puttalam	15	2.54%
	Ratnapura	25	4.24%
	Trincomalee	04	0.68%

Source: Analyzed data, 2020

Reliability Statistics

To ensure the reliability of used standard measurement scales, internal consistency statistics were used. As recommended by Nunnally (1978) and Lu et al., (2007) construct reliability and the dimension reliability were assessed using the Cronbach's Alpha coefficient. As shown in table 02, Cronbach's Alpha values of all the variables are greater than 0.7 indicating that the multi item scale is reliable, and all the items have played a significant role in constructing the construct of students' sustainable engagement in e-learning.

Table 02: Reliability Statistics

Construct	Dimensions	No. of Items	Cronbach's Alpha
Students' Sustainable Engagement in e-Learning	Psychological Motivation	6	0.933
	Peer Collaboration	5	0.815
	Cognitive Problem Solving	5	0.886
	Interactions with Instructors	2	0.819
	Community Support	3	0.859
	Learning Management [Systems]	4	0.796
Students' Sustainable Engagement in e-Learning ***[Composite value]***		**25**	**0.951**

Source: Analyzed data, 2020

Descriptive Statistics

There are two basic measures of descriptive statistics widely used in social science research; mean and the standard deviation. If the value of standard deviation falls between -2 and +2, the variability of the construct is said to be accepted for further statistical analyses (Lu et al, 2007). Further, skewness measures the relative size of two tails of the distribution, whereas the kurtosis is a measure of the combined size of two tails; measuring the extent of probability in the tails. The value is often compared to the kurtosis of the normal distribution, which equals to 3. Mean, standard deviation, skewness and kurtosis values of the construct its dimensions are given in table 03. Descriptive statistics depict that students' engagement in e-learning across all the dimensions are high; as the mean values are above 03. Also, the variability of the mean values are accepted as the Standard Deviations are between -2 and +2. Students in the sample [N=590] have shown a higher degree of engagement in e-learning.

Table 03: Descriptive Statistics

Construct / Dimension	N	Mean	SD	Skewness	Kurtosis
Psychological Motivation	590	3.7729	.75866	-.569	.265
Peer Collaboration	590	3.6807	.63406	-.741	1.200
Cognitive Problem Solving	590	3.7088	.62935	-.640	1.292
Interactions with Instructors	590	3.2534	.83571	-.304	-.492
Community Support	590	3.4910	.77660	-.513	-.138
Learning Management	590	3.7479	.63139	-.688	1.610
Students' Sustainable Engagement in e-Learning	**590**	**3.6622**	**.56846**	**-.540**	**1.004**

Source: Analyzed data, 2020

Moreover, the level of engagement is classified into two groups as depicted in table 04. 87.80% of the respondents were highly engaged in e-learning during the afore-mentioned academic semester.

Table 04: Level of Engagement in e-Learning

	Level of Engagement	Count	Percentage
Students' Sustainable Engagement in e-Learning	High Level of Engagement	518	87.80%
	Low Level of Engagement	72	12.20%

Source: Analyzed data, 2020

Sampling Adequacy and Sphericity

Sampling adequacy and sphericity were ensured through the Kaiser-Meyer-Olkin (KMO) Measure and the Bartlett's test respectively. As the KMO coefficient is greater than 0.7 for all the dimensions, and the Sig. values are less than 0.05, statistically it is claimed that the study sample of 590 observations is adequate enough to proceed with Exploratory Factor Analysis (EFA). Further, results indicate that sufficient correlations exist among the dimensions to proceed, and in this study therefore, sampling adequacy is significant. Since the KMO measure of sampling adequacy meets the minimum criteria, there is no need to generate the Anti-Image Correlation Matrix. Results of the KMO and Bartlett's test are given in table 03.

Table 05: KMO and Bartlett's Test Statistics

Dimensions of Students' Sustainable Engagement in e-Learning	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Sig. Value of Bartlett's Test of Sphericity
Psychological Motivation	0.915	0.000
Peer Collaboration	0.792	0.000
Cognitive Problem Solving	0.875	0.000
Interactions with Instructors	0.500	0.000
Community Support	0.715	0.000
Learning Management	0.793	0.000

Source: Analyzed data, 2020

Exploratory Factor Analysis (EFA)

As mentioned by Hair et al., (2010) in EFA it is essential to report whether the items are deviated from its theoretically defined location with factor loading values and cross loading issues if any. As depicted in table 06, all the items are loaded into their theoretically pre-defined locations. Also, no any cross loading issues found. Factor Loading (FL) values are above the minimum expected level of 0.7 for all the items, and hence, the construct validity is ensured.

Table 06: Factor Loading Values of EFA

Items	Psychological Motivation	Peer Collaboration	Cognitive Problem Solving	Interactions with Instructors	Community Support	Learning Management
Enjoying learning *[Online classes enhance my interest in learning]*	.885					
Stimulating interest *[I am motivated to study when I take an online class]*	.876					
Usefulness of the course *[Online classes are very useful to me]*	.849					
Satisfied with the course *[It is very interesting to take online classes]*	.891					
Learning expectations *[After taking an online lesson, I look forward to the next one]*	.822					
Learning satisfaction *[I am satisfied with the online class I am taking]*	.871					
Requesting help *[I study the lesson contents with other students]*		.808				
Collaborative problem solving *[I try to solve difficult problems with other students when I encounter them]*		.824				
Responding to questions *[I work with other students on online projects or assignments]*		.688				
Collaborative learning *[I ask other students for help when I can't understand a concept taught in my online class]*		.743				

Items	Psychological Motivation	Peer Collaboration	Cognitive Problem Solving	Interactions with Instructors	Community Support	Learning Management
Collaborative assignments *[I try to answer the questions that other students ask]*		.719				
Deriving an idea *[I can derive new interpretations and ideas from the knowledge I have learned in my online classes]*			.826			
Applying knowledge *[I can deeply analyze thoughts, experiences, and theories about the knowledge I have learned in my online classes]*			.851			
Analyzing knowledge *[I can judge the value of the information related to the knowledge learned in my online classes]*			.854			
Judging value of information *[I tend to apply the knowledge I have learned in online classes to real problems or new situations]*			.799			
Approach with new perspective *[I try to approach the subject of my online class with a new perspective]*			.813			
Communicating with the instructor *[I communicate with the instructor privately for extra help]*				.920		
Asking questions *[I often ask the instructor about the contents of the lesson]*				.918		
Belonging to community *[I feel a connection with the students who are in my online classes]*					.914	
Connection with peers *[I feel a sense of belonging to the online class community]*					.867	
Interaction with peers *[I frequently interact with other students in my online classes]*					.869	

Items	Psychological Motivation	Peer Collaboration	Cognitive Problem Solving	Interactions with Instructors	Community Support	Learning Management
Self-directed study *[I study related learning contents by myself after the online lesson]*						.765
Managing own learning *[I remove all distracting environmental factors when taking online classes]*						.753
Managing own learning time *[I manage my own learning using the online system]*						.840
Managing own learning schedule *[When I take an online course, I plan a learning schedule]*						.814

Source: Analyzed data, 2020

Dimension Loading Values and the Variance Explained

According to the dimension loading values reported in table 07, composite loading values for the dimensions except for 'instructions with instructors' are above 0.7. Further, the percentage of variance explained by each dimension is above 50%. Hence, statistically dimensions of the outcome variable is accepted and could proceed with further analysis and decision making.

Table 07: Dimension Loading Values of EFA

Dimensions of Students' Sustainable Engagement in e-Learning	Loading Values [Composite]	Initial Eigenvalues	% of Variance Explained
Psychological Motivation	.853	4.501	75.016%
Peer Collaboration	.807	2.876	57.526%
Cognitive Problem Solving	.894	3.438	68.753%
Interactions with Instructors	.615	1.694	84.700%
Community Support	.790	2.342	78.077%
Learning Management	.810	2.520	63.007%

Note: Extraction Method: Principal Component Analysis; 1 component extracted.

Source: Analyzed data, 2020

As per the results of total variance explained and ESSL cumulative percentage of the composite variable *[sustainable engagement of university students in e-learning]* given in table 08, which is above 50%, it could be concluded that all six dimensions *[multiple items measurement scale]* together cover the variable adequately, and thus, could use it for further analysis and decision making.

Table 08: Total Variance Explained and ESSL-Cumulative%

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.835	63.924	63.924	3.835	63.924	**63.924**
2	.710	11.838	75.762			
3	.521	8.682	84.443			
4	.385	6.416	90.859			
5	.345	5.742	96.601			
6	.204	3.399	100.000			

Source: Analyzed data, 2020

Further, ANOVA test was conducted to test whether the respondent identification factors [demographics] are correlated with their engagement in e-learning. F values and the respective Sig. values of the One-way ANOVA are given in table 9. Except the academic department *[F Value = 5.985]* to which the student is attached, relationship of other factors with engagement in e-learning were found to be statistically not significant. Thus, as the academic department was found to be significant, Tukey HSD test of multiple comparisons was conducted.

Table 9: AVOVA Results

ANOVA - Sustainable Engagement in e-Learning

Factor	F Value	Sig.
District from which the respondent engaged in e-learning	.862	.631
Learning Category (Undergraduate /Masters / Diploma)	.520	.595
Academic Year (For Undergraduates)	1.601	.189
Academic Department	**5.985**	**.000**

Source: Analyzed data, 2020

According to the statistics of Tukey HSD test of multiple comparisons given in table 10, students' engagement in e-learning is

significantly different *[on mean extremes]* among four academic departments in the Faculty, except the Department of Marketing Management. To explore the causes for this difference among the departments, as individual interview was conducted with a randomly selected senior lecturer from each department.

Table 10: Multiple Comparisons - ANOVA

Dependent Variable: Sustainable Engagement in e-Learning

			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Department of Accountancy	Department of Human Resource Management	.25566*	.08778	**.031**	.0151	.4962
		Department of Finance	.40768*	.09847	**.000**	.1378	.6775
		Department of Commerce and Financial Management	.45403*	.10700	**.000**	.1608	.7472
		Department of Marketing Management	.22485	.11539	.293	-.0913	.5410

*. The mean difference is significant at the 0.05 level [Base - Department of Accountancy]

Source: Analyzed data, 2020

From the semi-structured, individual interviews had with senior lecturers, it is found that number of assignments per course, nature of those assignments, online lecture time *[peak time of off-peak time in zoom]*, learning activities designed for students other than lecturing, to actively engage in e-learning and level of close monitoring of student engagement through LMS are different among the academic departments. Further, the conduct of live-lectures via zoom or any other possible virtual platform is emphasized more effective to get a higher level of student engagement than merely uploading a recorded lecturer into LMS.

Conclusion

Building on the findings of the current study, it could be concluded that, flex-

learning which is termed as 'location-free' learning will be one of the future learning trends among university students in the domain of commerce and management. Further, facilitators and instructors should focus more on cognitive problem solving, psychological motivation, and learning management; included the on-line learning time, monitoring and the learning volume in e-learning sessions to foster the sustainable engagement in e-learning. Moreover, the current study concludes declaring that, to get the optimum level of sustainable engagement of university students in e-learning in a developing country like Sri Lanka in which the conventional free-education in physical setups are well-established, a hybrid mode of blended learning should be adopted accordingly as a better teaching-learning strategy. Finally, it is predicted that the traditional mode of students' politics in state universities will drastically be changed in the future as a result of this ***'learn from home'*** initiatives.

Implications

Insights and conclusions of the present study are useful for the academia and administrators of university education to take decisions on continuation and/or modification of e-learning strategies in higher education. Further, even though e-learning is not to continue in the whole degree program, in the long-run, the curriculum, courses and the evaluations must be adopted accordingly. Developing the needed IT infrastructure, and the training of users; included students, lecturers and administrators are another two key areas to be considered. Moreover, relevant changes to the higher education policy of the country to be done to get the optimum outcome from such initiatives, at least, until the end of this Covid-19 pandemic. Additionally, strengthening the students with awareness, technology, welfare and positive attitudes is strongly recommended to keep their engagement for a certain period of time. As well, the landscapes of the orientation program organized for new entrants will have be adopted accordingly without misconstruction of the university culture and traditions. Ultimately, it could be strongly suggested to re-install a ***'hybrid mode of blended learning'*** to get the engagement of students in the long-run.

Directions for Future Research

Despite some of the coherent boundaries, current study has achieved its pre-set objectives, and opened new possibilities for further studies in the domain of e-learning during the upcoming new-normal situation, especially in higher education. However, this study was limited to the Faculty of Commerce and Management Studies of University of Kelaniya. Hence, it is suggested for future researches to consider other faculties in the same university, and also the faculties of other universities which will provide rich insights via a cross validation of the current findings. Further, longitudinal studies are proposed to cross check the findings, and some more qualitative inquiries to discover new dimensions of sustainable e-learning and the

determinants of sustainable e-learning. Moreover, the used standard measurement scale is recommended for future researchers in the context as in the current study is has been accepted again ensuring its validity and reliability. Most importantly, it is suggested to conduct more research to examine the ***possibility of continuation of e-learning and its extent*** in future studies considering the academic staff and academic support staff as well; who are on the other end of this e-learning story.

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