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Research Article 02

Student Engagement in Teaching and Learning Environment: Evidence from Sri Lanka

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Abstract

The challenges faced by higher education institutions globally, particularly in Sri Lanka, regarding student satisfaction, retention, and employability are exacerbated by the recent global pandemic and economic crisis. The study focuses on factors within the universities' control, emphasizing the importance of student engagement as recommended by academic investigations. Using Astin's Theory of Involvement, combined with ecological system theory and teaching and learning environment models, the research explores the influences on student engagement, including the moderating role of technology. The literature review underscores the significance of teaching, student-peer relationships, teacher-student relationships, and campus and institutional environment. Employing a deductive approach, the study includes both state and non-state university students in the sample, revealing positive relationships between these variables and student engagement in the Sri Lankan context. Ultimately, the research contributes a comprehensive model to understand and enhance student engagement in Sri Lankan higher education. Further research in this area could focus on several key aspects to address the limitations and expand our understanding of effective strategies for promoting student engagement in higher education. Further, empirical studies are needed to evaluate the effectiveness of the proposed practical implications in diverse institutional settings. Researchers could conduct longitudinal studies or quasi-experimental designs to assess the impact of implementing these strategies on student engagement, learning outcomes, and overall academic success. Such studies would provide valuable insights into the scalability and generalizability of the proposed interventions

Keywords: Education technology, student engagement, teaching and learning environment

Introduction

Higher education institutions have placed significant importance on student engagement, a concept that has been extensively researched. Student engagement can be defined as "the energy and effort that students employ within their learning community" (Bond & Bedenlier, 2019).

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Scholars argue that higher educational institutions can derive substantial benefits from student engagement, as it is associated with improved academic performance (Wittrock, 1990), satisfaction (Webber, Krylow, & Zhang, 2013), retention (Leach, 2011), and loyalty (Junco, Elavsky, & Heiberger, 2013). The value of student engagement is now unquestionable (Trowler, 2010) and is considered a critical indicator of the success of higher educational institutions, often serving as a proxy for quality assurance (Kuh, 2009).

Despite decades of scholarly work on student engagement, some argue that the concept lacks theoretical guidance (Appleton, Christenson, & Furlong, 2008), possibly due to its intricate nature. Student engagement is consistently portrayed as a multidimensional and complex concept encompassing behavioral and cognitive components (Handelsman, Briggs, Sullivan, & Towler, 2005). Seminal works, such as the theory of involvement (Astin, 1984), the conceptualization of three dimensions of student engagement (Fredricks, Blumenfeld, & Paris, 2004), and social-cultural theories of student engagement (Kahu, 2013), have attempted to refine our understanding of this complexity. Critics (Zepke, 2018) call for further investigation and theorizing of the student engagement concept, often linking it with motivation (Lim, 2004; Reschly & Christenson, 2012).

Amid the global pandemic, student engagement has become even more challenging. The increased use of educational technology, including virtual classrooms, has made it extremely difficult for higher education institutions to maintain student engagement at expected standards. Educational technology has become an integral feature in the strategic development of modern higher education institutions (Henderson, Selwyn, & Aston, 2017; Almutairi & White, 2018), with an emphasis on digital literacy and information and communication technology skills (Redecker, 2017). Scholars globally have explored how educational technology can be managed to enhance student engagement, acknowledging its potential to increase self-confidence and involvement among university communities (Alioon & Delialioğlu, 2019; Junco, 2012). However, deploying the latest technologies is also considered a significant challenge, necessitating an understanding of the pressure faced by higher education institutions in implementing educational technology. With a focus on the recent challenges in student engagement, this study aims to address the influencing variables, particularly those related to the teaching and learning environment, and their impact on student engagement. Moreover, the study explores student behavioral intentions toward the use of educational technology, examining how these intentions influence student engagement. The concept of Behavioral Intention (BI), drawn from technology adoption models, is considered a suitable measurement for the actual use and acceptance of technology. The study seeks to understand how variance in behavioral intention can impact student engagement in higher education.

The importance of understanding behavioral intention in the context of educational technology arises from the recent development and accessibility of such technology. Technological advancements have significantly eased access to modern educational technology for higher education institutions. While over two hundred technology tools are freely available for use in higher education institutions (Bower & Torrington, 2020), the increased accessibility has led educators globally to integrate technology for greater student engagement. However, the efficient management of technology is crucial, as its improper use could lead to student disengagement (Wimpenny & Savin-Baden, 2013). Hence, the study emphasizes the need for theoretical direction in the execution of technology for student engagement in higher education.Integrating educational technology into teaching and learning involves significant planning and resource investment. Therefore, the study recognizes the necessity of understanding student behavior toward educational technology and its potential

impact on student engagement. The adaptation process of technology in education is viewed as an intricate phenomenon (Ronny, Fazilat, & Jo, 2019), with technology acceptance models considered useful for higher educational organizations (Berrett, Murphy, & Sullivan, 2012). Scholars have called for further empirical research on the integration of student engagement and the technology adoption process (Hennessy et al., 2019; Hew et al., 2019), emphasizing the need for investigation into the impact of educational technology on student engagement.

Numerous theories and models have been used to study education technology in terms of social and psychological aspects. A study by a group of scholars categorizes these theories into three categories: personal behavior theories, social behavior theories, and mass communications theories (Eric et al., 2015). This study focuses on personal behavioral theories, using technology adoption models such as TAM 1 and 2, and the Unified Theory of Acceptance and Use of Technology (UTAUT) to predict the behavioral intention of students toward educational technology. The study aims to articulate the impact of educational technology, measured through behavioral intention, on student engagement.

Therefore, this study aims to address significant gaps in existing research on student engagement within higher education, particularly in the context of Sri Lanka. Despite the extensive literature on student engagement spanning several decades, there remains a notable lack of exploration into the intersection between student engagement and the adoption of educational technology. This gap is particularly pertinent given the recent global pandemic, which has accelerated the need for online learning platforms. Furthermore, existing studies often prioritize the pedagogical aspects of student engagement, overlooking crucial socio-cultural, ecological, and psychological influences that shape students' learning experiences. Therefore, this research seeks to fill these gaps by examining the behavioral intentions of students towards educational technology adoption, drawing from established technology acceptance models. By addressing these gaps, the study aims to contribute to a more understanding of student engagement and facilitate the effective integration of educational technology into higher education practices in Sri Lanka.

Background and Context of the Study

Student engagement is considered one of the critical parameters in higher education. The National Student Engagement Survey (NSSE) and the United Kingdom Engagement Survey (UKES) are conducted annually to measure student engagement at the national level in the United States of America and the United Kingdom, respectively. These national surveys are key performance indicators for higher education institutions in these countries. Due to the significance of the student engagement concept, most universities in the United Kingdom have a senior-level official responsible for student engagement in the university hierarchy. The importance given to student engagement by universities is further justified by numerous empirical studies (Wittrock, 1990; Webber, Kyrylo, & Zhang, 2013; Leach, 2011; Junco, Elavsky, & Heiberger, 2013) that have demonstrated its positive impact on student satisfaction, retention, loyalty, and academic performance. There is also a significant relationship between learning outcomes and student engagement (Kuh, 2009).

Student engagement in higher education is a long-researched yet complex concept (Appleton, Christenson, & Furlong, 2008). "The theory of involvement" (Astin, 1984) attempts to guide researchers with a theoretical underpinning, suggesting that increased involvement in the environment leads to positive outcomes. Understanding the "environment" of higher education, where engagement can be encouraged, is crucial. In this study, the researcher combines two separate models proposed in the fields of teaching and learning and psychology

to derive meaningful empirical evidence for the "environment" as mentioned in the theory of involvement. The first model is proposed by Kember and Leung (2009) in their teaching and learning environment (Kember & Leung, 2009). In the development of nurturing generic capabilities, Kember and Leung propose a "Teaching and Learning Environment" that serves as a base to understand the theory of involvement for student engagement. The second model is the seminal work of psychology, "The Ecological System Theory" by Bronfenbrenner & Ceci (1994). This ecological theory, also known as the ecological child development theory, focuses on the immediate environment of a child in its developmental stage (Bronfenbrenner & Ceci, 1994). In a higher education context, a student can be considered as the centric point of this theory, understanding the development of the system. The detailed literature understanding of these two models is provided in the literature chapter of this study. Combining these two separate models reveals that the "Teaching and Learning Environment" gives a meaningful concept to apply as the environment to the theory of involvement. Thus, the focus needs to be given to the teaching and learning environmental variable to encourage student engagement.

Another area of this study focuses on students' behavioral intention and its influence on student engagement, driven by the increased use of education technology by higher education institutions. Traditionally, educational technologies, such as learning management systems, emails, and websites, were considered less interactive (Rueda, Benitez, & Braojosa, 2017). However, with the global pandemic, the use of educational technology, such as virtual classrooms, has been accelerated. Educational technology is viewed as a crucial tool for achieving multi-dimensional objectives in higher education institutions (Junco, Elavsky, & Heiberger, 2013). Studies have found that educational technology assists institutions in improving student adjustment to the new environment (Madge, Meek, Wellens, & Hooley, 2009) and enhances brand engagement by students. However, with the use of technology, the interaction and the engagement become more challenging in Sri Lankan context. (Gamage, Gamage, & Dehideniya, 2022) Digital platforms and social media in higher education have shown a positive relationship with student engagement and learning outcomes (Junco, Elavsky, & Heiberger, 2013).

Before the global pandemic outbreak, education technology was considered part of the support system, such as learning management systems, emails, and websites, which were considered less interactive (Rueda, Benitez, & Braojosa, 2017). Most of these technologies were used by higher educational institutions to share materials and instructions with students, resulting in less pressure on all stakeholders to use technology. However, with the pandemic outbreak, technology became a significant part of higher educational institutions, transforming core functions globally. Technology advancement has significant benefits in the education sector for both academics and students in the Sri Lankan context (Ekanayake & Weerasinghe, 2020). Higher education institutions were pressured to develop their processes, and academic and non-academic staff members were trained to adapt to educational technology. However, there was less emphasis on understanding students' behavioral intention toward educational technology. Further students face various challenges such as internet connection, inadequate faculty-student interaction, poor quality of video collaboration and inadequate access to devices in implementing education technology in Sri Lanka (Hayashi, Garcia, Mattawan, & Hewagamage, 2020). Another significant issue in the effectiveness of the educational technology usage in Sri Lankan context (Haththotuwa & Rupasingha, 2021)

The digital medium through educational technology has been very attractive to students over the years. It enables students to interact with instructors and engage in meaningful learning.

Scholars have argued that technological engagement could positively influence teaching activities (Kane & Fichman, 2009). A study by Laura, Jose, and Jessica (2017) argues that digital engagement can be utilized to improve the learning process of students, indicating that user-friendliness, flexibility, closeness, and the entertainment factor encourage engagement. However, the utilization of educational technology has been slow in higher education institutions, as it has been argued that negative influences from digital platforms could affect the learning process of students (Gonzalez, Gasco, & Llopis, 2015). Gonzalez, Gasco, & Llopis (2015) further explain that students could be reluctant due to privacy invasion during group discussions on technological platforms. Therefore, before the pandemic, higher educational establishments showed reluctance in implementing education technology in their core functionality, despite empirical evidence of significant benefits. It is understood that student behavioral intention toward technology acceptance has played a major part in the slow-paced implementation of education technology in higher education institutions (Junco, Elavsky, & Heiberger, 2013). However, due to the urgency of implementing education technology during the pandemic and subsequent fuel crisis in Sri Lanka, student readiness towards accepting technology has been overlooked. Researchers have warned that any mismanaged education technology could possibly lead to disengagement (Wimpenny & Savin-Baden, 2013). With the challenge of understanding the multifaceted student engagement concept, the expedited use of education technology has further complicated matters for higher educational institutes. Researchers have called for further investigation and theoretical direction in employing education technology in higher education (Antonenko, 2015; Karabulut-Ilgu, Jaramillo Cherrez, & Jahren, 2018).

Though the benefits of education technology are understood, Sri Lankan students have expressed their preference to the traditional face to face learning as well (Selvaras, 2020). Therefore, universities and institutions need to understand student readiness towards the use of technology to ensure they reap the fullest potential benefits of educational technology. The focus needs to be on understanding student acceptance towards technology, as any mismanaged education technology could possibly lead to disengagement. It is crucial to understand how students would react to the implementation of education technology and how it could possibly influence student engagement. The process of understanding student reactions to the implementation of technology has been a constant challenge in the higher education environment. The integration of educational technology into the teaching and learning environment and student readiness for integration need theoretical direction. Scholars have recommended the application of technology adoption process models in the integration of educational technology into the learning and teaching environment. With increasing complications, it is paramount to understand the education technology adoption process, which measures students' readiness toward educational technology. Therefore, student behavioral intention is an important parameter in the higher education landscape before making significant investments in Studies conducted on student engagement have consistently emphasized the need for contextualization (Kahu, 2013; Appleton, Christenson, & Furlong, 2008; Quin, 2017)

Research Problem

Researchers consistently affirm the positive correlation between student engagement and various benefits in higher education, such as satisfaction, loyalty, and academic performance (Wittrock, 1990; Webber, Krylow, & Zhang, 2013; Leach, 2011; Junco, Elavsky, & Heiberger, 2013). Astin's theory of involvement (1984) underscores the link between engagement and favorable performance outcomes. Despite this agreement, the constructs of student engagement from the teaching and learning environment remain debated due to its

multifaceted nature (Zepke, 2015). While scholars advocate for the benefits of effective student engagement, the variables within the teaching and learning environment influencing engagement are still under discussion (Kahu, Nelson, & Picton, 2017).

Amidst the technological advancements in Sri Lanka's higher education, student engagement holds paramount importance for service production in educational establishments (Dassanayake & Senevirathne, 2018). Students, often viewed as co-producers, play a vital role in the physical and mental engagement required for effective service production (Writz, Lovelock, & Chatterjee, 2018). Previous studies (Glapaththi et al., 2019; Dassanayake & Nishantha, 2018; Weerasinghe & Fernando, 2018) in Sri Lankan universities call for further investigation into meaningful engagement to improve student satisfaction and overall service levels.

The urgency to integrate educational technology into the teaching and learning environment has presented challenges to student engagement. Empirical evidence suggests a decline in student engagement in technology-mediated learning environments compared to traditional face-to-face settings in Sri Lanka (Riyath, Rijah, & Rameez, 2022). With attendance dropping significantly in virtual teaching environments (Rajanen, 2021), the need for theoretical guidance in technological integration becomes apparent. Despite global trends in adopting technology for enhanced consumer experiences, the higher education industry, including Sri Lanka, has shown reluctance due to privacy and security concerns (Gonzalez, Gasco, & Llopis, 2015). This reluctance persisted even before the pandemic, emphasizing the need to explore student readiness for technology adoption. In this study, the author explores students' behavioral intention towards the use of educational technology, derived from technology adoption theories. Existing research (Dassanayake & Nishantha, 2018) indicates a failure in achieving the primary objective of new technology implementation in Sri Lankan higher education. The complex nature of enhancing student engagement through technology engagement necessitates further investigation. Understanding the relationship model between individual dimensions of student engagement, teaching and learning environmental variables, and the behavioral intention of students in the technology-driven teaching environment is crucial for effective application and encouragement of student engagement

Problem Statement

Although the importance of student engagement has been widely acknowledged by scholars (Trowler, 2010), higher educational institutions require empirical assistance to understand and design the teaching and learning environment. Based on theoretical guidance, student engagement is influenced by the teaching and learning environment; however, the variables influencing student engagement have not been agreed upon. Further, the prominent three dimensions of student engagement need individual investigation against each environmental variable where student engagement is influenced. Therefore, any attempts towards the enhancement of student engagement without a thorough understanding of the cognitive, behavioral, and affective dimensions would lead to ineffective and unfavorable results for higher educational institutions.

In the Sri Lankan higher educational context, various attempts have been made to understand student engagement (Dassanayake & Nishantha, 2018; Glapaththi et al., 2019) and have found a significant lack of student satisfaction and inconsistency among state and non-state higher education institutes. The inconsistency could be due to the complexity and multifaceted nature of the student engagement concept (Bond & Bedenlier, 2019), and contextual differences in the local context, as mentioned (Zepke, 2015). Also, the deficiency in understanding the three-

dimensional engagement framework cannot be overruled, as local studies were predominantly focused on the behavioral elements of student engagement. For a country that spends a significant percentage on higher education (2.2% of the total expenditure in 2018 - World Bank collection of development indicators), it is needed to have a broader view of spending for higher engagement.

Further integration of educational technology could be challenging for higher educational institutions. Though empirical evidences have been revealed that educational technology can significantly assist higher education institutions in achieving their objectives (Junco, Elavsky, & Heiberger, 2013; Laura, Jose, & Jessica, 2017), the use of educational technology was accelerated due to the global pandemic. However, institutions face significant obstacles in investing and implementing educational technology due to various reasons. Empirical studies revealed that the use of educational technology had certain challenges even prior to the global pandemic. Security concern was one of the major burdens for institutions around the globe (Gonzalez, Gasco, & Llopis, 2015) at the deployment implementation of educational technology. While service industries are focusing on the enhancement of their consumer engagement through technology (Gunewardana, 2017), higher education institutes have to deal with the fundamental challenge of implementing educational technology, as mentioned above. Needless to say, technology-empowered organizations can connect with an enormous number of consumers and interact with them effectively (Lipsman et al., 2012). A study (Berthon et al., 2012) claims that engagement and communication through digital technology help organizations and consumers connect at a personal level. Despite the opportunities provided by educational technology, getting consumer engagement still seems to be a huge challenge for organizations. With the global pandemic and the compelling reasons to deploy educational technology, the complications of student engagement have risen further. Therefore, calls have been made for meaningfully integrating student perception in accepting educational technology in the teaching and learning environment. Empirical research argues mismanagement of educational technology could possibly disengage students from universities. However, the integration of student perception and the acceptance towards educational technology have not been investigated in student engagement studies. Technology adoption models provide theoretical guidance towards understanding technology acceptance, and this study aims to integrate the behavioral influence variable from the theory and understand how student engagement in the educational technology-enabled environment.

Therefore, this study aims to explore the holistic view in conceptualizing the influencing variables in the teaching and learning environment in the development of the student engagement concept in the higher education sector in Sri Lanka and the adaption towards educational technology and its influence over student engagement. Studies have shown that higher education institutions must think beyond the traditional pedagogical strategy for effective student engagement. Student engagement does not happen in a vacuum. Studies have shown that engagement has been influenced by a large number of contextual factors and engagement can grow over time (Appleton, Christenson, & Furlong, 2008; Kahu, 2013). Therefore, it is important to use a theoretical underpinning concept to understand the holistic view of student engagement, and the concept requires further expansion. In his theory of involvement, Astin (1984) had revealed the outcome of the process largely determined by the involvement process in the "environment." Therefore, the educational environmental influences have been discussed to get student engagement effectively above the traditional engagement methodology. The holistic view presented through the environmental influences will be compared with the widely accepted student engagement dimensions of cognitive, emotional, and behavioral engagement aspects presented by Fredricks et al., (2004) and Fredricks et al., (2016).

The second part of this study focuses on the student acceptance of technology and how it reflects on student engagement in the teaching and learning environment. Empirical research done with regard to higher education institutions in Sri Lanka revealed that Sri Lankan higher education institutions face significant challenges in terms of achieving learning outcomes, students' satisfaction, students' retention, and students' loyalty. With the global pandemic, most of the Sri Lankan higher education institutions have deployed educational technology to conduct their operation. However, empirical findings show that student engagement in such technologically enabled environments has significantly reduced in the Sri Lankan context. Therefore, student behavioral intention has been taken from the technology adoption model to understand student engagement in the teaching and learning

Research Questions and Objectives

With the broader context of understanding student engagement in a holistic view and the influence of behavioral intention on the engagement process, this study aims to answer the following research questions and achieve the below-mentioned objectives:

Research Questions:

1. What are the influencing variables of the teaching and learning environment on student engagement in higher education in Sri Lanka?
2. Is there any relationship between the teaching and learning environment and student engagement in higher education in Sri Lanka?
3. Is there any moderating effect from the behavioral intentions of students on student engagement and the teaching and learning environment in higher education in Sri Lanka?

Research Objectives:

1. To examine the influencing variables of the teaching and learning environment in higher education in Sri Lanka.
2. To examine the relationship between teaching and learning environment variables and student engagement in higher education in Sri Lanka.
3. To examine the impact of behavioral intention on student engagement and the teaching and learning environment in higher education in Sri Lanka.

Significance of the Study

The higher education industry in Sri Lanka is entering a new era as the education system undergoes reengineering. With the global pandemic situation and the virtualization of education posing enormous challenges to higher education institutions, student engagement has become increasingly important in recent history. According to the University Grants Commission (UGC) of Sri Lanka (2020), 194,366 students were qualified to enter the national university system. However, out of the total qualified students, only 43,882 students were enrolled in national universities, accounting for a mere 22.56% enrollment rate. The Ministry of Higher Education in Sri Lanka, in its vision statement, aims to become an international education hub of excellence for higher education. This vision statement has been reinforced by the accompanying mission statement, which aims to delight students and deliver results in an effective and efficient manner. With increasing pressure on the government in higher education placement, the Ministry of Higher Education has started accrediting private higher education institutions to offer degree-awarding status. According to the Ministry of Education website (December 2020), 21 alternative institutions have been approved to offer various degrees.

While the government seeks to address resource gaps in the higher education system through the private sector, it is also important to understand the challenges faced by the industry. Student engagement has been a key determinant in measuring the quality, satisfaction, and retention of students in higher education (Trowler, 2010). Though previous empirical research has agreed that engagement is derived from the teaching and learning environment, the common constructs in which student engagement occurs have not yet been agreed upon. Further, continuous calls are made to integrate educational technology into the process of student engagement, as evidence suggests that student engagement is positively influenced by educational technology (Junco, Elavsky, & Heiberger, 2013). However, studies suggest there is a requirement of clear theoretical guidance in the employment of educational technology in higher education for effective student engagement. Studies conducted in scope of Sri Lanka's higher education sector indicate that both state and private higher education institutions have failed to satisfy or meet the student requirements (Dassanayake & Nishantha, 2018; Glapaththi et al., 2019). Due to the lack of student satisfaction, some degree programs have experienced higher student dropout rates. Additionally, studies have shown that student academic performance has been affected by the lack of satisfaction. Furthermore, the deployment of educational technology in the system has significantly failed. Universities around the globe invest significant resources in building and developing educational technology, and Sri Lanka is no exception. However, the effectiveness of these technologies needs further guidance. Therefore, this study also aims to understand student behavioral intentions toward the technology adoption process and its relationship with student engagement. This study is an attempt to fill the knowledge gap in understanding student engagement in the Sri Lankan context and extend student engagement with the technology adoption dimension. By introducing a better understanding of student engagement to national state and non-state sector higher education institutions, this study aims to uplift student satisfaction, retention, and academic performance. These milestones are required in the higher education industry in Sri Lanka to establish the country as an international education hub of excellence.

Literature Review

The concept of student engagement in higher education literature has been extensively discussed. Student engagement is defined as the energy and effort students put into their learning community (Bond et al., 2020). It is a multidimensional concept comprising cognitive, affective, and behavioral components. Cognitive engagement involves self-motivated learning efforts, affective engagement relates to emotional attachment and belongingness, and behavioral engagement includes positive behaviors like participation and involvement in extracurricular activities. Empirical research has shown a positive relationship between student engagement and academic performance. Various studies emphasize the importance of teachers' enthusiasm, supportive relationships, and contextual factors in enhancing student engagement. The chapter also discusses different theoretical perspectives on student engagement, including behavioral, psychological, sociocultural, and holistic approaches. Additionally, it explores efforts to improve student engagement, highlighting the role of empathetic understanding, transparent communication, and positive teacher-student relationships in fostering meaningful engagement and learning outcomes. Theoretical models like the "Quality and effort model," "Theory of involvement," "Seven principles of good practice in undergraduate education," and the "Casual model of learning and cognitive development" have influenced research on student engagement. Scholars have emphasized considering various contextual factors, sociocultural influences, structural factors, and psychological influences when studying student engagement. The literature review also explores different dimensions of student engagement in higher education. It emphasizes the critical role of academic faculty members in encouraging student engagement and highlights

the importance of honesty, transparency, and behavioral attitudes in fostering engagement. Student persistence, psychological responses, and the relationship between students and faculty members are identified as crucial factors. Several studies are cited to support the importance of active and collaborative learning, student interactions with faculty, academic challenge, enriching educational experiences, and a supportive Campus and Institutional Environment in enhancing student engagement. The use of multiple communication channels and the integration of technology are found to be essential for higher engagement levels. The literature review discusses various theoretical models, including the Bioecological Model, and emphasizes the need for a holistic understanding of student engagement. It identifies key themes such as teaching quality, student-peer collaboration, teacher-student relationships, and Campus and Institutional Environment as influencing factors for student engagement.

In a study by Kember and Leung (2009), two dimensions where student engagement needs to be addressed were proposed. One is the teaching and learning environment, and the second one is the student generic capabilities. Under the teaching and learning environment, Kember and Leung propose the Teaching, Relationship between student and teacher, and peer relationship. However, the campus environment and the support services have not been looked into. Therefore, this study adapts the model proposed under the teaching and learning environment with the inclusion of the campus environment as discussed above. Accordingly, this study focuses on the teaching and learning environmental variable proposed by excluding the capability development section of the model proposed by Kember & Leung (2009). Therefore, it was very evident that most of the constructs were revolving around the teaching and learning environment. The Campus and Institutional Environment and student support system have also been given required merit by scholars. Based on the theoretical underpinning of Astin (1983), it was argued that enhanced involvement will enhance engagement and academic performance.

Based on the critical literature review, the following themes emerged as the influencing variables for student engagement:

1. Teaching (T)
2. Student Peer Relationship (SPR)
3. Teacher-Student Relationship (TSR)
4. Campus Environment (CE)

However, it was noticed that the “Technology” factor denoted in the bio-ecological model was not included in the influencing variable model. Therefore, Education Technology is discussed extensively in this chapter. The impact of educational technology on student engagement in higher education was discussed. It is observed that the increased usage of technology in teaching and learning aims to improve students' attitudes, discipline, and self-efficacy. The study emphasizes the shared responsibility of institutions and students for student engagement, which, if not managed properly, can lead to issues like lower retention rates and reduced satisfaction. Scholarly works reveal integration of technology is a challenging and complex process (Bishop & Spector, 2014). While integrating the technology to facilitate student engagement, technology acceptance and usage of technology are argued to be in a problematic state (Berrett et al., 2012). When analyzing the technological integration in higher education, measuring the students' acceptance of the technology has been proposed as a mechanism for successful integration of educational technology in the environment (Ronny et al., 2019). The technology adaption models one and two (TAM 1 and TAM 2) and the Unified Theory of Acceptance and Use of Technology (UTAUT) models have been widely used, finding that the “Behavioral Intention (BI)” leads towards the user behavior, thereby

facilitating technological use. Based on this empirical understanding, this study attempts to explore the UTAUT model and the BI as an influencing variable or a moderating variable to fill the gap which is coming out of the bio-ecological model for the "Technology" variable in understanding student engagement with the teaching and learning environment.

Research Methodology

The research methodology is crafted to investigate various aspects of student engagement, with a specific focus on the teaching and learning environment and the integration of technology. A positivism research philosophy is followed in this study with a deductive research approach. The time horizon applied in this study is Cross-sectional studies. The unit of analysis is the students as defined in this study. The online survey method was adapted with a 5-point Likert scale in the variable operationalization. Amos computer software version 22 was used for the data analysis of this study.

In order to comprehensively explore the impact of the teaching and learning environment on student engagement in higher education in Sri Lanka, the study encompasses both state and non-state institutions, covering undergraduate and postgraduate faculties. The total population consists of 423,702 students, based on the 2019 statistics from the University Grant Commission. A sample size of 384 students is determined with a confidence level of 95% and a confidence interval of 5%. The sampling method employed is stratified random sampling, with 90% representing undergraduates (27% state, 73% external) and 10% representing postgraduates. To measure variables in the teaching and learning environment, scales from the literature are utilized. The Student Engagement Questionnaire (SEQ) by Kember & Leung (2009) serves as a foundational tool. Scales for the campus environment and student support are derived from established sources such as the National Student Survey for Engagement (Kuh, G.D, 2001) and the Course Experience Questionnaire (McInnis, Griffin, James, & Coates, 2001). The operationalization of educational technology integration is based on two scholarly works (Chin Choo & Hallett, 2008; Srikanth, Rajiv, & Pu, 2015).

The hypotheses developed in this study aim to investigate the influence of various factors on student engagement within the teaching and learning environment. Firstly, in the dimension of teaching and learning environment, the constructs of teaching, student peer relationship, teacher-student relationship, and Campus Environment are considered pivotal. Teaching is identified as a significant determinant of student engagement, encompassing aspects such as active learning, teaching for understanding, assessment, and coherence of the curriculum. The hypothesis (H1) regarding teaching posits whether it has a positive influence on student engagement (H1b) or not (H1a). Secondly, student peer relationship (SPR) is proposed as another crucial factor affecting student engagement, with the hypothesis (H2) examining its potential positive influence (H2b) or lack thereof (H2a). Thirdly, teacher-student relationship (TSR) is highlighted as a key determinant of student engagement, with the hypothesis (H3) testing whether it has a positive influence (H3b) or not (H3a). Furthermore, the study explores the impact of the campus and institutional environment (CE) on student engagement, with hypothesis (H4) probing its potential positive influence (H4b) or lack thereof (H4a). Moreover, the cumulative influence of all these factors on student engagement is examined under the hypothesis (H5), investigating whether the teaching and learning environment has a positive influence (H5b) or not (H5a). Lastly, the study investigates the moderating effect of behavioral intention (BI) on student engagement in the context of educational technology integration, with hypothesis (H6) testing whether BI has a moderating effect (H6b) or not (H6a). These hypotheses collectively aim to shed light on the complex dynamics shaping student engagement within higher education settings.

The use of exploratory factor analysis (EFA) confirms convergent validity, with EFA values exceeding 0.7 indicating a high level of validity. The reliability of the construct is assessed through reliability analysis, which aims to establish consistency in measurement. This involves testing the stability and internal consistency of the measurement scale over time. The Cronbach's alpha coefficient is employed, with a value of 0.7 indicating good reliability. The findings of the survey suggest favorable outcomes for both validity and reliability measures, thus instilling confidence in the research instrument and its ability to accurately capture the intended variables.

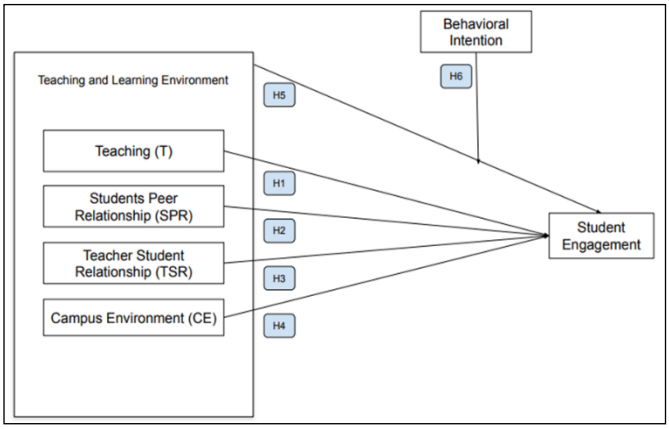

Figure 1: Conceptual Framework
Source: Designed by author based on theories and previous literature (2023)

Results and Interpretations

The data analysis was done with an exploration of the data overview and proceeded to delineate the data cleaning process. Following the cleaning procedure, attention was given to addressing missing data and outliers to ensure a dependable analysis. Subsequently, multivariate assumptions including tests for Normality, Linearity, Multicollinearity, and Homoscedasticity were conducted. Following the completion of the multivariate assumption tests, the correlation analysis was conducted to assess the relationships between all independent and dependent variables. The correlation analysis revealed positive relationships between independent and dependent variables, all of which were statistically significant.

Table 1: Correlation Analysis

		Teaching	**Teacher Student Relationship**	**Student Peer Relationship**	**Campus and Institutional Environment**
Student Engage	Pearson Correlation	.733**	.664**	.534**	.656**
	Sig. (2-tailed)	0	0	0	0
	N	384	384	384	384

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

Source: Eviews output (2023)

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) was subsequently executed to evaluate the model fit before developing the Structural Equation Model (SEM). The indicators for CFA demonstrated a satisfactory level of fit. The CMIN/DF value, which stands at 3.320, is typically deemed an acceptable fit. The CMIN/DF value, standing at 3.026, is generally considered to represent an acceptable fit in statistical modeling. Specifically, a CMIN/DF value below 3 is regarded as good, while a value below 5 is deemed acceptable according to Hu and Bentley (1999). For the Goodness of Fit Index (GFI), a value of 0.90 or higher is considered good, and 0.80 or higher is considered acceptable. However, in this study, the GFI for the Confirmatory Factor Analysis (CFA) is measured at 0.760, and the Adjusted Goodness of Fit Index (AGFI) is at 0.717, both indicating a fair fit based on Hu and Bentler's criteria. The Root Mean Square Residual (RMA) value of 0.045 is deemed a good fit, with a threshold of less than 0.08 considered as such according to Hu and Bentler (1999). Fit indexes, including NFI (Normed Fit Index) at 0.825, RFI (Relative Fit Index) at 0.804, IFI (Incremental Fit Index) at 0.875, TLI (Tucker-Lewis Index) at 0.860, and CFI (Comparative Fit Index) at 0.874, are observed in the CFA model and fall within the accepted range outlined by Hu and Bentler (1999). Parsimony-adjusted measures, including PRATIO, PNFI, and PCFI, are employed to evaluate the model fit while considering the number of parameters. A PRATIO value of 1.0 signifies a perfect fit, and both PNFI and PCFI values of 0.90 or higher are considered acceptable. Hu and Bentler (1999) suggest that these parsimony-adjusted measures indicate a fairly good fit of the model. The Non-centrality Parameter (NCP), measuring the discrepancy between observed and model-implied data, reveals a value of 1207.649 for the default model. The 90% confidence intervals for the NCP range from 1083.756 to 1339.132, suggesting that the default model is reasonably fitting the data according to Hu and Bentler (1999). A CMIN/DF value below 3 is generally considered good, while a value below 5 indicates an acceptable fit (Hu & Bentler, 1999).

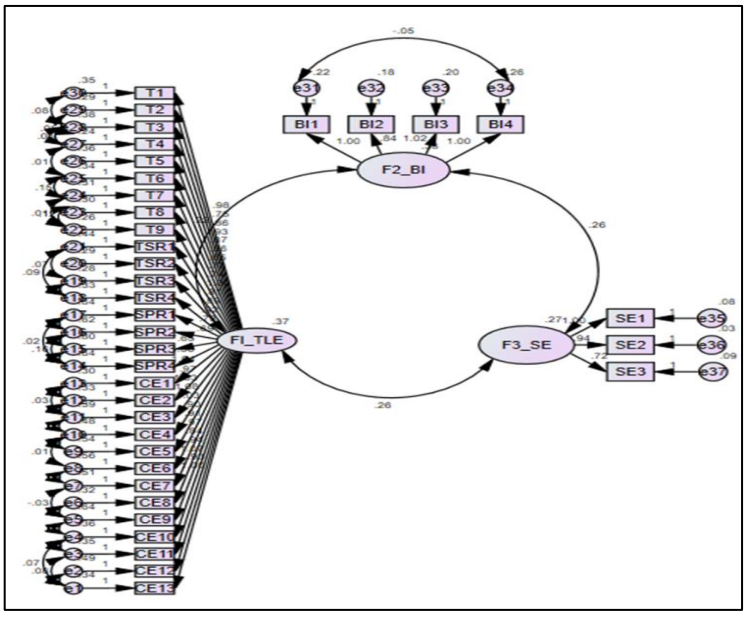

Figure 2: Confirmatory Factor Analysis
Source: Covariance-based structural equation modelling (2023)

Structural Equation Model (SEM)

The CMIN/DF value of 3.080 is generally considered to be an acceptable fit. A CMIN/DF value of less than 3 is generally considered to be a good fit, while a value of less than 5 refers to an acceptable fit (Hu & Bentler, 1999). GFI value of 0.90 or higher is considered to be a good fit, while a GFI value of 0.80 or higher is considered to be an acceptable fit. The observed GFI value is at 0.572 and the AGFI is at 0.546. These values are considered to be a fair fit (Hu & Bentler, 1999). The fit indexes are observed as NFI is at 0.662, RFI is at 0.651, IFI is at 0.744, TLI is at 0.734 and CFI is at 0.743 in the SEM model. According to Hu and Bentler (1999) these indexes are in the accepted range.

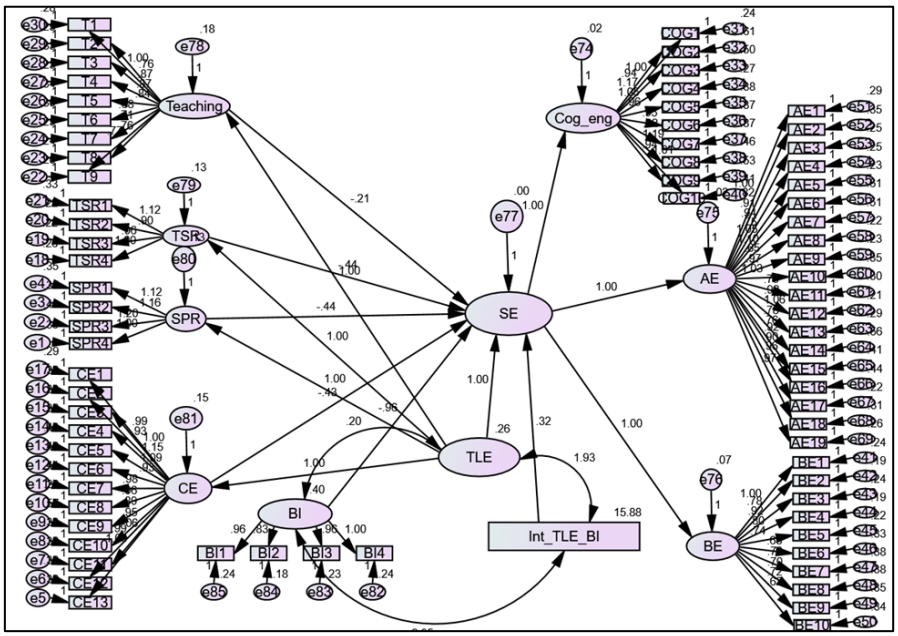

Figure 3: Structural Equation Model
Source: Covariance-based structural equation modelling (2023)

Discussion

This study aimed to investigate the influence of the teaching and learning environment on student engagement in higher education within Sri Lanka, while also exploring the moderating effect of students' readiness, measured through behavioral intention. The conceptual model, drawing from theories of involvement, bioecological models, and teaching and learning environmental models, identified four key variables within the teaching and learning environment: Teaching (T), Student Peer Relationship (SPR), Teacher-Student Relationship (TSR), and Campus and Institutional Environment (CE). The analysis, conducted through path analysis, regression analysis, and structural equation modeling, revealed significant positive relationships between all variables within the teaching and learning environment and student engagement. Moreover, behavioral intention was found to moderate this relationship, signifying the importance of students' readiness towards educational technology. Statistical tests confirmed the validity and reliability of the research instrument, while hypothesis testing supported the positive influence of teaching, student peer relationships, teacher-student relationships, campus and institutional environments, and the overall teaching and learning

environment on student engagement. These findings align with existing literature, emphasizing the pivotal role of these factors in promoting student engagement in higher education settings, particularly within the Sri Lankan context.

The study successfully identified and examined the influencing variables of the teaching and learning environment in higher education in Sri Lanka. Through rigorous analysis, it was revealed that variables such as teaching, student-peer interactions, teacher-student relationship, and Campus Environment are significantly influence student engagement. Further Robust positive correlations were observed between Teaching and Learning Environment Variables and Student Engagement. Further positive moderating effect of behavioral intention on student engagement was observed. Therefore, it is demonstrated that the student readiness towards embracing educational technology serves as a significant moderator in the relationship between the teaching and learning environment and student engagement.

Conclusion and Recommendation

This study endeavors to contribute to the understanding of student engagement in the higher education landscape, particularly within the context of Sri Lanka. Drawing on Astin's theory of involvement as the foundational framework, the research explores the multifaceted dimensions of student engagement, incorporating Teaching, Student Peer Relationship, Teacher-Student Relationship, and Campus Environment. The study recognizes the evolving landscape of education technology and its potential impact on student engagement, emphasizing the moderating role of behavioral intention derived from the technology adoption model. Based on the outcome of the empirical finding it can be concluded that the student engagement is influence by all independent variables discussed in this study and the behavioral intension has a moderating influence over the student engagement. Following recommendations can be derived from this study

1. Enhancing Teaching Practices: Based on the findings of this study, it is recommended that higher education institutions in Sri Lanka focus on enhancing teaching practices to foster greater student engagement. This can include implementing active learning strategies, promoting student-centered approaches, and providing professional development opportunities for faculty members to improve their teaching effectiveness.

2. Strengthening Student Support Services: Given the significant impact of student support services on engagement levels, it is crucial for institutions to invest in and strengthen support services such as counseling, academic advising, and mentorship programs. These services play a vital role in addressing student needs, promoting academic success, and fostering a supportive campus environment.

3. Integrating Technology Effectively: The study highlights the importance of integrating educational technology in higher education settings. Institutions should prioritize the effective integration of technology into teaching and learning processes, ensuring that it enhances rather than detracts from student engagement. This may involve providing training and support for faculty and students, as well as investing in technological infrastructure and resources.

4. Promoting Positive Campus Environment: Creating a positive campus environment is essential for promoting student engagement and overall well-being. Institutions should focus on initiatives to enhance campus culture, foster a sense of belongingness, and

promote inclusivity and diversity. This can include organizing extracurricular activities, events, and programs that promote student interaction and community building.

5. Incorporating Behavioral Intention in Educational Technology Adoption: Recognizing the moderating effect of behavioral intention on student engagement, institutions should consider the attitudes, perceptions, and beliefs of students towards technology adoption. Strategies to promote positive behavioral intentions towards technology use may include raising awareness, addressing concerns, and providing incentives for technology adoption.

6. Continuous Monitoring and Evaluation: Finally, it is recommended that institutions engage in continuous monitoring and evaluation of student engagement initiatives to assess their effectiveness and identify areas for improvement. This may involve collecting feedback from students, analyzing engagement metrics, and conducting periodic reviews of engagement strategies.

By implementing these recommendations, higher education institutions in Sri Lanka can enhance student engagement, improve academic outcomes, and contribute to the overall quality of higher education in the country.

Limitations

While this study provides valuable insights into practical implications for enhancing student engagement in higher education, it is essential to acknowledge some limitations. Firstly, the study primarily focuses on theoretical frameworks and practical strategies without exploring or validating their effectiveness. While the proposed strategies are grounded in established theories and best practices, their real-world applicability and impact may vary across different institutional contexts. Additionally, the study predominantly discusses the role of technology in student engagement, however it is importance to understand the potential challenges associated with its implementation. Factors such as digital inequality, privacy concerns, and technological disruptions could hinder the successful integration of educational technology and warrant further exploration. Furthermore, the study may overlook cultural or institutional barriers that could impede the adoption of proposed strategies, emphasizing the need for a more detailed understanding of contextual factors influencing student engagement. Lastly, the study does not explicitly address the potential financial or logistical constraints that institutions may face when implementing the proposed strategies, raising questions about their feasibility and scalability. Overall, while the study provides valuable insights and recommendations, further research is needed to address these limitations and offer a more comprehensive understanding of effective practices for promoting student engagement in higher education.

Further Studies

Further research in this area could focus on several key aspects to address the limitations and expand our understanding of effective strategies for promoting student engagement in higher education. Firstly, empirical studies are needed to evaluate the effectiveness of the proposed practical implications in diverse institutional settings. Researchers could conduct longitudinal studies to assess the impact of implementing these strategies on student engagement, learning outcomes, and overall academic success. Such studies would provide valuable insights into the scalability and generalizability of the proposed interventions.

Future research should explore the intersectionality of student engagement with other factors such as socio-economic status, cultural background, and individual differences. Understanding how these factors interact with institutional practices and policies to influence student engagement can help identify equity gaps and inform targeted interventions to support marginalized student populations. Moreover, there is a need for research that examines the potential drawbacks or unintended consequences of integrating educational technology into teaching and learning environments. Qualitative studies, surveys, or focus groups could explore students' experiences, perceptions, and concerns regarding the use of technology in education, shedding light on barriers to adoption and strategies for mitigating them. Additionally, researchers could investigate innovative approaches to fostering student engagement, such as gamification, experiential learning, or community-based initiatives. Exploring emerging trends and best practices in student engagement can enrich our understanding of effective pedagogical strategies and inform the development of evidence-based interventions.

Lastly, future research should consider the financial and logistical implications of implementing student engagement initiatives, particularly for resource-constrained institutions. Cost-effectiveness analyses, case studies, or comparative studies could provide insights into the feasibility and sustainability of different approaches, helping institutions make informed decisions about resource allocation and investment priorities. By addressing these research gaps, scholars can advance our understanding of student engagement in higher education and contribute to the development of evidence-based practices that promote equitable access, retention, and success for all students.

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