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Student Engagement, Self-Regulation, Satisfaction, and Success in Online Learning Environments

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2020

Abstract

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MPhil, University of the West Indies, Mona, 1985

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

An increasing number of higher education institutions are seeking to widen access to education using online learning environments. Transitioning to this learning modality requires institutions to focus on factors related to the constructs of student engagement, self-regulation practices, and student satisfaction as predictors of student academic success. Little research has been conducted on the 3 constructs and perceptions of student success in the English-speaking Caribbean. This quantitative cross-sectional study explored the relationship of the constructs and student success using the theoretical frameworks of Knowles' adult learning theory, self-regulation theory, and constructivism. An enhanced Moore interaction model was used to design a new instrument to measure the self-reported responses of learners and faculty. This instrument was determined to be valid by content experts and reliable using statistical methods. Using the convenience sampling strategy, 385 students and 61 faculty from a regional Caribbean institution were selected. Data were analyzed using descriptive statistics, correlation relationship between pairs of the constructs, and multiple linear regression relationship between the constructs and perceptions of student success. The findings showed that the construct pairs correlated significantly with each other. The findings also showed that student engagement, self-regulation, and satisfaction significantly predicted perceptions of student success. The potential findings could lead to positive social change in how universities approach the process of learning and instruction in online learning environments. The instrument might also be used as a preliminary model in higher education institutions in the Caribbean for predicting student success.

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Dedication

I dedicate this dissertation project to my mother, Florence Holness Commissiong, whose desire for knowledge and passion for excellence inspired me to strive for perfection in all that I do.

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Chapter 1: Introduction to the Study

Introduction

Online learning has become a popular means of greater access to higher education among students (Fonolahi, Khan, & Jokhan, 2014; Garrison & Vaughan, 2013; O'Connor, 2014; Stack, 2015). Despite the increased access, the retention rate of students using this learning modality remains a concern for higher education administrators. University and college administrators are constantly exploring ways to improve student persistence and student satisfaction of online learners. Student success is predicated on the ability of institutions to actively engage students in the learning process and increase students' use of self-regulation skills (Cho & Shen, 2013; Mello, 2016). While there have been numerous studies on student engagement, self-regulation practices, and student satisfaction globally, such studies are scarce in the English-speaking Caribbean. In this quantitative study, I focused on the relationship among the three constructs of student engagement, self-regulation practices, and student satisfaction and the impact of the constructs on perceived student success in the online learning environment at Caribbean higher education institutions. The research may address a gap in the literature on the exploration of student engagement, self-regulation practices, and student satisfaction together with perceptions of student success in a single study. The examination of the three constructs together is innovative not only in the Caribbean but also globally. The closing of the gap in knowledge has the potential to promote positive social change in the teaching and learning approaches adopted by universities to increase student satisfaction levels in online learning. In Chapter 1, I present the background to the research study and

describe the problem statement and purpose of the study. This chapter includes the research questions, which align with null and alternate hypotheses, theoretical framework, and the nature of the study. In the remainder of Chapter 1, I describe the assumptions, limitations, and significance of the research.

Background

In prior studies conducted in the English-speaking Caribbean, researchers have centered primarily on the transitioning process to the online learning platform (Beaubrun, 2012; Rhoden, 2013). Studies on the three constructs of student engagement, self-regulation practices, and student satisfaction have been conducted outside the Caribbean in combinations of two constructs at a time (Jackson, 2015; Johnson, Edgar, Shoulders, Graham, & Rucker, 2016; Kuh, Kinzie, Cruce, Shoup, & Gonyea, 2007; Larose, 2010; Mello, 2016; Pellas, 2014; Puzziferro, 2008; Wang, Shannon, & Ross, 2013; Zhang et al., 2015). There have been no studies on any one of the three constructs in Caribbean institutions and no studies on the relationship between these constructs and student success from the perspectives of students and faculty. The unique and innovative combination of the three constructs as one research project was a gap in the literature.

Problem Statement

Higher education institutions have begun to widen access to their programs of study using online learning platforms (Fonolahi et al., 2014; Garrison & Vaughan, 2013; O'Connor, 2014; Stack, 2015). The shift to online learning requires institutions to ensure student satisfaction through student engagement and self-regulation practices (Cho & Shen, 2013; Mello, 2016). The constructs of student engagement (Pera, 2013), self-

regulation activities (Chapman, 2015; Cho & Shen, 2013; Greer, Pokorney, Clay, Brown, & Steele, 2010; Wang et al., 2013; Zimmerman, 1989), and student satisfaction (Kauffman, 2015; Saeler, 2015) have been studied in both traditional and online learning environments. In these studies, researchers explored the impact of each of the constructs on students' learning experiences. Additionally, in studies conducted at colleges and universities, researchers examined only two constructs at a time to determine the relationship between the constructs within the pair. Previous researchers have focused on the relationships between the pairs of constructs of (a) student engagement and student satisfaction (Jackson, 2015; Johnson et al., 2016; Kuh et al., 2007; Larose, 2010); (b) student engagement and self-regulation (Boekaerts, 2016; Mello, 2016; Pellas, 2014; Zhang et al., 2015); and (c) self-regulation and student satisfaction (Puzziferro, 2008; Wang et al., 2013) in either traditional classrooms or online settings. These studies have shown a positive correlation between each of the constructs for the construct pairs of student engagement and self-regulation and self-regulation and student satisfaction. The relationship between the constructs of the construct pair for student engagement and student satisfaction has produced mixed results. According to Jackson (2015) and Kuh et al. (2007), a positive correlation exists between the constructs of student engagement and student satisfaction in the traditional environment. In contrast, Larose (2010) reported that the lack of attention paid to fostering student engagement in the online environment as opposed to the traditional classroom is the reason for poor student satisfaction rates at community colleges. Although studies have been conducted on two constructs at a time,

there is a gap in the literature as it relates to examining three constructs at a time in both the traditional classroom setting and the online environment.

In the English-speaking Caribbean, there is little documented research on comparisons between online and traditional environments related to educational practices, learning processes, student characteristics, and student outcomes. Consequently, there is a gap in the literature on the correlation between the pairs of constructs of student engagement, self-regulation practices, and student satisfaction. I explored this innovative relationship among the three constructs at the same time in online learning environments in an English-speaking Caribbean higher education institution. The closing of the gap in knowledge has the potential to promote positive social change in the innovative teaching and learning approaches adopted by universities to increase student satisfaction levels in online learning. The research would be of interest to faculty and administrators of English-speaking Caribbean higher education institutions in the design of innovative programs that are more responsive to the needs of the student population pursuing online education programs of study.

Purpose of the Study

The purpose of this quantitative research study was to understand the relationship among the constructs of student engagement, self-regulation practices, and student satisfaction and how this relationship impacts perceptions of student success in online learning settings at English-speaking Caribbean higher education institutions. To address the gap associated with the relationship among the three constructs and student success in the English-speaking Caribbean literature, I used the quantitative research approach,

specifically the cross-sectional design methodology, to establish patterns of correlation between the three constructs and patterns of regression between the three constructs and perceived student success in the online environment. I used survey instruments to examine the self-reported experiences of students and faculty concerning the constructs of student engagement, self-regulation practices, and student satisfaction and factors associated with student success in online programs of study.

Research Questions

The research questions in this study were used to determine whether there was statistical significance in the relationship among student engagement, self-regulation practices, student satisfaction, and perceived student success in online learning environments. The first research question relates to the correlation model:

RQ1: What is the relationship among the pairs of constructs of student engagement, self-regulation practices, student satisfaction in online courses?

The three sub questions and null and alternate hypotheses for the correlation model:

RQ1a: What is the relationship between student engagement and self-regulation practices in online courses?

$H_0$1a. There is no relationship between student engagement and self-regulation practices in online courses.

H_a1a. There is a relationship between student engagement and self-regulation practices in online courses.

RQ1b: What is the relationship between student engagement and student satisfaction in online courses?

$H_0$1b: There is no relationship between student engagement and student satisfaction in online courses.

H_a1b: There is a relationship between student engagement and student satisfaction in online courses.

RQ1c: What is the relationship between self-regulation practices and student satisfaction in online courses?

$H_0$1c: There is no relationship between self-regulation practices and student satisfaction in online courses.

H_a1c: There is a relationship between self-regulation practices and student satisfaction in online courses.

The second question and null and alternate hypotheses correspond to the regression model:

RQ2: To what extent do the constructs of student engagement, self-regulation practices, and student satisfaction relate to perceptions of student success in online courses?

$H_0$2: The constructs of student engagement, self-regulation practices, and student satisfaction do not relate to perceptions of student success.

H_a2: The constructs of student engagement, self-regulation practices, and student satisfaction do relate to perceptions of student success.

Theoretical Framework for the Study

The theoretical framework for this study encompassed Knowles' adult learning theory (Phillips, 2005), self-regulated learning theory (Zimmerman, 1989), and the constructivist model of Vygotsky that promotes student-centered learning (Ahn & Class, 2011). First, Knowles' adult learning theory indicates that adult learners exhibit self-directed learning characteristics during the engagement phase of the learning process (Phillips, 2005). Furthermore, the theory has been used to illustrate the characteristics and approaches employed by adult learners in learning environments, such as readiness and self-motivation to learn (Allen & Zhang, 2016). The alignment of these characteristics to the process of learning can provide insight into the relationship between student engagement, self-regulation practices, and student satisfaction in the online learning environment. Second, self-regulation models revolve around the motivational, behavioral, and metacognitive abilities of students (Zimmerman, 1989). All three abilities play a role in determining levels of student satisfaction in online learning (Artino, 2007; Puzziferro, 2008). Third, constructivism posits that student-centered learning positively impacts student engagement and self-regulation practices (Ahn & Class, 2011; An & Reigeluth, 2011; Chapman, 2015). These three theories support the constructs of student engagement, self-regulation practices, and student satisfaction in terms of enhancing student learning experiences in the online environment (Kauffman, 2015), details of which are given in Chapter 2.

Nature of the Study

The nature of this study was quantitative, using the cross-sectional research design. I sought to establish both a pattern of correlation between pairs of the three constructs of student engagement, self-regulation practices, and student satisfaction and a relationship between the three constructs and perceived student success. Using the cross-sectional design, I selected student and faculty participants using the nonprobability convenience sampling strategy. Although several researchers have developed instruments for the three constructs and student success, no one instrument incorporated all the measurable indicators in a single questionnaire. As a result, I developed an instrument for this study using the Moore (1989) interaction model as the common operational definition for all three constructs. The interactions comprised learner-content, learner-instructor, and learner-learner, and I incorporated a fourth interaction representing the learning environment in the form of the learner-online environment. In the final design of the instrument, I aligned the indicators of perceptions of student success to the operational definitions of the three constructs. The cross-sectional design is consistent with the collection of data on the level of experiences of faculty and students in real-life situations and allows for comparative studies in the online learning environment using statistical analytical methods.

Definition of Terms

For this research study, I defined the following terms:

Andragogy: A learning model that incorporates the life experiences of adults in the learning process. The model is linked to Knowles' adult learning theory, which

emphasizes the need for learners to self-direct their learning, become engaged in the learning process, and be intrinsically motivated (Allen & Zhang, 2016; Schultz, 2012).

Constructivism: A learning theory that fosters student-centered learning in a collaborative learning environment (Ahn & Class, 2011; An & Reigeluth, 2011).

Online learning: The use of a technologically enhanced platform for the delivery of courses and programs that provides a collaborative environment to foster relationships and community among learners and instructors (Cox & Cox, 2008; Yuan & Kim, 2014).

Self-regulation practices: Constitutes the ability of students to apply metacognitive, motivational, or behavioral skills in self-directed learning at the four collaborative interfaces or interactions of (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-online platform (Moore, 1989; Zimmerman, 1986, 1989).

Student engagement: Corresponds to the amount of effort that students expend in the active learning process at the four collaborative interfaces or interactions of (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-online platform (Kuh, 2003; Moore, 1989).

Student satisfaction: Correlates to the educational experience of students at the four collaborative interfaces or interactions of (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-online platform. Dimensions of student satisfaction include (a) academic achievement, (b) performance, (c) perceptions of the learning environment, (d) success, (e) persistence, and (f) quality of the instructional design, content, and delivery (Artino, 2007, 2008; Bolliger & Martindale, 2004; Kuo, Walker, Belland, & Schroder, 2013; Kuo, Walker, Schroder, & Belland, 2014; Moore, 1989;

Puzziferro, 2008; Reinhart & Schneider, 2001; Thurmond, & Wambach, 2004; Yukselturk & Yildirim, 2008).

Student success. Relates to the measure of student academic achievement attributed to satisfaction with the overall educational experience and the efforts of students to engage in the learning process and self-direct their learning. Dimensions of student success include academic achievement, such as pass rates, retention, persistence, and advancement (Ashby, Sadera, & McNary, 2011; Cuseo, 2007; Subotzky & Prinsloo, 2011).

Assumptions of the Study

For this research study, I made several assumptions. First, I assumed that survey participants' responses would represent the actual experiences of the learners and faculty. Second, I assumed that the institution's representative would send the survey instrument to all eligible participants. The remaining assumptions related to the correlation and regression models. Correlation assumed that the variables associated with the constructs of student engagement, self-regulation practices, and student satisfaction would be independent of each other. Multiple linear regression assumed a linear relationship between the predictor and outcome variables.

Scope and Delimitations

The scope of the study was limited to a regional institution in the English-speaking Caribbean. The population comprised both students and faculty members from programs that offer at least one course online. Programs using the traditional face-to-face learning model were excluded from the project. Before conducting the data analysis for

the study, I ascertained the validity and reliability of the instrument. For this study, I achieved content validity by engaging two experts with experience in teaching online learning courses. I received feedback on the comprehensiveness and relevance of each question and the representativeness of the entire instrument based on its purpose. I revised the questionnaire by clarifying question items and expanding the student success indicators. The current instrument comprises a 13-item scale for student engagement, a 13-item scale for self-regulation practices, a 5-item scale for student satisfaction, and a 14-item scale for perceptions of student success.

I determined the reliability of the new instrument through field testing, which I conducted at different higher education institutions. I did not use the data collected from the field test in the actual data analysis; I used the data to verify reliability through the calculation of the Cronbach's alpha statistic. I also used the data to establish construct validity based on preliminary factor analysis of the correlation between the three constructs of student engagement, self-regulation practices, student satisfaction, and factors aligned to perceptions of student success.

Limitations

The limitations of this quantitative research study were related to threats to internal and external validity. The threat to internal validity was reduced because the intent of the study was to generalize within the target population and not to determine cause and effect relationships between the predictor and outcome variables. Similarly, the use of a cross-sectional study minimized the threat to external validity as I sought only to establish a relationship between the variables in the target population.

Significance

I focused on combining the three constructs of student engagement, self-regulation practices, and student satisfaction at one time as experienced by faculty and students in the online learning environment in this quantitative study. This innovative approach to the unique combination of the three constructs helps fill a gap in the literature. The results of the research study might provide a model that can be used by institutions to predict the success of students based on their engagement, self-regulation practices, and levels of satisfaction. The research would be particularly useful to faculty and administrators designing instructional approaches that foster the alignment between the three constructs to meet student needs. Additionally, the potential findings could lead to positive social change in the way that universities approach the process of learning and instruction for the benefit of students in online learning environments.

Summary

In Chapter 1, I presented a summary of the research study as it related to the need for the project, its purpose and significance, and social change implications. The chapter also included the problem statement; research questions and hypotheses; research design model, including development of a new instrument; the rationale for the target population selection; and steps to minimize threats to internal and external validity.

In Chapter 2, I examine the theoretical frameworks of Knowles' adult learning theory, the self-regulated learning theory, and the model for a constructivist learning environment in setting the foundational principles of the study. The alignment of the frameworks to the three constructs of student engagement, self-regulation practices,

student satisfaction, and student success, and the operational definition is highlighted as essential to achieving the purpose of the study. The gap in the literature related to the exploration of the correlation of pairs of the three constructs and the innovative relationship of the three constructs and perceived student success in a single study is detailed.

Chapter 2: Literature Review

Introduction

The purpose of this quantitative research study was to understand the relationship among the constructs of student engagement, self-regulation practices, and student satisfaction and the alignment of this relationship to student success in online learning settings at English-speaking Caribbean higher education institutions. Numerous studies, outside of the Caribbean, have been conducted on the constructs of student engagement (Pera, 2013), self-regulation activities (Chapman, 2015; Cho & Shen, 2013; Greer et al., 2010; Wang et al., 2013; Zimmerman, 1989), and student satisfaction (Kauffman, 2015; Saeler, 2015) in both the traditional and online learning environments. Researchers have explored the impact between each of the constructs and students' learning experiences. Despite these studies, there is a gap in the literature concerning the study of the three constructs at the same time in the online environment. Additionally, there is a gap in the literature on the innovative relationship between the three constructs and perceptions of student success in a single study in the English-speaking Caribbean.

Higher education institutions have recognized the importance of developing and maintaining effective infrastructural systems to encourage learner persistence in the shift to online learning (Milman, Posey, Pintz, Wright, & Zhou, 2015). The design of these systems is required to satisfy the needs of learners while ensuring that students remain engaged in the learning process and apply self-regulation skills to succeed (Cho & Shen, 2013; Mello, 2016). In previous studies conducted at colleges and universities, researchers have combined or paired two constructs at a time to determine the

relationship between the constructs within the pair. Studies in the English-speaking Caribbean have centered primarily on the process of transitioning to the online learning platform (Beaubrun, 2012; Rhoden, 2013). A study of the innovative relationship between pairs of the three constructs would add value to the transition process for these Caribbean institutions as they seek to create an innovative learning space that is responsive to the needs of online learners. The following four points substantiate this innovation. First, there is little empirical data on the impact of any of the three constructs in the Caribbean as it pertains to higher education learners in both traditional and online learning environments. Second, there is no information on the study of any two of the constructs together in Caribbean institutions in the two learning environments. Third, there is no information on the innovative study of the three constructs together globally in the traditional and online learning environments in higher education. Fourth, there is no study examining the innovative relationship of the three constructs and student success together globally in traditional and online learning. Based on the gaps identified, this research study can create a positive social impact on the teaching and learning process employed at Caribbean higher education institutions in online learning. Additionally, a positive social change at the policy level may emerge because of the exploration of factors associated with student engagement, self-regulation practices, student satisfaction, and student success in a single study when institutions are transitioning to the online learning modality.

In this chapter, I present a review of the literature on Knowles' adult learning theory, self-regulated theory, and the constructivist model that supports student-centered

learning. My review includes the tenets of the constructs of student engagement, self-regulation, and student satisfaction and the alignment of the constructs to perceptions of student success. I conclude with a review of the online learning environment and the relationship between this environment and factors associated with the three constructs and student success.

Literature Search Strategy

For this literature review, I used the databases in the Walden University library related to Academic Source Complete, Education Source, ERIC, PsychINFO, SocINDEX, ProQuest Dissertations and Theses Global, and Google Scholar to search for the following keywords and terms: *transitioning to online learning, online learning environments, student engagement, self-regulation, student satisfaction, student success, Knowles' adult learning theory, self-regulation theory, constructivism,* and *constructivist model*. Keywords for the three constructs were searched first separately and then combined to ensure there was a gap in the literature on the study of the constructs at the same time.

The Online Learning Environment

As a preamble to the presentation of the theoretical framework, I conducted a literature review of the online learning environment to set the context for the study. The review focused on the transition to online learning platforms and the need for innovative change in the delivery of learning content. The review further linked the transition process to the constructs of student engagement, self-regulation practices, and student satisfaction and viewpoints of student success.

Higher education institutions are constantly seeking to widen access to their programs of study using online learning platforms (Fonolahi et al., 2014; Gallagher & LaBrie, 2012; Garrison & Vaughan, 2013; O'Connor, 2014; Stack, 2015). There also has been increasing demand by students for institutions to use multiple formats in the delivery of courses (Duesbery, Brandon, Liu, & Braun-Monegan, 2015). Accessing courses online or in a blended format of face-to-face and online delivery modes is an attractive and flexible option for both undergraduate and graduate students. The use of this modality is evident in the significant growth in the number of students enrolled in online courses in higher education institutions (Allen & Seaman, 2014).

The shift to online learning requires that institutions review their pedagogical approaches and strategies so that curricular designs accommodate learner diversity and learner needs in the online environment (Judge & Murray, 2017; Stocker, 2018; Sun & Chen, 2016). Cox and Cox (2008) and Yuan and Kim (2014) posited that providing a collaborative learning environment is an essential component of online learning platforms because it fosters relationships and a sense of community among instructors and learners. Yuan and Kim further asserted that this sense of community positively impacts student performance and student satisfaction levels.

The transition to using online learning platforms also depends on the abilities of instructors to adjust their teaching and learning norms for instructional delivery and time management skills (Martins & Nunes, 2016). Students expect instructors to establish or promote a sense of community and maintain an online presence so they feel supported throughout the entire learning experience (Loh, Wong, Quazi, & Kingshott, 2016;

Northcote, Gosselin, Reynaud, Kilgour, & Anderson, 2015). Student expectations were consistent with the main predictors for instructors' online teaching self-efficacy, which included learner satisfaction through engagement, use of instructional strategies, and class management (Horvitz, Beach, Anderson, & Xia, 2015).

Technology Adoption and Acceptance

The successful delivery of online educational content is further predicated on the acceptance and use of technology by students and their perceived level of technical self-efficacy (Castillo-Merino & Serradell-López, 2014; Cheung & Vogel, 2013). Several models have been proposed to measure the level of acceptance of technology use by students in learning environments. These models include the technology acceptance model (TAM; Davis, 1989) and the unified theory of acceptance and use of technology (UTAUT; Venkatesh, Morris, Davis, G. & Davis, F., 2003), both of which rely on the principle of an intent to use the technology and the associated behavioral patterns of actual use.

TAM and UTAUT have been applied to studies in higher education institutions using traditional, blended, and online learning modalities (Attuquayefio & Addo, 2014; Awwad, & Al-Majali, 2015; Dečman, 2015; McKeown & Anderson, 2016; Nagy, 2018; Padhi, 2018; Sattari, Abdekhoda, & Gavgani, 2017). In all the studies, the importance of placing emphasis on institutional technical support was underscored, particularly in online learning environments. Additionally, differences in technology adoption and usage between undergraduate and graduate student cohorts suggested that it was important to adjust approaches to content delivery of course materials between the two groups in the

online learning environment (McKeown & Anderson, 2016). In this study, graduate students were more likely to accept readily and adopt the use of technology in the learning process over undergraduate students.

In studies of technology acceptance and adoption in the Caribbean region, researchers have focused primarily on mobile learning and UTAUT (Thomas, Singh, & Gaffar, 2013; Thomas et al., 2014). Findings suggested that the context in which studies using UTAUT were conducted played a significant role in determining the effects of technology adoption among students at the higher education level. According to Thomas et al. (2013), contextual factors related to non-Western cultures or country-specific differences tended to contradict some of the UTAUT relationships, particularly those relationships involving facilitating conditions and attitudes of technology users. Thomas et al.'s (2013) research showed that similar uncharacteristic outcomes could occur when exploring students' online learning experiences in studies conducted in regions outside the United States, such as the English-speaking Caribbean, and justifies the need to establish contextual baselines in these countries.

Sense of Community and the Interaction Framework

In initial studies, researchers proposed that social presence, cognitive presence, and teaching presence were fundamental constituents for the successful delivery of online educational content (Garrison, Anderson, & Archer, 1999). Subsequent researchers explored the relationship between the three constituents and the relative importance of each constituent on the online teaching and learning process (Garrison, Anderson, & Archer, 2009; Ke, 2010; Kehrwald, 2008; Tallent-Runnels et al., 2006; Wallace, 2003).

Although there was general agreement that the three constituents were integrated and transposable, there was divergence in the hierarchical importance of the constituents. Garrison et al. (2009) positioned cognitive presence as the pivotal constituent; Kehrwald (2008) concentrated on social presence; and Ke (2010), Tallent-Runnels et al. (2006), and Wallace (2003) placed teaching presence as the key constituent. Given that the three constituents involved both student and instructor interactions, they were reviewed as being synonymous with social interaction, cognitive interaction, and teaching interaction. All three interactions were considered influential in promoting a community of learning and a community of learners in asynchronous and synchronous online settings (Sun & Chen, 2016).

Sher (2009) recognized three types of interactions that occur in the online learning environment. These interactions were previously presented as a framework and pertained to student and instructor, student and student, and student and educational content as it related to the traditional learning environment (Moore, 1989). Additionally, Garrison et al. (2009) aligned social presence (interaction) to student participation or student engagement and teaching presence (interaction) to the activities between the student and content or self-regulation skills. Ke (2010), on the other hand, likened cognitive presence (interaction) to perceptions of student satisfaction and a higher level of student success.

Other researchers have expanded the original interaction framework to include a learner-interface interaction (Hillman, Willis, & Gunawardena, 1994) and instructor-instructor, instructor-content, and content-content interactions (Anderson & Garrison, 1995). I used the original Moore interaction model of student-instructor, student-student,

and student-educational content as a foundation for this study. In addition, I introduced a fourth interaction component, the learner-online platform interaction, to explore the interplay between the learner and the online learning space. This newly constructed interaction model comprised the subdivisions (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-online platform, and was named the *four-phased interaction model*.

Theoretical Framework

I used three theoretical frameworks as the basis for exploring the association between pairs of the three constructs of student engagement, self-regulation practices, and student satisfaction and the relationship between the three constructs and student success. These theoretical frameworks are Knowles' adult learning theory (Knowles, 1975; Phillips, 2005), self-regulated learning theory (Zimmerman, 1989), and the constructivist model of Vygotsky that promotes student-centered learning (Ahn & Class, 2011). Each framework is presented separately below and shows the alignment between the theory and the three constructs and student success.

Knowles' Adult Learning Theory

I conducted the study at a higher education institution and used Knowles' adult learning theory as the foundational theoretical framework. Knowles' adult learning theory is aligned with the andragogical model that incorporates and values the life experiences that adults bring to the learning process (Schultz, 2012). Owing to the participatory role of the adult learner, emphasis is placed on facilitating self-directed learning as opposed to instructor-directed learning. Studies have shown that a larger

number of adult learners are more likely to choose the online learning model over the traditional learning model due to financial, family, and work responsibilities when compared to the choices of recent graduates (Aragon & Johnson, 2008; Hachey, Conway, & Wladis, 2013; Ke, 2010; Rotar, 2017; Xu & Jaggars, 2011). The online learning environment requires students to be actively engaged in activities that foster the six tenets of Knowles' adult learning theory (Allen & Zhang, 2016; Schultz, 2012). These tenets underscore the learner's ability to (a) develop a need or longing for acquiring knowledge, (b) establish a learning baseline or foundation, (c) self-conceptualize, (d) position oneself in a cognitive state of readiness to achieve goals, (e) develop problem-centered skills, and (f) become a self-motivator. Chief among the characteristics of the adult learner is the correlation that exists between self-directed learning and learner engagement, where learner motivation is intrinsically stimulated.

Contrary to this belief, Phillips (2005) proposed that self-directed learning must be externally stimulated first for learners to become engaged. Phillips further purported that once extrinsically motivated engagement occurs, continuous engagement of the adult learner in the learning process is replaced by intrinsically motivated engagement. The notion that self-directed learning is not always intrinsically motivated was supported by Cox (2015), who cited an actual example of a conversation held with an adult learner. Like Phillips' proposition, this learner had to be externally driven to complete the program of study.

Studies grounded in the Knowles' adult learning theory have shown that both the online learning environment and instructional content need to be technology-driven to

foster self-directed learning (Schultz, 2012). Schultz (2012) illustrated the link between learner-centered curriculum and an interactive learning environment in the development and implementation of an online GIS certificate program. The proposed model used for the design of the program focused on "learning success in a student-centered adult distance learning environment" (p. 51). In this model, there was alignment between the characteristics of the adult learner and the facilitator's best practice approaches to content delivery. Given that Knowles' adult learning theory is predicated on students taking charge of their learning, it follows that the theory is correlated with the constructs of student engagement, student self-regulation practices, and by extension, student satisfaction and student success.

Self-Regulated Learning Theory

The study of self-regulatory processes has been of interest to many researchers over the years, particularly in the social learning context (Zimmerman, 1989; Zimmerman & Martinez-Pons, 1988). Zimmerman (1986) proposed a definition for self-regulation in the academic setting that aligns learner metacognitive, motivational, and behavioral competencies to academic performance and success. Zimmerman (1989) further postulated that the theory for self-regulation learning requires learners to apply self-directed learning strategies and perceptions of skills self-efficacy to achieve academic targets. In this study, I used the three components of self-regulation to explore the learner's ability to control and optimize the learning process. Metacognition involves strategies that lead to the continuous cycle of self-instruction and self-evaluation (Zimmerman & Martinez-Pons, 1988). Motivation, which is intrinsically driven,

enhances the perceptions of self-efficacy to accomplish learning tasks and activities, and behavior leads to the social interactions that take place within the learning environment. The theory of self-regulation has led to studies related to the implementation of strategies geared towards the achievement of learning outcomes, particularly in the online environment (Tabak & Nguyen, 2013; Wandler & Imbriale, 2017). These studies supported the use of the Zimmerman self-regulation model in online learning platforms, particularly due to the online social interactions necessary for student success (Kitsantas, & Dabbagh, 2011; Lai, 2011; Lear, Linda, & Prentice, 2016).

Constructivism

Constructivism emerged as a learning theory based on the contributions by philosophers Piaget on cognitive development through the construction of knowledge and Vygotsky on the social context of cognitive development (Brown, 2014; Guo, 2018; Johnson, 2017; Wang, 2014). The Vygotsky approach to the constructivist theory fosters student-centered learning in a collaborative learning environment (Ahn & Class, 2011; An & Reigeluth, 2011). Focusing on higher-order critical thinking skills, the constructivist model supports self-regulated learning, student engagement, and social and cognitive interaction skills. The creation of a collaborative learning environment is a critical requirement for online learning platforms as it allows students to take an active part in the learning process.

Further, it is argued that the online learning environment is better aligned to the constructivist model than the traditional mode of learning as the online platform allows learners to create meaning from their interactions with the learning content (Guo, 2018;

Johnson, 2017). A collaborative learning environment also is integral to the application of the andragogical learning model (Ahn & Class, 2011; An & Reigeluth, 2011). Studies illustrating the use of the constructivist model confirmed that student competencies to direct their learning were strengthened through engagement, collaborative, and technological supportive activities to produce positive learning outcomes (Blayone, vanOostveen, Barber, DiGiuseppe, & Childs, 2017; Chitanana, 2012; Cortés & Barbera, 2013; Seo & Engelhard, 2014).

Alignment of the Theoretical Frameworks to the Interaction Theory

The interaction and interplay between Knowles' adult learning theory, self-regulated learning theory, and the constructivist model are evident from the literature review conducted, and the three theories present a comprehensive, integrated framework within which the study can be conducted. Furthermore, the theories are linked to the successful delivery of the learning content through the creation and alignment of the components of a social presence, cognitive presence, and teaching presence in the online environment. These three components are synonymous with Moore's (1989) interaction theory that identifies three types of interactions occurring in the learning process, that is, learner-content, learner-instructor, and learner-learner interactions. These interactions result in learners playing an active role in student engagement and self-regulation activities as a means of achieving student satisfaction and student academic success.

Student Engagement

Numerous studies have been conducted on student engagement in the traditional and online learning environments (Centner, 2014; Czerkawski & Lyman, 2016; Dixson,

2015; Handelsman, Briggs, Sullivan, & Towler, 2005; Kuh, 2003; Mello, 2016; Pellas & Kazanidis, 2015; Robinson & Hullinger, 2008; Schreiber & Yu, 2016). These studies linked student engagement to the key factors impacting the learning process inclusive of instructional design and delivery, technology support, self-regulated or self-directed learning, student satisfaction, persistence, student performance, and student academic success. The role of the instructor in fostering student engagement also has been explored and found to be an additional key factor, particularly considering the transition process to online platforms (Cho & Cho, 2014; Ma, Han, Yang, & Cheng, 2015). More recently, there has been a focus on the relationship between engagement and the collaborative learning environment and associated tools due to the rapid advances in technology and digital resources (Donaldson et al., 2017; Hew, 2016). Technology has been found to enhance the collaborative environment through the creation of active learning sites.

The definition of student engagement remains elusive, and the challenge to finalize and accurately describe the term is based on how scholars conceptualize the construct in the field (Azvedo, 2015; Dixson, 2015; Sinatra, Heddy, & Lombardi, 2015). The definition proposed by Kuh (2003) that engagement correlates to the amount of effort expended by the student in the learning environment was used in this study. This description of student engagement appears to be widely accepted as it was used to develop the National Survey of Student Engagement (NSSE) instrument: an instrument that is recognized as valid and reliable throughout the educational sector (Dixson, 2015).

Since the implementation of the NSSE, other engagement measurement tools have emerged (Dixson, 2010, 2015; Handelsman et al., 2005; Ouimet & Smallwood,

2005; Roblyer & Wiencke, 2004). A study of student engagement in the traditional learning environment revealed that four basic elements were in alignment with the Kuh (2003) definition (Handelsman et al., 2005). The engagement elements comprised skills (effort), emotional (connection to course material), participation/interaction (interactions with course content, peers, instructors), and performance (achieving desired goals). While these engagement elements were fundamental in the development of the Online Student Engagement Scale (OSE; Dixson, 2010, 2015), Schreiber and Yu (2016) applied the themes of the South African Survey of Student Engagement (SASSE) to the study of student engagement and academic achievement. These themes encompassed academic challenges, learning with peers, experience with staff, and campus environment. I applied the engagement elements used by Dixson (2010, 2015) and the SASSE themes which address the active learning components theorized by Vygotsky (Ahn & Class, 2011; An & Reigeluth, 2011) to the four-phased interaction model and used the elements as the foundation for the development of the instrument for this study. The combined engagement factors are depicted in Table 1.

Table 1

Type of Interactions and Engagement Factors

Type of interactions	Engagement factors of learner
Learner-content	Applies critical thinking skills Integrates own views with that of others Prepares study notes Applies learning to real-life situations
Learner-instructor	Interacts with instructor Discusses academic performance and other matters related to academic goal achievements Obtains meaningful feedback on assignments Understands better difficult concepts and content after interaction
Learner-learner	Collaborates as one-to-one or as a group Interacts with peers on mastering course material Respects peer differences Values peer differences
Learner-online platform	Uses learning space to participate in course activities

Challenges to Student Engagement

Student engagement has been established as a key component of the learning process. Despite this recognition by researchers and scholars, Khan, Egbue, Palkie, and Madden (2017) reported that faculty faced challenges in fostering student engagement in online learning spaces. Most of these challenges related to the transfer of traditional instructional methods to the online environment without modifying these methods for suitability in online settings. Khan et al. explored the mechanisms that could be employed in increasing the level of participation and engagement among learners and concluded that incorporating active learning strategies in the design and delivery of instructional content was a critical requirement. The quantitative instrument for this study included an examination of learning mechanisms using in the online learning spaces.

Other challenges of student engagement in the online learning environment related to the mechanisms employed by students in their decision-making processes. Kahn, Everington, Kelm, Reid, and Watkins (2017) examined the need for students to engage in reflexive or involuntary reflective thought or activities when considering the actions to take about the demands of online learning. In the decision-making process, students first aligned the cause and effect of proposed actions to their social contexts prior to exercising the appropriate actions. The Kahn et al. research study demonstrated that the process of reflexivity could either encourage or discourage student engagement actions where the latter could lead to frustration and eventually program withdrawal. By understanding this dynamic relationship between reflexivity and engagement, educational institutions can implement measures to promote active learning and engagement practices.

Student Self-Regulation Practices

The practice of self-regulation is predicated on the ability of learners to apply metacognitive, motivational, and behavioral skills to the learning process to achieve the desired outcomes (Zimmerman, 1986, 1989). The three components of self-regulation are aligned to student performance and academic success (Artino, 2008; Broadbent & Poon, 2015; Cho & Shen, 2013). Studies have shown further that the metacognitive component of self-regulation is more central to positive student experiences in the learning process (Kuo et al., 2013, 2014; Lee, Kim, & Grabowski, 2010; Puzziferro, 2008).

Survey instruments to measure self-regulated learning have been developed for traditional and online modalities (Cho & Cho, 2017; Pintrich, Smith, Garcia, &

McKeachie, 1993; Schraw & Dennison, 1994). The most recent instrument correlated self-regulation in the three types of interaction: learner-content, learner-instructor, and learner-learner with students' online learning experiences (Cho & Cho, 2017). Measuring the learning experiences as self-efficacy and course satisfaction, Cho and Cho (2017) found that there was a positive relationship between (a) self-regulation in learner-content interaction and learning experiences, and (b) self-regulation in learner-instructor interaction and learning experiences. There was no relationship found between self-regulation in learner-learner interaction and learning experiences. While the instrument developed by Cho and Cho (2017) was a significant addition to the measurement tools available for assessing self-regulation practices and the interaction theory, it did not align the interactions with the components of metacognitive, motivational, and behavioral self-regulated learning. For this dissertation project, I developed an instrument; which incorporated the three components of self-regulation into the four-phased interaction model. Table 2 shows the integration of the practice of self-regulation with the four-phased interaction model using the four themes of the SASSE.

Table 2

Type of Interactions and Self-Regulation Factors

Type of interactions	Self-regulation practices of learner	Components of self-regulated learning
Learner-content	Allows time for review of content Develops plan to achieve learning goals Implements plan to achieve learning goals Completes course activities Checks online learning space for course material updates	Metacognitive, motivational
Learner-instructor	Initiates communication with instructor Uses more than one way to communicate	Motivational, behavioral
Learner-learner	Develops plan to assist peers Implement plan to assist peers Monitors interactions with peers Reflects on interactions with peers Responds to contributions by peers	Metacognitive
Learner-online platform	Uses online activities to self-direct learning	Behavioral

Student Satisfaction

The predictors of student satisfaction relate to academic achievement, performance, perceptions of the learning environment, success, persistence, and quality of the instructional design, content, and delivery (Artino, 2007, 2008; Bolliger & Martindale, 2004; Kuo et al., 2013, 2014; Puzziferro, 2008; Reinhart & Schneider, 2001; Thurmond, & Wambach, 2004; Yukselturk & Yildirim, 2008). These predictive dimensions of student satisfaction, which have been explored either separately or combined, are viewed as the hallmark of the teaching and learning process (Yukselturk & Yildirim, 2008). For instance, a study of the relationship between the construct of student

satisfaction and academic achievement in traditional versus online learning settings Saeler (2015) showed that there was no statistical significance found between academic achievement and satisfaction in both learning environments. As with the construct for self-regulated practices, Moore's (1989) interaction model has been used as a framework to study the relationship between student satisfaction and interactions occurring at the (a) learner-learner, (b) learner-instructor, and (c) learner-content interfaces. These studies have shown that there is a positive correlation between interaction and student satisfaction in both distance and online learning (Ali & Ahmad, 2011; Bolliger & Martindale, 2004; Bray, Aoki, & Dlugosh, 2008; Dennen, Darabi, & Smith, 2007; Kuo et al., 2013, 2014; Lee, 2012; Thurmond & Wambach, 2004).

Kuo, Walker, Belland, and Schroder (2013) highlighted that more studies have been conducted on learner-learner and learner-instructor interactions than on learner-content interactions. These studies revealed that the first two types of interactions were more suitably aligned to student satisfaction in online learning environments (Bolliger & Martindale, 2004; Jung, Choi, Lim, & Leem, 2002; Sher, 2009). Conversely, Kuo et al. (2013) found that the learner-instructor and learner-content interactions were better predictors of student satisfaction than the learner-learner interaction. While further studies using the interaction model showed that the learner-instructor interaction was the key predictor of student satisfaction (Battalio, 2007), the Kuo et al. study placed the learner-content interaction in the primary predictive position. Moreover, Kuo et al. inferred that the course design for online learning and ease of navigating the course material were critical to the interactive ability of learners and the content.

In reviewing the dimensions of student satisfaction, it was clear that these dimensions or outcomes of student satisfaction could be organized using the newly configured interaction model. For this study, the four-phased interaction model was applied as shown in Table 3.

Table 3

Type of Interactions and Student Satisfaction Factors

Type of interactions	Student satisfaction factors
Learner-content	Quality of learning experiences Course activities aligned to expectations
Learner-instructor	Interactions with instructors
Learner-learner	Interactions with peers
Learner-online platform	Orientation program to online learning

Studies of Pairs of the Three Constructs of Student Engagement, Self-Regulation Practices and Student Satisfaction

Previous research studies have explored the relationships between two constructs at the same time. There were no studies found that examined the three constructs together in a single study in higher education institutions. The relationship of the constructs which were investigated together and which represent all possible pairs of the three constructs are presented as follows: (a) student engagement and student satisfaction (Jackson, 2015; Johnson et al., 2016; Kuh et al., 2007; Larose, 2010); (b) student engagement and self-regulation (Boekaerts, 2016; Mello, 2016; Pellas, 2014; Zhang et al., 2015); and (c) self-regulation and student satisfaction (Puzziferro, 2008; Wang et al., 2013). These studies were conducted in either the traditional classroom or the online environment.

Student Engagement and Student Satisfaction

The relationship between the constructs of student engagement and student satisfaction has produced mixed results. According to Jackson (2015) and Kuh et al. (2007), a positive correlation existed between the constructs of student engagement and student satisfaction in the traditional environment. In contrast, Larose (2010) reported that the lack of attention paid to fostering student engagement in the online environment as opposed to the traditional classroom is the reason for poor student satisfaction rates at community colleges.

Studies that used the National Survey of Student Engagement (NSSE) survey instrument were conducted based on the traditional face-to-face mode of learning at higher education institutions (Jackson, 2015; Johnson et al., 2016). The positive correlation that resulted between engagement and satisfaction was obtained at the undergraduate level, regardless of the ethnicity of the students studied. While there was alignment between the factors associated with student engagement in the two studies, Jackson (2015) reported that engagement was found to be a predictor of satisfaction in both the adult African American and adult Hispanic American student groups. Additionally, the student engagement indicators of the NSSE were found to be positively correlated to each other, thereby validating the alignment of the energumen factors (Johnson et al., 2016).

Student Engagement and Self-Regulation

The studies of the relationship between the constructs of student engagement and self-regulated learning showed a general positive correlation trend between the constructs

(Mello, 2016; Pellas, 2014; Zhang et al., 2015). In addition to engagement and self-regulation, some of the studies included other constructs or factors such as self-efficacy and self-esteem (Pellas, 2014) and academic burnout (Zhang et al., 2015). Both engagement and self-regulation were further segregated into their respective components. Engagement was categorized into cognitive, emotional, and behavioral (Pellas, 2014), while self-regulation was split into the locomotion and assessment forms.

The classification of both engagement and self-regulation resulted in a deviation from the general positive correlation trend. Pellas (2014) reported that there was a positive correlation between self-regulation and cognitive and emotional engagement but a negative correlation between self-regulation and behavioral engagement. Similarly, Zhang et al. (2015) found that the locomotion form of self-regulation and student engagement but a negative correlation between the assessment form of self-regulation and student engagement. These results suggest that while the two constructs, overall, can exhibit a positive relationship with each other, mixed results can be obtained when the constructs are sub-divided into smaller components.

Self-Regulation and Student Satisfaction

Studies related to self-regulation and student satisfaction showed a positive correlation between each of the constructs (Puzziferro, 2008; Wang et al., 2013). Both studies examined the relationship between the two constructs in online learning environments. These results were the same for community college students (Puzziferro, 2008) and undergraduate and graduate students (Wang et al., 2013). The Motivated Strategies for Learning Questionnaire (MSLQ) instrument was used in either the whole or

altered forms to monitor motivational levels of students. Students who had prior experiences with online learning were likely to be more motivated. Additionally, motivation was directly linked to self-regulation learning strategies, and in all cases, increased levels of motivation were associated with higher course satisfaction levels.

Constructs of Student Engagement, Self-Regulation Practices and Student Satisfaction

A recent study was conducted on the psychological processes through which student-athletes in youth sports academies in Ethiopia will be successful (Tadesse, Asmamaw, Mariam, & Mack, 2018). Although the research was not conducted in a higher education institution, the study reported on the development and testing of a model to measure student engagement, self-regulation, and psychological need satisfaction of adolescents and youths. A review of the study showed that the psychological need satisfaction construct was primarily related to sporting activities and not to the quality of the learning experiences. This research study in youth sports academies justified the need for conducting a similar study in higher education institutions.

The gap in the literature for my study concerns the innovative relationship of the constructs of student engagement, self-regulation practices, and student satisfaction in a single research project in higher education institutions. With the addition of student success as a fourth factor and as an outcome variable, the cross-sectional relationship of the three constructs and student success was explored. I developed an instrument for this study as there was no existing instrument that measured all three constructs and student success at the same time in a single questionnaire.

Student Success

Student success has been aligned with the components of active learning (Ahn & Class, 2011; An & Reigeluth, 2011). The factors contributing to student success are similar to those presented for student satisfaction. These factors include academic achievement, such as pass rates, retention, persistence, and advancement (Ashby et al., 2011; Cuseo, 2007; Subotzky & Prinsloo, 2011). Student success is not only an important desired outcome of learners, but it is a sought-after goal of instructors and institutions alike. Chief among these factors is student retention and hence degree completion. The retention rates tended to be lower for students taking online courses when compared to students in face-to-face classes in one community college setting (Gregory & Lampley, 2016). Nonetheless, studies related to learners at community colleges have shown that the differences in student success in the online learning environment and the traditional learning environment are linked to the category of learners (Aragon & Johnson, 2008; Hachey et al., 2013; Xu & Jaggars, 2011). Traditional learners or recent high school graduates tend to enroll in face-to-face courses at community colleges, while adult learners or non-traditional learners tend to pursue online learning programs. In the online environment, adult learners had more successful outcomes as these learners deliberately chose this mode of learning as opposed to the younger learners who often were guided by their parents or guardians to select the traditional face-to-face programs. An interesting paradox arises with this argument regarding the differences in choices made by the recent high school graduates and older adult learners. Researchers reported that online learners tended to be more successful if they were proficient in using the technology associated

with the learning environment (Dupin-Bryant, 2004; Hachey et al., 2013; Harrell & Bower, 2011; Kerr, M. S., Rynearson, & Kerr, M. C (2006). This finding suggested that the younger generation were more likely to demonstrate technological self-efficacy in comparison to the adult learners. Additionally, online learners who displayed characteristics associated with self-directed learning and time management skills were more likely to succeed in online environment (Johnson & Berge, 2012; Kenner & Weinerman, 2011; Kerr et al., 2006; Kiely, Sandmann, & Truluck, 2004; Neuhauser, 2002; Rovai, 2004; Wojciechowski & Palmer, 2005).

For this study, student success factors comprised learners' self-report on course grade improvements, student engagement and self-regulated activities, and student satisfaction with the online environment and overall institutional support. Furthermore, this research study explored student and faculty perceptions of student success using the same measurement scale in the newly constructed instrument. Table 4 presents the indicators for the measurement of perceived student success.

Table 4

Perceived Student Success Indicators

Perceived student success
Academic success is influenced by
Obtaining better grades
Engaging in course activities
Participating in assistance programs
Self-directed own learning
Interacting with instructors
Interacting with peers
Feeling of a sense of belonging to the online learning community
Meeting of course expectations
Being motivated intellectually
Feeling of a personal sense of accomplishment
Relevancy of course goals to professional goals
Relevancy of course goals to personal goals
Being satisfied with the delivery of the course content
Being satisfied with the support given to achieving academic goals

Studies of the Three Constructs of Student Engagement, Self-Regulation Practices, and Student Satisfaction and Factors of Student Success

There were no studies found that explored the three constructs of student engagement, self-regulation practices, and student satisfaction, together with factors associated with student success in a single study. Instead, studies examined either the relationship between each construct and student success or the relationship between two of the constructs and student success. For the combination of pairs of constructs and student success, I present the following studies: (a) student engagement, student satisfaction, and student success (Burrow & McIver, 2012; Korobova & Starobin, 2015; Webber, Krylow, & Qin, 2013); (b) self-regulation, student satisfaction, and student success (Inan, Yukselturk, Kurucay, & Flores, 2017; Nicol, 2009); and (c) student

engagement, self-regulation, and student success (Fong et al., 2017; Rahal & Zainuba, 2016).

Student Engagement, Student Satisfaction, and Student Success

Studies related to student engagement, student satisfaction, and student success showed a positive correlation between each of the constructs and student success (Burrow & McIver, 2012; Korobova & Starobin, 2015; Webber et al., 2013). The studies were conducted in the traditional setting and used undergraduate student grades to measure academic success. Two of the studies examined data from the 2008 NSSE survey to assess the alignment of the engagement factors to student satisfaction and student success (Korobova & Starobin, 2015; Webber et al., 2013) while the correlation to student engagement in the third study was deduced based on improvements in student performance (Burrow & McIver, 2012). The NSSE benchmarks incorporated categories related to students' experiences with academic programs, relationships and interactions, and support. Findings from the Korobova and Starobin (2015) and Webber, Krylow, and Qin (2013) studies confirmed that interactions between faculty and students and staff and students were linked to the quality of the learning experience and desirable student outcomes. Additionally, the research showed that designing an appropriate assessment model can lead to overall academic success.

Self-Regulation, Student Satisfaction, and Student Success

Studies related to self-regulation, student satisfaction, and student success showed a positive correlation between each of the constructs and student success in online and blended learning modalities (Inan et al., 2017; Nicol, 2009). In one study, self-regulation

was sub-divided into the four components (Inan et al., 2017), while self-regulation was treated as a developmental process based on students' interaction with the online segment of the course design (Nicol, 2009). The use of the online learning environment allowed students to monitor their progress through assessment feedback provided by the course facilitator and build their confidence in controlling their own learning. Owing to the self-regulation developmental exercise, students reported that they were more engaged in the learning process and chose to expend greater effort in learning the course material to achieve better grades. These comments were consistent with the tenets of the self-regulation instrument of the first study, which assessed the extent to which students planned, requested assistance, managed their time, and evaluated their learning (Inan et al., 2017). The outcome of the self-regulated activities in both studies contributed to higher satisfaction and academic success rates. Furthermore, a comparison of the studies showed that the online environment promoted greater self-regulated activities and provided more flexible opportunities for learning over the traditional learning environment (Inan et al., 2017; Nicol, 2009).

Student Engagement, Self-Regulation, and Student Success

Studies related to student engagement, self-regulation, and student success generally showed a positive trend between each of the constructs and achievement as one of the factors aligned to student success (Fong et al., 2017; Rahal & Zainuba, 2016). The construct of self-regulation was found to influence the emergence of student engagement activities, and the studies focused more on the relationship between self-regulation and student success. While both studies agreed that self-regulation practices led to higher

student performance and factors of student success, Rahal and Zainuba (2016) showed that this finding was not the case for at-risk students. Using the principles associated with motivation and innovation, self-regulation skills were not always used for achieving academic success (Rahal & Zainuba, 2016). Students who were most likely to perform well always self-regulated their abilities to engage in the learning process. On the contrary, students who were low achievers had the highest number of repeat chances and hence failure rates prior to the eventual success in their courses.

Self-regulation showed a stronger correlation for achievement than for student persistence (Fong et al., 2017). This finding suggested that self-regulation was not positively associated with all the factors for student success, such as student retention. While the researchers aligned self-regulation to the strategies of cognition, motivation, and metacognition, this definition was different from the one I used for the dissertation research study. Fong et al. (2017), in their meta-analytical study, identified self-regulation as one of the psychosocial components required to measure the student success factors of achievement and persistence. The researchers posited that self-regulation on its own and, by extension, student engagement, would not be high predictors for all factors associated with student success.

These results are particularly useful for this dissertation study, where I sought to establish a relationship between the three constructs and perceived student success from the viewpoint of both students and faculty. Additionally, the factors selected for student success are wider than those examined in the Fong et al. (2017) study. The use of the construct of student satisfaction added another dimension to studies related to the

predictors for student success. In this context, the dissertation added value to and had the potential to have a positive social impact on the implementation of online programs at higher education institutions in the English-speaking Caribbean.

Summary

The shift to online learning has driven institutions to ensure student satisfaction through student engagement and self-regulation practices (Cho & Shen, 2013; Mello, 2016). These three constructs are even more critical to student persistence and student success in online learning environments. While studies have shown that there is equivalence in learning in both traditional and online learning settings (Fonolahi et al., 2014), educators have sought to enhance the online modality to drive and improve student success (Khan, Egbue, et al., 2017; Kuo et al., 2013).

In Chapter 2, I explored the essential components of a collaborative online learning environment and aligned these components to the three constructs. The theoretical framework for the study examined the tenets of the Knowles' adult learning theory, the self-regulated learning theory, and the model for a constructivist learning environment. The three constructs were presented as single concepts and construct pairs. Similarities and differences between each of the constructs were highlighted. The gap in the literature pertained to the absence of documented scholarly work in higher education institutions on the exploration of the innovative relationship of the three constructs in a single study. My study examined an innovative approach to measuring the three constructs and student success in higher education institutions in the English-speaking Caribbean. In Chapter 3, I outline the quantitative methodology used to examine the

cross-sectional relationship among the constructs of student engagement, self-regulation practices, and student satisfaction, and the impact of these constructs on perceptions of student success.

Chapter 3: Research Method

Introduction

This non-experimental quantitative cross-sectional study was to explore the innovative relationship between the constructs of student engagement, self-regulation practices, and student satisfaction and how this relationship was aligned to perceptions of student success in online learning settings at English-speaking Caribbean higher education institutions. This relationship was measured from the perspectives of both students and faculty. Studying the three constructs of student engagement, self-regulation practices, and student satisfaction at the same time in a single research study in higher education has been a gap in the literature. Additionally, the exploration of the innovative relationship of the factors associated with the three constructs and student success in the same study has been a gap in the literature. This cross-sectional research study required the use of two instruments to capture data separately for students and faculty, and each instrument incorporated the variables associated with the three constructs and student success as one questionnaire. The overarching goals of the study comprised both a correlational study of the constructs and a regression study of the constructs and perceived student success at a Caribbean regional institution.

In Chapter 3, I present the research design and rationale for the development of a new instrument to measure student engagement, self-regulation practices, student satisfaction, and student success. I describe the process for scale development, establishing validity and reliability of the instrument, field testing the instrument, and

administering the final iteration of the instrument to sample participants (Worthington & Whittaker, 2006). The chapter also includes the data analysis plan and ethical procedures.

Research Design and Rationale

I used a quantitative cross-sectional design (Campbell & Stanley, 1963) given that data were collected at a single point in time. As a descriptive study, the intention was not to determine cause-and-effect relationships between the constructs but to suggest possible relationships or predictions across constructs as variables. An advantage of cross-sectional studies is that several variables can be explored at the same time. Cross-sectional studies also allow for the collection of self-reported data over a short period (Field, 2016). Due to the limited resources for this study, a short time frame to conduct the research was consistent with the design choice. Many of the predictive studies presented in Chapter 2 were cross-sectional in design; they were conducted to either validate new or modified instruments or to add to the body of knowledge and scholarly literature by confirming or disproving associations between variables.

This study explored (a) the correlational relationship between all possible pairs of the three constructs of student engagement, self-regulation practices, and student satisfaction and (b) the multiple regression relationship of the constructs and perceived student success. For the multiple regression model, the three constructs of student engagement, self-regulation practices, and student satisfaction were treated as the independent or predictor variables and perceptions of student success as the dependent or outcome variable. While student engagement, self-regulation practices, student satisfaction, and perceptions of student success were the main variables for the multiple

regression model, it was important to identify any other variables that could influence the relationship between the independent and dependent variables. For this study, data in the form of gender and age groups of student and faculty participants, and years of experience of faculty participants were collected and managed as control variables given that these variables remained unchanged during the period of the research project. Consequently, the use of a cross-sectional design approach to the study supported the statistical analyses of the relationships between the primary variables of student engagement, self-regulation practices, student satisfaction, and perceived student success, the development and testing of a new instrument as a means of exploring these relationships, and the continuation of research in the field (Campbell & Stanley, 1963).

Methodology

The methodology described the population for the study and the sampling procedures used to determine the appropriate sample size. A separate population was used for field testing of the instrument prior to its use as the final survey. Additionally, the methodology section includes descriptions of how the data were collected and the process for obtaining approval from the Walden University Institutional Review Board (IRB) and consent from the participants.

Population

This research study was conducted at one of the campuses of a Caribbean regional university, and the target population consisted of students and faculty at both the undergraduate and graduate levels. Based on information from the institution's 2017–2018 annual report, the CCC campus (pseudonym) serves 15 countries across the

Caribbean and offers face-to-face, blended, and online courses and programs at the professional, undergraduate, and graduate levels. The campus has an average annual enrollment of approximately 6,000 students, 540 adjunct faculty members, and 467 full-time staff members. The main program disciplines incorporate studies in the humanities and social sciences. At the undergraduate and graduate levels, 62 programs of study comprise certificates, diplomas, associate degrees, bachelor's degrees, graduate diplomas, master's degrees, and doctoral degrees. Only a subset of these seven program groupings uses online learning as the teaching and learning delivery modality.

Although the CCC campus website specified that the institution offers a total of 78 online courses and programs, the exact number of online programs within each of the program groupings could not be determined, as the delivery mode was not stated for all program offerings. The number of online programs was approximated, as shown in Table 5. These programs were delivered in two main formats: (a) online only or (b) online or blended.

Table 5

Number of Online Programs in Each Program Grouping

Program level	Program groupings	Total number of programs	Total number of online programs
Undergraduate	Certificate	6	6
	Diploma	6	5
	Associate degree	4	3
	Bachelor's degree	30	22
Graduate	Diploma	5	1
	Master's degree	11	9
	Doctorate	3	2

The total student enrollment for the academic programs at the start of the academic year 2017–2018 was 6,325, with 5,351 women and 974 men. Of the 6,325 students, 6,049 students were enrolled in the seven program groupings as shown in Table 6. Given that most programs offered were determined to use the online delivery modality, the size of the target population was estimated as 540 faculty and 6,000 students.

Table 6

Student Enrollment by Program Groupings

Program level	Program groupings	Number of students
Undergraduate	Certificate	107
	Diploma	141
	Associate degree	382
	Bachelor's degree	4,492
Graduate	Diploma	36
	Master's degree	763
	Doctorate	128
Total		6,049

Sampling Strategy and Procedures

The intent of the sampling strategy was to select students and faculty who represented the seven undergraduate and graduate program groupings offered at the CCC regional campus. In quantitative studies, two types of sampling methodologies can be applied to the research design: probability and nonprobability sampling (Frankfort-Nachmias, Nachmias, & DeWaard, 2015). Probability sampling is employed when the researcher desires a representative sample of the study population. Furthermore, probability sampling allows for the comparisons of findings from different samples taken from the same target population because the sampling parameters used are identical or equivalent. Conversely, nonprobability sampling is not representative of the target

population, and repeated sampling measures would not produce the same probability of inclusion when using the same population parameters or definition.

Many factors were considered in the selection of an appropriate sampling strategy for this research study. First, most of the English-speaking Caribbean higher education institutions were established as brick-and-mortar institutions to offer traditional face-to-face programs. The transition to offering online programs in these institutions has been slow, resulting in a limited number of online programs being offered. The only institution that offers a broad selection of online programs is the CCC campus. Second, an advantage of the CCC campus is that it was developed as an institution to offer both face-to-face and online programs and courses at the undergraduate and graduate levels. Furthermore, the programs offered at this campus cover typical types of programs found in Caribbean institutions, from certificate programs to doctoral degrees. Third, while not all disciplines are embraced at the CCC campus, the programs are accessible to a wide cross-section of learners within the Caribbean community. Fourth, a list of names of faculty and students was not available from any of the institutions to obtain a representative sample of an identified target population. Thus, I conducted the study at the CCC campus due to the range and number of online programs and courses offered and the student and faculty populations, which would have representation across the English-speaking Caribbean countries.

Initially, I considered the use of a probability sampling technique in the forms of either the stratified sampling design or cluster sampling design so that I would employ the program groupings as the strata or clusters. This technique would have resulted in

multi-stage selection points as the goal of the research questions was to identify faculty and students as two separate sampling units, both of which are aligned to online programs. Instead, I chose the non-probability sampling methodology of convenience sampling for the study, where participants would be classified as volunteers. In this case, entire classes used the online delivery modalities within the programs would comprise the target population of students and faculty. An advantage of convenience sampling is that the process of data collection can be extended until the desired sample size is achieved, or the availability of volunteer participants has been exhausted. Convenience sampling was also chosen to minimize the time needed to construct sampling selection points to arrive at the target population numbers for the study. While non-probability sampling may or may not limit my ability to generalize the findings of the target population at the regional campus, the convenience sampling method supports the testing of a new instrument on the seven program groupings at the institution.

Sampling procedures. The sampling procedures apply to the process by which the sample population of students and faculty were selected. I obtained a letter of cooperation from the director of the regional campus to allow access to the students and faculty in the programs selected (see Appendix D). Faculty and student participants were invited to participate in the study and asked to complete an online survey instrument. The survey instrument was sent to entire classes of students and faculty in online programs by the campus representatives using their email addresses.

Sampling frame. In this study, the sampling units were the faculty who teach in the online programs and their students. The online courses within these online programs

constituted the sampling frame. The eligibility criteria for the study were detailed as inclusion and exclusion criteria. The inclusion criteria consisted of those programs that were categorized by the institution as used the online delivery approach to offer the programs to students. Given that the CCC campus was asked to distribute the survey instrument, I did not require a list of the online programs and their attendant online courses as a selection point. The exclusion criteria for this study were the programs and courses that were not delivered to students online.

Sample Size

The minimum sample sizes for the study were determined collectively for the undergraduate and graduate student and faculty participants in the online programs using the G*Power statistical tool available online. The G*Power tool is a statistical analysis program used in survey research methods (Faul, Erdfelder, Lang, & Buchner, 2007). The statistical tool's computational range includes a variety of statistical tests, such as *t*-tests, *F*-tests, correlation, and regression analyses (Faul, Erdfelder, Buchner, & Lang, 2009). I incorporated these analyses into this study.

In computing the required sample size prior to data collection, an *a priori* power analysis was conducted based on the determination of several factors (Faul et al., 2007, 2009). These factors comprise (a) type of statistical tests, (b) statistical significance level or the alpha- (α-) value, (c) effect size of the statistical analysis, and (d) power of the statistical test. The α-value is normally set at 0.05 or 0.01. An α-value of 0.05 generally means that there is a 5% probability that the results obtained will be due to chance. The effect size represents the statistical differences obtained when comparing the results of

the variables and has three classification levels: small, medium, and large. When the three classification levels are compared, a larger effect size results in a larger sample size. Conventionally, the medium effect size is chosen and differs for correlation and regression analyses. The power of the statistical test concerns the probability that the differences between the variables, if found, are statistically significant. A power of 0.08 or greater is normally used in data analyses and signifies that there is an 80% chance that the differences are statistically significant.

Several statistical models were considered in the determination of the total sample size for conducting the correlation and regression analyses. For each model, the α-value and power level chosen were 0.05 and 0.95 respectively. The effect size classification levels are given as 0.10 (small), 0.30 (medium) and 0.50 (large) for correlation analyses, and 0.02 (small), 0.15 (medium), and 0.35 (large) for regression analyses (Faul et al., 2007, 2009). The correlational models considered were the bivariate normal random model (continuous variables) and the point biserial model (continuous and binary variables). The total sample sizes for each of the student and faculty participant groups were calculated as (a) 138 for the bivariate normal correlation model, and (b) 134 for the point biserial correlation model with both models using a medium effect size of 0.30. Given that the regression analysis involved two or more predictor variables, the multiple linear regression model was identified as being appropriate for the research study. Both the random and fixed multiple linear regression models were considered in the calculation of the population sample size. The total sample sizes for each of the student and faculty participant groups were calculated as (a) 68 for the random model, and (b)

119 for a fixed model by setting the number of tested predictors to three and using a medium effect size of 0.15 for both models. Consequently, the total sample size for each student and faculty participant group was 138, which was the largest sample size calculated for the conduct of the statistical analyses in this study. I expected a minimum response rate of 25%, and considering I intended to administer the survey instrument to more than one class, this response rate was achievable.

Data Collection

The research project explored the relationship of the three constructs of student engagement, self-regulation practices, student satisfaction, and perceptions of student success in the online programs at the CCC campus from the viewpoint of both student and faculty participant groups. The project used a single questionnaire for each participant group that I developed to represent the three constructs and factors aligned to perceived student success. The online programs differed in the number of progression levels required for completion of the respective programs. The recruiting procedure involved the collection of data from participants within the various levels for the 2018-2019 academic year. The cross-sectional sampling of the academic levels of any one program allowed for greater representation of the participants in that program. Additionally, demographic data collected from participants included gender, age group range, and country of residence.

I established a relationship with the executive management team at the Caribbean regional campus for (a) seeking permission to access the students and faculty as participants and (b) sending the survey questionnaire. Students and instructors from the

regional campus in the selected programs were invited to participate through the institution's Email system. Given that a list of students and faculty was not be provided, I submitted the link to the questionnaire and invitation to participate to my assigned contact at the institution. The invitation had an introduction to the survey, explained the intent of the research project, provided instructions on how to proceed, and presented the informed consent details. Participants were given information as to how they could exit the survey at any time. My contact in turn uploaded the link to the questionnaire and invitation on the institution's intranet. To maximize participation, I included three follow-up reminders to participants. There were no conflicts of interest as I had no prior relationship with the campus or its members.

Data were collected using SurveyMonkey as the online survey platform. The standard version of the software was purchased for the research study as it was more versatile than the basic version for conducting the survey for this study. One of the disadvantages of the basic version of Survey Monkey is that it only allows the collection of data from a maximum of 100 participants. Considering the sample size was a minimum of 138 student participants and 138 faculty participants, the standard version was more than adequate. The standard version of the software accommodated the import of the results into Microsoft Excel. From Microsoft Excel, I imported the data into SPSS, which was the statistical software used to analyze the data.

Participants had 4 weeks to complete the survey. During this period, I sent the three follow-up emails to students and faculty, encouraging them to participate in the research study. I included documentation related to informed consent at the beginning of

the survey and formed part of the purpose of the study, along with instructions to complete the questionnaire. This information indicated that by completing the questionnaire, students and faculty would have voluntarily consented to be part of the research study. The instructions also gave students and faculty the opportunity to exit the survey at any time.

Field (Pilot) Testing of the Questionnaire

Prior to collecting data for the study, the instrument was field tested under the same conditions described for the data collection process using a sample of students and faculty from two other higher education institutions inclusive of obtaining informed consent. The purpose of testing the instrument was to identify any problems associated with the question items and the methodology to be employed in the actual study. The results of the field test were used only in determining the instrument's reliability as outlined in the section on determination of validity and reliability. Additionally, the results were not used in the data analysis for the actual research study.

Instrumentation

I designed a survey instrument to measure the constructs of student engagement, self-regulation practices, and student satisfaction using an enhanced version of Moore's (1989) interaction theory, and the factors related to perceived student success The Moore interactions constitute learner-content, learner-instructor, and learner-learner. I added the learner-online platform as a fourth interaction to ascertain the contribution of the three constructs to the online learning environment. In Chapter 2, I identified several factors for each of the constructs and perceptions of student success (see Tables 1-4). Tables 7-

10 below is a compilation of survey items for the constructs of student engagement, self-regulation practices, and student satisfaction and factors of perceived student success.

I present the operational definitions used to conduct this study for the three constructs and perceptions of student success as a precursor to introducing the survey items. The operational definition for student engagement in the online learning environment corresponds to the amount of effort that students expend in the active learning process at the four collaborative interfaces or interactions of learner-content, learner-instructor, learner-learner, and learner-online platform.

Table 7

Survey Items for the Student Engagement Construct

Student engagement	
• Applies critical thinking skills • Integrates own views with that of others • Prepares study notes • Applies learning to real-life situations • Interacts with instructor • Discusses academic performance and other matters related to academic goal achievements • Obtains meaningful feedback on assignments	• Understands better difficult concepts and content after interaction • Collaborates as one-to-one or as a group • Interacts with peers on mastering course material • Respects peer differences • Values peer differences • Uses learning space to participate in course activities
Number of survey items: 13	

The operational definition for self-regulation practices in the online learning environment constitutes the ability of students to apply metacognitive, motivational, or behavioral skills in self-directed learning at the four collaborative interfaces or interactions of learner-content, learner-instructor, learner-learner, and learner-online platform.

Table 8

Survey Items for the Self-Regulation Practices Construct

Self-regulation practices	
• Allows time for review of content • Develops plan to achieve learning goals • Implements plan to achieve learning goals • Completes course activities • Checks online learning space for course material updates • Initiates communication with instructor	• Uses more than one way to communicate • Develops plan to assist peers • Implement plan to assist peers • Monitors interactions with peers • Reflects on interactions with peers • Responds to contributions by peers • Uses online activities to self-direct learning
Number of survey items: 13	

The operational definition for student satisfaction in the online learning environment correlates to the educational experience of students at the four collaborative interfaces or interactions of learner-content, learner-instructor, learner-learner, and learner-online platform.

Table 9

Survey Items for the Student Satisfaction Construct

Student satisfaction
• Quality of learning experiences • Course activities aligned to expectations • Interactions with instructors • Interactions with peers • Orientation program to online learning
Number of survey items: 5

The operational definition for perceived student success in the online learning environment relates to the measure of student academic achievement attributed to

satisfaction with the overall educational experience and the efforts of students to engage in the learning process and self-direct their learning.

Table 10

Survey Items for Perceptions of Student Success

Perceived student success
Academic success is influenced by • Obtaining better grades • Engaging in course activities • Participating in assistance programs • Self-directed own learning • Interacting with instructors • Interacting with peers • Feeling of a sense of belonging to the online learning community • Meeting of course expectations • Being motivated intellectually • Feeling of a personal sense of accomplishment • Relevancy of course goals to professional goals • Relevancy of course goals to personal goals • Being satisfied with the delivery of the course content • Being satisfied with the support given to achieving academic goals
Number of survey items: 14 questions

The student and faculty questionnaires were developed using the survey items given in Tables 6-9 (see Appendices A and B). The questionnaires were a combination of four scales for the variables: student engagement, self-regulation practices, student satisfaction, and perceptions of student success. The same survey items were used for both the student questionnaire and the faculty questionnaire allowing for the comparison of student responses and faculty responses for each scale item for the four variables.

The questionnaires were sectionalized into two parts. Part I pertained to demographic information and Part 2 related to four variables of student engagement, self-

regulation practices, student satisfaction, and student success. The demographic items included gender, age group, name and level of program, full-time and part-time status. Table 11 defines the demographic variables and justifies the measurement used for each variable.

Part II of the questionnaires used the five-point Likert scale: strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), strongly disagree (1). Participants rated the extent to which each scale item for each variable applied to either students' experiences or faculty members' experiences regarding their students. I recognized that while the student participants ascribed a personal value to the scale items for each variable for the online program in which they are enrolled, faculty participants ascribed a composite or class value to the scale items for each variable.

The variable scores were calculated using the numerical values assigned to the Likert scale. The total possible scores for each variable are shown in Table 12. For example, one of the student engagement question items required students to respond to "I apply critical thinking skills to the course activities." There were five possible responses to this question based on the five-point Likert scale. If the response chosen was *disagree*, the score calculated for this item was the numerical value 2.

Table 11

Demographic Variable Information

Name of variable	Definition	Value ascribed to variable	Measurement of variable	Highest possible score
Gender	Male/Female	0=No answer 1=Male 2=Female	Categorical – nominal	2
Age group	Range of ages in years	1=30 and under 2=31-40 3=41-50 4=51-60 5=Over 60	Categorical – ordinal	5
Country of residence	English-speaking Caribbean territories	15 country possibilities	Categorical - nominal	15
Name of program	List of all programs offering only online courses	36 possibilities	Categorical - nominal	36
Program groupings	Four groups at the undergraduate and graduate levels	1=Certificate 2=Diploma 3=Bachelor's 4=Master's	Categorical – ordinal	4
Year of program	Current year student enrolled	8 possibilities	Discrete numerical	8
Cohort status	Full-time or part - time	1=Full-time 2=Part-time	Categorical - binary	2
Expected year of graduation	Graduation year	8 possibilities	Discrete numerical	8
Number of online courses currently pursuing	Numerical data	Open number of possibilities	Discrete numerical	Open until data collected
Number of hours spent online per week	Numerical data	Open number of possibilities	Discrete numerical	Open until data collected

Table 12

Highest Possible Scores for each Variable

Type of variable	Variable	Measurement of variable	Highest possible score
Predictor	Student engagement	Categorical - ordinal	65
	Self-regulation practices		65
	Student satisfaction		25
Outcome	Perceptions of student success	Categorical - ordinal	70

Determination of Validity and Reliability

A newly constructed instrument needs to be confirmed as being valid and reliable before being administered for data collection (Worthington & Whittaker, 2006). For this study, content validity was achieved by engaging two experts in online learning to evaluate the question item constructions. An invitation was first sent to the content experts asking them to participate in a content review of the instrument (see Appendix C). Once agreement was given, the experts were sent the questionnaire and asked to provide feedback on (a) the comprehensiveness and relevance of each question item, and (b) the representativeness of the entire instrument to its purpose. I received comments on six question items in the both the student engagement and self-regulation practices categories. These comments related to the clarity and complexity of the question item construction. Additionally, comments were received on the purpose of the question items in the perceived student success category. I revised the question items and reconstructed the questions for the perceived student success category of the instrument. The adjustments increased the number of items for student engagement by 1 to 13-item scale

and self-regulation practices by 3 to a 13-item scale. I refined the questions in the perceived student success to a 14-item scale sub instrument.

Reliability was to be determined through the field testing of the instrument through the application of the Cronbach's alpha statistic and verification of significant correlations between the question items. Additionally, field testing was to be used to determine content validity and to conduct a preliminary factor analysis of the correlation between the four factors of student engagement, self-regulation practices, student satisfaction, and perceptions of student success.

The field test of the instrument was conducted at two other higher education institutions, one in the Caribbean and the other in the United States, prior to the administration of the study. The field test participants were both students and faculty who were not associated with the study site. Results from the field test were not used in the statistical analyses for the research study.

Data Analysis Plan

Data were analyzed using the Statistical Package for Social Sciences (SPSS) Version 23 software. Each participant data was screened first for completeness (Warner, 2013). Data screening is critical to the data analysis process as it allows the researcher to maintain the integrity of the dataset. Data screening identifies incomplete responses such as missing scores for the demographic information and the scale items for each variable, incorrect scoring of items, coding errors, and extreme data. Prior to confirming the findings that there were incomplete or extreme responses, I examined the data to determine if the data could be modified or replaced. If the incomplete data influenced the

remaining dataset negatively in terms of the quality of the data collected and the results of the analytical process, the data were cleaned by removing the data from the datasets such that there were no missing scores for the demographic information and the scale items for each variable. The data values were removed by defining the parameters and rules within which data were acceptable. The SPSS tool selected the values that did not comply with the predefined rules and removed the unwanted data.

Research Questions

The research questions were aligned to the conduct of correlational analyses between pairs of the three constructs of student engagement, self-regulation practices, and student satisfaction, and regression analysis of the three constructs as predictor variables and perceived student success as the outcome variable. The intent of the study concerned the self-reported opinions of both students and faculty as it related to their experiences in the online learning environment. Figure 1 and Figure 2 represent the relationship patterns of the variables for this study.

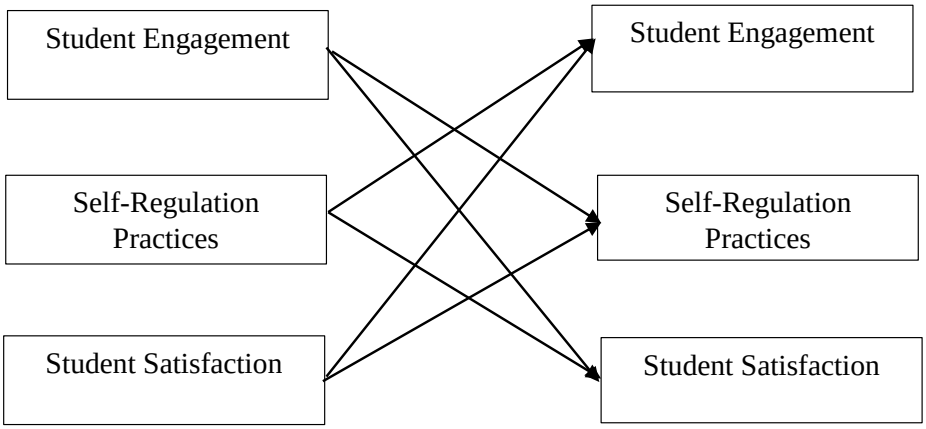

Figure 1. Conceptual model of the correlational patterns.

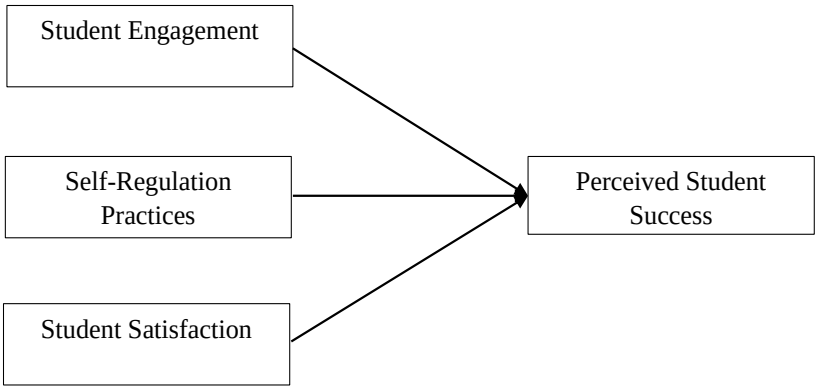

Figure 2. Conceptual model of the regression pattern.

As stated in Chapter 1, the research questions were to determine whether there was statistical significance in the correlation model for the pairs of constructs among student engagement, self-regulation practices, student satisfaction, and the regression

model for the constructs and perceived student success in online learning environments. The first question related to the correlation model:

RQ1: What is the relationship among the pairs of constructs of student engagement, self-regulation practices, student satisfaction in online courses?

The three sub questions and null and alternate hypotheses for the correlation model:

RQ1a: What is the relationship between student engagement and self-regulation practices in online courses?

$H_0$1a. There is no relationship between student engagement and self-regulation practices in online courses.

H_a1a. There is a relationship between student engagement and self-regulation practices in online courses.

RQ1b: What is the relationship between student engagement and student satisfaction in online courses?

$H_0$1b: There is no relationship between student engagement and student satisfaction in online courses.

H_a1b: There is a relationship between student engagement and student satisfaction in online courses.

RQ1c: What is the relationship between self-regulation practices and student satisfaction in online courses?

$H_0$1c: There is no relationship between self-regulation practices and student satisfaction in online courses.

H_a1c: There is a relationship between self-regulation practices and student satisfaction in online courses.

The second question and null and alternate hypotheses correspond to the regression model:

RQ2: To what extent do the constructs of student engagement, self-regulation practices, and student satisfaction relate to perceptions of student success in online courses?

$H_0$2: The constructs of student engagement, self-regulation practices, and student satisfaction do not relate to perceptions of student success.

H_a2: The constructs of student engagement, self-regulation practices, and student satisfaction do relate to perceptions of student success.

Data analysis commenced with the data screening and cleaning procedures that first identified abnormal or uncharacteristic datasets and second cleaned the data by modifying, correcting, or removing these anomalies. Data analysis of the cleaned datasets included descriptive and inferential statistics for both students and faculty. The descriptive statistical analysis summarized the data for each demographic variable using frequency data tables depicting mean scores, standard deviation, and the number of respondents for the online programs represented in the data collected. Inferential statistics were used to examine (a) the correlation model of pairs of the three construct variables of student engagement, self-regulation practices, and student satisfaction, and (b) the regression model of the three constructs and perceived student success as outlined in the

research questions. Table 13 summarizes the inferential statistics tests that were used for each research question.

Table 13

Summary of Inferential Statistical Tests per Research Question

Research questions	Research sub question	Data analysis
RQ1	RQ1a	Correlation
	RQ1b	
	RQ1c	
	RQ1d	
RQ2		Multiple linear regression

Correlation Analysis

The correlation analysis determines if there is an association between two continuous variables. Although the Likert scale is classified as ordinal variables, the ordinal values can be converted to numerical values to allow for the correlation model to be applied. A Pearson correlation coefficient, *r*, is a common correlational tool that is calculated to examine the extent of the association (Field, 2016). The closer the Pearson coefficient is to 1, the stronger the association between the two variables. Pearson coefficients of 0 and -1 indicate a zero correlation and a total negative correlation respectively. The two assumptions that must be satisfied for correlation analyses are (a) the variables are normally distributed, and (b) the scores for the variables are independent of each other. The fulfillment of the first assumption was determined by creating a scatterplot of the data and checking to see if there was a linear relationship between the two variables. The completion of the questionnaire by separate participants satisfied the second assumption that the scores on the two variables were independent. If the criteria

of the two assumptions are met, *r* can be computed using SPSS. The correlation between the variables will be significant if the probability value is $p < .05$ or $p < .01$. An example of the correlation statement is represented by $r(df) =$ correlation value, $p < .05$ where df = degrees of freedom.

Multiple Linear Regression

Multiple linear regression analysis was conducted to determine the association between multiple predictor variables (two or more variables) and outcome variables (Warner, 2013). For the research project, the multiple linear regression assessed the strength of the relationship between the three constructs and perceptions of student success. The output of the multiple linear regression analysis is the Pearson coefficient, *r*, multiple coefficient, *R*, as the coefficient of determination and its squared value, *F*-test to measure the predictive value, beta coefficients, *t*-test, and the intervals associated with 95% confidence levels. The assumptions for multiple linear regression are that (a) the variables are evenly distributed (normality); (b) a linear relationship exists between the predictor and outcome variables (linearity); (c) the variance of error terms is similar across the predictor variables (homoscedasticity), and (d) the absence of multicollinearity is satisfied. These assumptions are tested while the multiple regression analysis is being conducted. The first three assumptions are ascertained from the patterns of relationship between the variables on a scatterplot diagram. Additionally, the criteria for homoscedasticity are met when the confidence levels and statistical significance tests are validated (Field, 2016). One of the statistics that is determined in the multiple linear regression analysis is the Durbin-Watson test. If the value of this test is greater than the

cut-off point of 1, the assumption is that the residual values of the variables are independent. In the coefficient table, if the collinearity statistic is less than the upper level of the confidence interval of 95%, then the predictor variables are not highly correlated with each other. This last assumption is further tested by reviewing the variance inflation factor (VIF) statistic, which requires that the predictor variables are not highly correlated with each other.

The general equation for the multiple linear regression model shows the relationship between the outcome variable and the three predictor variables as follows:

$$Y = B_1X_1 + B_2X_2 + B_3X_3 + B_0$$

where Y is the outcome variable, B_1 to B_3 are the slopes of the predictor variables X_1 to X_3, and B_0 is the constant error. For statistical significance, the null hypothesis should be rejected.

In research studies, it is important to identify any confounding variables and covariates that could interfere with *a priori* assumptions made during the data analysis phase. Confounding variables are hidden variables that influence the results ascribed to the relationship between predictor and outcome variables (Field, 2016; Warner, 2013). Conversely, covariates are variables that could have a predictive influence on the outcome variable. Potential confounding variables and covariates may be treated as control variables. In this study, the control variables identified were gender, age group, and years of experience of faculty participants in using an online learning environment. The reason for classifying these variables as control variables was due to the possibility

of influence on the predictor variables. Hence, there was a need to control the effects that these control variables would have across the levels of the predictor variables.

Threats to Validity

Validity of survey research or cross-sectional designs concerns the accuracy of the instrument to measure the intended variables and the precision to which the findings can be generalized (Frankfort-Nachmias et al., 2015). Threats to validity are categorized as both external and internal. External threats to validity relate to the extent to which the sample is representative of other populations, over time, and in other settings. Threats to internal validity relate to extrinsic factors associated with selection biases and intrinsic factors associated with changes within the sampling units over time, the stability of the survey instrument, or the inclusion of extreme anomalies in the findings.

Threats to External Validity

As a cross-sectional study, the threats to external validity was heightened using convenience sampling procedures that do not adequately support generalizability within the target population. Furthermore, the study was conducted in the participants' natural setting, and data collected only at a single point in time and not through a pre-test and post-test design structure. The results emerging from the singular collection period had the potential to threaten the ability of the researcher to generalize to outside populations. To address this threat, the cross-sectional research design was only intended to study the relationship between the variables in the target population.

Threats to Internal Validity

Many of the threats that occur to internal validity correlate to pre-test and post-test research designs. Given that the intent of this research study was to generalize the relationship between the predictor and outcome variables and not to determine cause and effect relationships, the threat to internal validity was reduced. Additionally, other potential threats to internal validity were reduced through the exploratory nature of this study and the short timeframe for the study, thereby reducing the focus on the cause and effect interpretation of the results regarding the relationship between the variables.

Threats to Construct and Statistical Conclusion Validity

The possibility of threats to both construct and statistical conclusion validity existed in this study. Aligning the development of the survey instrument to the theoretical framework of Moore's interaction theory reduced the impact of this threat. The threat to statistical conclusion validity was minimized by comparing the results of the relationship between the variables with other similar established instruments.

Ethical Procedures

Students and faculty participated in the research study on a volunteer basis, and I maintained confidentiality and anonymity throughout the research process. Given that I did not send the questionnaire to the participants directly, the names and email addresses of the students and faculty were not be captured. To alleviate any ethical concerns about the recruitment of participants to the study, I followed up with my assigned contact at the institution to ensure that the invitation and questionnaire link to participate had been posted on the general website for students and faculty. Additionally, my institutional

liaison was independent of the participation pool of faculty members to eliminate any conflict of interest that could arise. The administration and staff at the institution did not have access to the data collected. The use of SurveyMonkey as the software survey tool allowed for data collection to be accessed directly and only by the researcher, thereby eliminating any ethical concerns regarding anonymity and confidentiality. The online survey tool also allowed respondents' information, including participants who would have withdrawn from the study, and their survey data to be kept confidentially for the period specified by the researcher. For the study, I will keep the data on SurveyMonkey for the period of the dissertation study, after which I will delete the data from my SurveyMonkey account.

The consent form prepared for the expert content evaluation and the field testing of the instrument was submitted to the Walden University IRB for evaluation. Data from the field testing did not form part of the statistical analyses of the survey findings. An application for the conduct of the actual study was submitted to IRB for approval. The IRB approval number for this study was 02-06-19-0397117.

Summary

In Chapter 3, I presented the quantitative cross-sectional study which explored the innovative relationship between the constructs of student engagement, self-regulation practices, and student satisfaction and how this relationship was aligned to student success in the online learning environment at English-speaking Caribbean higher education institutions. This innovative relationship was measured from the perspectives of both students and faculty. The cross-sectional study involved the design of a new

instrument to examine the four factors, and the operational definition for the constructs used the Moore (1989) interaction model as the basis for the design. The two questionnaires developed separately for students and faculty used the same thematic approach to each of the four factors, and the wording of questions generally was the same. The strategies for content validity and reliability were presented and included the use of subject experts and pilot testing of the instruments. In Chapter 4, I discuss the results obtained for validity and reliability and statistical analyses conducted to explore the innovative relationship between the four factors.

Chapter 4: Results

Introduction

The purpose of this study was to explore the innovative relationship between the constructs of student engagement, self-regulation practices, and student satisfaction and how this relationship aligns to perceptions of student success in online learning settings at English-speaking Caribbean higher education institutions. These relationships were measured from the perspectives of both students and faculty who self-reported their experiences in the online environment. The overarching goals of the study comprised both a correlational study of the constructs and a regression study of the constructs and perceived student success at one Caribbean regional institution.

Two main research questions guided this study. The first question related to the correlation model:

RQ1: What is the relationship among the pairs of constructs of student engagement, self-regulation practices, student satisfaction in online courses?

The three sub questions and null and alternate hypotheses for the correlation model:

RQ1a: What is the relationship between student engagement and self-regulation practices in online courses?

$H_0$1a. There is no relationship between student engagement and self-regulation practices in online courses.

H_a1a. There is a relationship between student engagement and self-regulation practices in online courses.

RQ1b: What is the relationship between student engagement and student satisfaction in online courses?

$H_0$1b: There is no relationship between student engagement and student satisfaction in online courses.

H_a1b: There is a relationship between student engagement and student satisfaction in online courses.

RQ1c: What is the relationship between self-regulation practices and student satisfaction in online courses?

$H_0$1c: There is no relationship between self-regulation practices and student satisfaction in online courses.

H_a1c: There is a relationship between self-regulation practices and student satisfaction in online courses.

The second question and null and alternate hypotheses correspond to the regression model:

RQ2: To what extent do the constructs of student engagement, self-regulation practices, and student satisfaction relate to perceptions of student success in online courses?

$H_0$2: The constructs of student engagement, self-regulation practices, and student satisfaction do not relate to perceptions of student success.

H_a2: The constructs of student engagement, self-regulation practices, and student satisfaction do relate to perceptions of student success.

The development of a new instrument (student and faculty) to analyze these relationships in a single study required that the instrument be pilot tested at different institutions other than the institution selected for the actual study site. As a new instrument, the validity and reliability of the instrument needed to be confirmed to verify the accuracy of variables being measured and internal consistency of the scales. Validity was determined as content validity in this study and described in Chapter 3. Details of the internal reliability of the instruments will be presented in this chapter.

Chapter 4 provides the results of the pilot study and the actual research study. Chapter 4 is organized into five sections: (a) the results of the pilot study and how the results impacted the reliability of the instrument, (b) the results of the actual study and the reliability outcome of the instrument for the research study compared with the outcome obtained for the pilot study, (c) the preliminary factor analysis of the instrument, (d) the correlation analyses between pairs of the three constructs, and (e) the linear multiple regression analysis between the three constructs as predictor variables and perceptions of student success as the outcome variable.

New Research Instruments

The research instrument was designed to ask the same questions of both student and faculty participants. As described in Chapters 2 and 3, questions were structured using a four-phased interaction model to obtain the most relevant items for each of the three constructs. This four-phased model allowed for the establishment of commonality between the question items in relation to the interactions of (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-online platform. The learner-online

platform was added as an innovative modification to Moore's (1989) original interaction model that comprised the first three interactions. This modification was necessary considering I was exploring students' and faculty's self-reported opinions of their interactions in the online learning space. Question items for perceptions of student success were not linked directly to the four-phase interaction model but instead to the question items for the three constructs.

Validity and Internal Reliability of the Scales

Validity, as content validity, was established using one set of question items as the instrument's two questionnaires were the same for both students and faculty. In Chapter 3, I described the stages to establish content validity for the question items. Two content experts determined the validity of the instruments prior to the distribution of the surveys to participants in the pilot study and the actual research study. While the research questions focused primarily on each construct overall, I recognized that the internal reliability using the Cronbach's alpha test would not distinguish between the four interactions in this study.

Data Collection and Results of the Pilot Study

The pilot study was conducted at two institutions offering online programs and courses using two surveys, one for students and one for faculty. The response rate was very low, and this response rate may have been affected by the timing of distribution of the surveys at both institutions. During the time that the surveys were open to the participants, students were in the process of either writing final examinations or completing projects for the close of the semester/quarter. For the student survey, a total of

10 responses were received. Of the 10 responses, two responses were incomplete. For the faculty survey, a total of three responses were received, and one of those was incomplete. The question items were coded for all constructs to represent the data more clearly. The codes are given in Tables 14, 15, 16, and 17.

Table 14

Question Coding for Student Engagement Items

No.	Question	Code
1	Apply critical thinking skills to the course activities	SE1
2	Integrate my own views with that of others when learning the course material	SE2
3	Prepare study notes to understand the course material	SE3
4	Apply my learning of the course material to real-life situations	SE4
5	Interact with my instructors at least once a week about the course material	SE5
6	Discuss academic performance and other matters related to the achievement of academic goals with my instructors	SE6
7	Obtain meaningful feedback on assignments from instructors	SE7
8	Understand difficult concepts and content better after interacting with instructors	SE8
9	Collaborate with my peers in a one-to-one or group relationship	SE9
10	Interact with peers on mastering the course material at least once a week	SE10
11	Respect peer differences	SE11
12	Value peer differences	SE12
13	Use the online learning space to participate in the course activities	SE13

Table 15

Question Coding for Self-Regulation Practices Items

No.	Question	Code
1	Give myself enough time to review the course material	SR1
2	Develop plans to achieve my learning goals	SR2
3	Implement plans to achieve my learning goals	SR3
4	Complete course activities assigned by the given deadline	SR4
5	Check the online learning space for course material updates at least twice weekly	SR5
6	Initiate communication with my instructors	SR6
7	Use more than one way to communicate with my instructors	SR7
8	Develop a plan to assist peers in understanding the course material	SR8
9	Implement a plan to assist peers in understanding the course material	SR9
10	Monitor interactions with peers about the course material	SR10
11	Reflect on interactions with peers about the course material	SR11
12	Take the initiative to respond to contributions by my peers in the online learning space	SR12
13	Use the online course activities to guide my own learning of the course material	SR13

Table 16

Question Coding for Student Satisfaction Items

No.	Question	Code
1	Quality of my learning experiences	SS1
2	Alignment of course activities to my expectations of the course	SS2
3	Interactions with instructors	SS3
4	Interactions with peers	SS4
5	Orientation program provided for online learning	SS5

Table 17

Question Coding for Perceptions of Student Success Items

No.	Question	Code
1	Obtaining better grades	PSS1
2	Engaging in course activities	PSS2
3	Participating in programs that assist in improving my understanding of the course material	PSS3
4	Self-directed learning	PSS4
5	Interacting with instructors	PSS5
6	Interacting with peers	PSS6
7	Feeling of a sense of belonging to the online learning community	PSS7
8	Meeting of course expectations	PSS8
9	Being motivated intellectually	PSS9
10	Feeling of a personal sense of accomplishment	PSS10
11	Relevancy of course goals to professional goals	PSS11
12	Relevancy of course goals to personal goals	PSS12
13	Being satisfied with the delivery of the course content	PSS13
14	Being satisfied with the support given to achieving academic goals	PSS14

Internal Reliability of the Scales

Reliability analyses of the scales of the three constructs of student engagement, self-regulation practices, student satisfaction, and factor for perceptions of student success were conducted by calculating the value of Cronbach's alpha (α). According to Kline (1999), a Cronbach statistic between 0.7 and 0.8 demonstrates acceptable reliability of scales, and a Cronbach statistic above 0.8 exhibits good reliability. Table 18 illustrates the Cronbach statistic for each of the construct and factor scales of the student survey, which varied between 0.749 and 0.824.

Table 18

Reliability Statistics for the Construct/Factor Scales of the Student Survey Instrument for All Responses

Construct/factor	Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
Student engagement	0.426	0.537	13
	0.777	0.775	10
Self-regulation practices	0.824	0.827	13
Student satisfaction	0.751	0.743	5
Perceptions of student success	0.749	0.774	14

Student engagement scale. For the original 13-item student engagement scale, an initial value of Cronbach's alpha was found to be 0.426, as shown in Table 18. This value was below the acceptable statistic for the internal consistency of a scale. When three questions were removed, the internal reliability of the scale increased to an acceptable value of 0.777. Table 19 gives further details of the gradual increase in internal consistency with question items removed.

Table 19

Increase in Internal Reliability of the Student Engagement Scale for the Student Survey Instrument

Reliability test number	Cronbach's alpha	Highest Cronbach's alpha if item deleted	Question removed
1	0.426	0.569	SE6
2	0.569	0.686	SE5
3	0.686	0.777	SE3
4	0.777		

Self-regulation practices scale. For the original 13-item self-regulation practices scale, the value of Cronbach's alpha was found to show good internal reliability at 0.824,

as shown in Table 18. The initial Cronbach statistic result indicated that no questions were to be removed.

Student satisfaction scale. For the original 5-item student satisfaction scale, the value of Cronbach's alpha was found to be acceptable at 0.751, as shown in Table 18. The initial Cronbach statistic result indicated that no questions were to be removed.

Student success scale. For the original 14-item student satisfaction scale, the value of Cronbach's alpha was found to be acceptable at 0.749, as shown in Table 18. The initial Cronbach statistic result indicated that no questions were to be removed.

Due to the low participation numbers for the pilot study, the 13-item questionnaire for student engagement was not adjusted to 10 items for the actual study as I wanted to retest the internal reliability of the instrument using a larger sample size. Although eight of the 10 participants answered all questions in the pilot study, the Cronbach statistic was calculated on the 10 student responses and not the eight complete responses. A preliminary result for the eight responses showed that the internal reliability was lower than the internal consistency of the 10 responses. This result supported the decision to test the reliability of the instrument using a larger population size.

Data Collection of the Actual Research Study

Introduction

The actual study was conducted at a Caribbean regional institution (CCC campus) with a population of students and faculty spanning several Caribbean islands. The two questionnaires, one each for student and faculty participants, were not adjusted following the pilot study as the sample size was small. The recruitment exercise was carried as

described in the methodology for the duration of the planned data collection period. The internal reliability of the larger sample from the study site was calculated using Cronbach's alpha. Data analyses comprised both a descriptive study and an inferential study.

Data Collection

The actual study was conducted over four weeks. Students enrolled in and faculty teaching online courses were invited to participate in the study using the convenience sampling method. Letters of cooperation and IRB approval from the institution (see Appendix D) allowed the researcher to collect data from participants. The data collection involved issuing invitation letters and three follow-up letters to participants through my administrative contacts at the institution. Data collection was carried out as planned except in one instance when the institution's liaison for student participants indicated that the second follow-up letter was not distributed as scheduled. To compensate for this oversight, the survey remained open for an additional five days after the third and final follow-up letter was issued.

Internal Reliability of the Scales

The internal reliability of the instrument used for the actual research study was determined in two ways. First, Cronbach's alpha was calculated using all the responses from each participant group, and second, Cronbach's alpha was calculated using only those responses that had no missing demographic data. Participant groups were separated for the internal reliability determination. Tables 16, 17, 18, and 19 give the results of the Cronbach statistic test.

Cronbach's Alpha for All Responses

The internal reliability for the scales for each participant group was calculated using all the responses collected. Tables 20 and 21 show the Cronbach statistic for each of the construct and factor scales. This statistic varied between 0.838 and 0.917 for the student questionnaire and between 0.806 and 0.907 for the faculty questionnaire.

Table 20

Reliability Statistics for the Construct/Factor Scales of the Student Survey Instrument for All Responses

Construct/factor	Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
Student engagement	0.835	0.837	13
Self-regulation practices	0.866	0.868	13
Student satisfaction	0.861	0.861	5
Perceptions of student success	0.917	0.921	14

Table 21

Reliability Statistics for the Construct/Factor Scales for the Faculty Survey Instrument for All Responses

Construct/factor	Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
Student engagement	0.863	0.864	13
Self-regulation practices	0.907	0.910	13
Student satisfaction	0.806	0.807	5
Perceptions of student success	0.898	0.903	14

Cronbach's Alpha for Responses With No Missing Demographic Data

The internal reliability for the scales for each participant group was calculated using responses that had no missing demographic data. Tables 22 and 23 show the Cronbach statistic for each of the construct and factor scales. This statistic varied between 0.833 and 0.921 for the student questionnaire and between 0.794 and 0.906 for the faculty questionnaire.

Table 22

Reliability Statistics for the Construct/Factor Scales of the Student Survey Instrument for Responses With No Missing Demographic Data

Construct/factor	Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
Student engagement	0.833	0.836	13
Self-regulation practices	0.860	0.863	13
Student satisfaction	0.863	0.863	5
Perceptions of student success	0.921	0.925	14

Table 23

Reliability Statistics for the Construct/Factor Scales of the Faculty Survey Instrument for Responses With No Missing Demographic Data

Construct/factor	Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
Student engagement	0.863	0.864	13
Self-regulation practices	0.906	0.910	13
Student satisfaction	0.794	0.797	5
Perceptions of student success	0.889	0.983	14

A comparison of the internal reliability statistics obtained for the student engagement, self-regulation, student satisfaction, and perceptions of student success scales for all responses with the same scales for responses with missing demographic data removed revealed little differences in the values of the Cronbach's alpha. The high degree similarity between the two sets of statistics confirmed that the reliability of the instrument designed for students and faculty was consistent. Consequently, there was no need to remove any of the items from the two questionnaires as the Cronbach's alpha result showed that the measurements for each of the constructs of student engagement, self-regulation practices, student satisfaction, and factors on perceptions of student success were consistent.

Preliminary Factor Analysis

The preliminary factor analysis was conducted to support the content validity established in Chapter 3 for the question items of the newly developed instrument. Given that the question items were the same for both student and faculty groups, the factor analysis was conducted on the student group, which had a larger number of respondents. A separate factor analysis was conducted for the three constructs and perceptions of student success, as each of the four dimensions had a different operational definition. The questionnaire was constructed by identifying four interaction factors for each of the three constructs: (a) learner-content; (b) learner-instructor; (c) learner-learner; and (d) learner-online platform. The group of questions for perceptions of student success did not pre identify factors. The factor analysis used the principal components extraction method with an oblimin rotation.

Student engagement. The factor analysis examined 13 question items for student engagement to determine how these items were grouped. All items were correlated with at least one other item above the correlation value set at 0.3 (see Appendix E, Table E1). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.78 (see Appendix E, Table E2), and was greater than the recommended value of 0.6 (Field, 2016). The same table confirmed the significance of the factor analysis based on Bartlett's test of sphericity ($\chi^2(78) = 1755.94$, $p < .001$).

Four factors emerged from the principal component analysis for student engagement (see Appendix E, Table E3). These four factors explained 71% of the variance in the question items for eigenvalues over 1. The pattern matrix of these factors revealed how the question items were loaded to represent the construct of student engagement (see Appendix E, Table E4). An examination of the factor loading showed that all the question items for the learner-content interface were categorized in the same factor. The items for the learner-instructor interface also were placed in the same factor. The items for the learner-learner interface were sorted into two factors, and the learner-online platform question was placed in one of the two factors identified for the learner-learner interface. The preliminary factor analysis showed that the factors for learner-learner and learner-online platform could be improved by adding more questions that would create a further distinction between the items.

Self-regulation practices. The factor analysis examined 13 question items for self-regulation practices to determine how these items were grouped. All items were correlated with at least one other item above the correlation value set at 0.3 (see

Appendix E, Table E5). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.81 (see Appendix E, Table E6), and was greater than the recommended value of 0.6 (Field, 2016). The same table confirmed the significance of the factor analysis based on Bartlett's test of sphericity ($\chi^2(78) = 1984.48$, $p < .001$).

Four factors emerged from the principal component analysis for self-regulation practices (see Appendix E, Table E7). These four factors explained 70% of the variance in the question items for eigenvalues over 1. The pattern matrix of these factors revealed how the question items were loaded to represent the construct of self-regulation practices (see Appendix E, Table E8). An examination of the factor loading showed that all the question items for the learner-instructor interface were categorized in the same factor. The items for the learner-content interface shared three factors. The items for the learner-learner interface were sorted into three factors, and the learner-online platform question was placed in one of the same factors with the learner-content interface. The preliminary factor analysis showed that the question items for learner-content and learner-learner could be shifted around. The learner-online platform interface could be improved by adding more questions that would create a further distinction between the items.

Student satisfaction. The factor analysis examined the five-question items for student satisfaction to determine how these items were grouped. All items were correlated with at least one other item above the correlation value set at 0.3 (Appendix E, Table E9). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.82 (see Appendix E, Table E10), and was greater than the recommended value of 0.6 (Field,

2016). The same table confirmed the significance of the factor analysis based on Bartlett's test of sphericity ($\chi^2(10) = 763.65$, $p < .001$).

Only one factor emerged from the principal component analysis for student satisfaction. This factor explained 65% of the variance in the question items for eigenvalues over 1 (see Appendix E, Table E11). There was no pattern matrix of these factors given that one factor for the question items could not be rotated. An examination of the preliminary factor analysis showed that the question items depicting the learner-content, learner-instructor, learner-learner, and learner-online platform interfaces could be improved by adding more questions that would create a further distinction between the items.

Perceptions of student success. The factor analysis examined 14 question items for perceptions of student success to determine how these items were grouped. All items were correlated with at least one other item above the correlation value set at 0.3 (see Appendix E, Table e12). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.90 (see Appendix E, Table E13), and was greater than the recommended value of 0.6 (Field, 2016). The same table confirmed the significance of the factor analysis based on Bartlett's test of sphericity ($\chi^2(91) = 2518.26$, $p < .001$).

Three factors emerged from the principal component analysis for perceptions of student success (see Appendix E, Table E14). These three factors explained 68% of the variance in the question items for eigenvalues over 1. The pattern matrix of these factors revealed how the question items were loaded to represent perceptions of student success

(see Appendix E, Table E15). The preliminary factor analysis showed that the question items for perceptions of student success could be refined to create distinctive categories.

Overall factor analysis results. The preliminary factor analysis was conducted to establish the construct validity of the question items within the three constructs and perceptions of student success. The analysis revealed the number of factors associated with the question items created for this study. For the constructs, student engagement, and self-regulation practices, the results confirmed the four-factor design of the question items. Despite the confirmation, some question items did not fit exclusively in the factors as originally intended. For the construct, student satisfaction, the results contradicted the four-factor design and established that a one-factor design was a better fit for the original question items. For perceptions of student success, although the original question item design did not identify the number of factors to be represented, a three-factor design emerged. The preliminary factor analysis results were discussed further in Chapter 5.

Participant Responses and Missing Data

The treatment of missing data was considered in this study. I found missing data in participants' responses to the demographic questions and the questions associated with the three constructs and perceptions of student success. An initial total of 385 students and 61 faculty members responded. The number of student responses was above the minimum sample size of 138 calculated for this study, while the number of faculty responses was below the projected sample size. The student and faculty responses were cleaned by removing all missing demographic information. The cleaning exercise resulted in a lower number of responses for the participant groups, as shown in Table 24.

Table 24

Comparison of Number of Participant Group Responses Before and After Removal of Missing Demographic Information

Participant group	Number of original responses	Number of responses after removal of missing demographic information
Student	385	352
Faculty	61	53

The survey instruments treated the scales for student engagement, self-regulation practices, student satisfaction, and perceptions of student success as distinct from each other. Although I found missing data for responses related to these scales, I noted that missing data for one scale did not mean missing data for the other scales. As a result, I kept the missing data for the scales and reported on them when I conducted the correlation and linear multiple regression analyses.

Baseline Descriptive and Demographic Characteristics of the Sample

The research sample comprised both student and faculty participant groups. The baseline demographic characteristics presented relate to the gender, age group, and country of residence of the sample. Gender and age group were identified as covariate variables in Chapter 3 and were included in the baseline model to describe the characteristics of each participant group.

Table 25 shows the gender ratio for the student and faculty respondents. In both participant groups, the percentage of female respondents was higher than male respondents. Female respondents were 87.8% for the student participant group and 75.5% for the faculty participant group.

Table 25

Gender Characteristics of the Participant Groups

Gender	Student		Faculty	
	Frequency	Percentage	Frequency	Percentage
Male	43	12.2	13	24.5
Female	309	87.8	40	75.5
Total	352	100.0	53	100.0

The age ranges for the two participant groups are displayed in Table 26. There were five age group ranges between *30 years and Under* to *Over 60 years*. For the student participant group, the highest number of respondents was found in the 31-40 age group range (39.2%), and the lowest number of respondents was in the over 60 age group (0.3%). For the faculty participant group, the highest number of respondents was found in the 51-60 age group range with 35.8%, and the lowest number of respondents was in the over 60 age group with 9.4%. There were no faculty members in the age group 30 and under who participated in the study.

Table 26

Age Group Characteristics of the Participant Groups

Age group range	Student		Faculty	
	Frequency	Percentage	Frequency	Percentage
30 and under	120	34.1	0	0.0
31-40	138	39.2	16	30.2
41-50	72	20.5	13	24.5
51-60	21	6.0	19	35.8
Over 60	1	0.3	5	9.4
Total	352	100.0	53	100.0

The age group ranges of each participant group were further categorized by gender, as seen in Table 27. For the student participant group, the highest number of male

respondents was found in the 41-50 age group, and the highest number of female respondents was found in the 31-40 age group range. The lowest number of male respondents and the lowest number of female respondents were found in the same age group range of over 60 years. For the faculty participant group, the highest number of male respondents and the highest number of female respondents were found in the 51-60 age group range. The age groups with the lowest number of male and female respondents differed for the faculty participant group. The lowest number of male respondents was found in the 41-50 age group, whereas the lowest number of female respondents was found in the over 60 age group.

Table 27

Age Group Characteristics of the Participant Groups Categorized by Gender

Age group range	Student gender by numbers		Faculty gender by numbers	
	Male	Female	Male	Female
30 and under	10	110	0	0
31-40	12	126	4	12
41-50	16	56	1	12
51-60	5	16	6	13
Over 60	0	1	2	3
Total	43	309	13	40

The CCC regional institution serves several islands in the Caribbean. Figure 3 and Figure 4 show the distribution of respondents by country of residence. For the student participant group, 21 countries were represented, inclusive of two countries outside of the Caribbean region. The largest number of student respondents was from Trinidad and Tobago, followed by Jamaica. For the faculty participant group, 12 countries were

represented, inclusive of four countries outside of the Caribbean region. The largest number of faculty respondents was from Trinidad and Tobago followed by Jamaica.

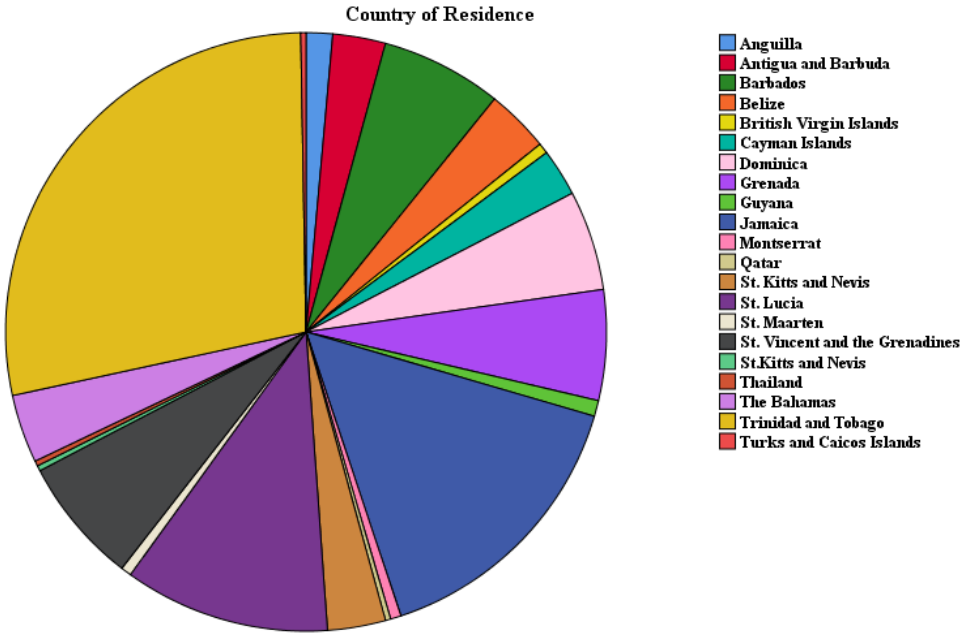

Figure 3. Country of residence characteristics of the student participant group.

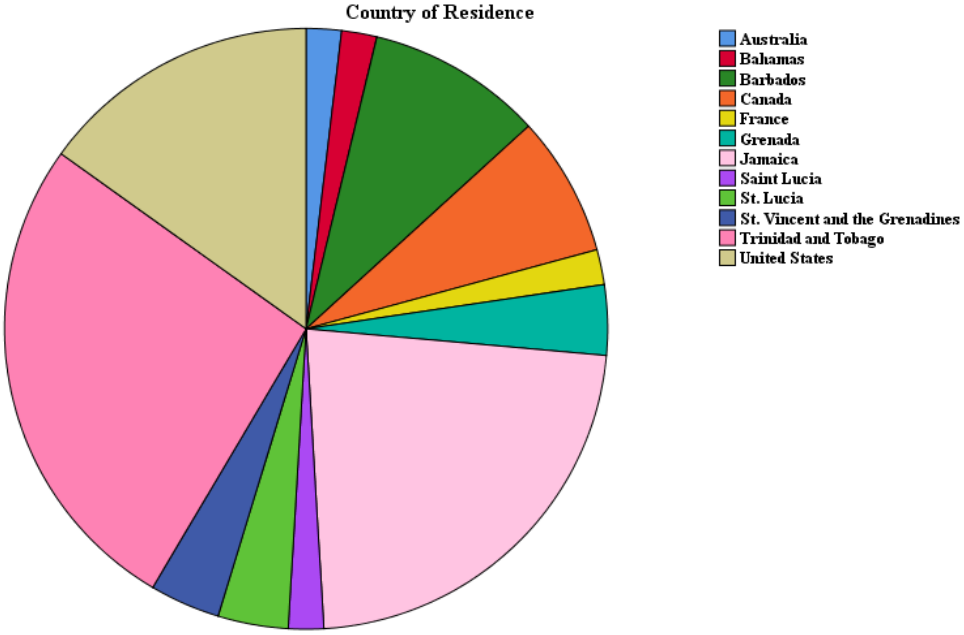

Figure 4. Country of residence characteristics of the faculty participant group.

Relationship of the Sample to the Population

The research study used a non-probability sampling technique to explore the self-reported opinions of students and faculty. The intent of the study was not to generalize and determine cause and effect. The study was an exploratory one, particularly due to the development of a new instrument comprising two questionnaires (student and faculty) to measure student engagement, self-regulation practices, student satisfaction, and perceptions of student success. The distribution of the survey questionnaires occurred during the summer period and did not represent the total student and faculty population of the institution. Consequently, the timing of the study impacted the representativeness of the sample to the institution's population.

The response rate for the student participant group could not be determined as information on the size of the summer student population enrolled in online courses was not provided. While the summer population size for students could not be ascertained, the average annual student population or target population was approximately 6000 students. Based on this annual projection of the total student population, the response rate for the student participant group was 6.4% for all responses and 5.9% after removing the missing demographic data.

The invitation to participate, follow-up reminders, and the link to the survey were sent to 273 adjunct faculty members by the institution. The total response rate for the faculty participant group was 22.3%. After the data cleanup exercise, the response rate for faculty was 19.4%. This response rate was less than the 25% predicted in Chapter 3. Furthermore, the response rate was less than the anticipated minimum sample size of 138

and would have required 50.0% of the faculty to respond with no missing data. There are approximately 540 adjunct faculty members, and the final response rate of faculty represented 9.8% of the faculty population.

Research Study Results

The results of the research study comprise descriptive and inferential statistics. The descriptive statistical analysis of the responses summarized the data for the demographic variables of the student cohort and faculty teaching statuses, program level and year, number of programs, number of teaching years, number of courses, number of hours spent online. The number of teaching years was identified as a covariate variable in Chapter 3 and was included in the statistical analysis to describe the characteristics of the faculty participant group. These variables were measured using frequency tables, mean, standard deviation, and the number of respondents for the online programs. The inferential statistical analyses presented the results of the correlation and multiple linear regression statistics according to the research questions.

Descriptive Statistical Analysis of the Sample

Student cohort characteristics. Table 28 presents the cohort characteristics of the student participation group. These characteristics comprised student respondents' full-time and part-time statuses, and program level, and program year in which they were enrolled. The frequency and percentage descriptions are provided. The largest student respondent group was part-time (80.7%). Most of the student respondents were enrolled in the Bachelor's programs (61.4%), followed by the Master's programs (16.5%). The smallest student respondent group was enrolled in the Graduate Certificate (1.1%) and

Graduate Diploma programs (1.1%). Most of the student respondents were enrolled in year 1 of their programs of study (41.8%). The numbers of student respondents enrolled in year 2 (24.7%) and year 3 (25.6%) were almost the same. The smallest numbers of student respondents (0.3%) were enrolled in years 6, 7, and 8.

Table 28

Cohort Characteristics of the Student Participant Group

Demographics	Frequency	%
Cohort information		
Full-time	68	19.3
Part-time	284	80.7
Total	352	100.0
Program level enrolled		
Undergraduate certificate	8	2.3
Undergraduate diploma	6	1.7
Associate degree	21	6.0
Bachelor's degree	216	61.4
Graduate certificate	4	1.1
Graduate diploma	4	1.1
Master's degree	58	16.5
Doctoral degree	35	9.9
Total	352	100.0
Program year enrolled		
1	147	41.8
2	87	24.7
3	90	25.6
4	22	6.3
5	3	0.9
6	1	0.3
7	1	0.3
8	1	0.3
Total	352	100.0

Student program and course characteristics. Table 29 displays the program and course characteristics of the student participation group. These characteristics comprised the expected graduation year, the number of courses in which the student

respondents were enrolled, and the number of hours spent online per week. The central tendency, standard deviation, and range of responses are given. The largest number of student respondents selected 2021 as the expected graduation year. Most student respondents indicated that they were pursuing two courses, while most respondents spent 10 hours per week online.

Table 29

Program and Course Characteristics of the Student Participation Group

Statistics	Graduation year	Number of courses enrolled	Number of hours per week
Mean	2020.89	1.56	15.42
Median	2021.00	2.00	13.00
Mode	2021	2	10
Standard deviation	1.483	0.916	10.930
Range	7	5	60
Minimum	2019	0	0
Maximum	2026	5	60

Faculty teaching characteristics. Table 30 presents the teaching characteristics of the faculty participant group, which comprised faculty respondents' full-time and part-time teaching statuses and program teaching levels. The frequency and percentage descriptors are provided. The largest faculty respondent group was part-time (84.9%). Most of the faculty respondents taught in the bachelor's programs (60.4%) followed by the master's programs (22.6%). The associate degree level had the smallest number of faculty respondents (3.8%). There were no faculty respondents who taught at the undergraduate certificate, undergraduate diploma, graduate certificate, and graduate diploma levels.

Table 30

Teaching Characteristics of the Faculty Participant Group

Demographics	Frequency	%
Status information		
Full-time	8	15.1
Part-time	45	84.9
Total	53	100.0
Program teaching level		
Associate degree	2	3.8
Bachelor's degree	32	60.4
Master's degree	12	22.6
Doctoral degree	7	13.2
Total	53	100.0

Faculty program and course characteristics. Table 31 displays the program and course characteristics of the faculty participation group. These characteristics comprised the number of years teaching, number of programs teaching, number of courses teaching in a select program, and number of hours spent online per week. The central tendency, standard deviation, and range of responses are given. The largest number of faculty respondents had been teaching for at least four years. Most faculty respondents indicated they taught one online program of study. In their selected programs, most faculty respondents taught one course while the majority of respondents spent 10 hours per week teaching online.

Table 31

Program and Course Characteristics of the Faculty Participation Group

Statistics	Number of years teaching	Number of programs teaching	Number of courses teaching in a select program	Number of hours per week
Mean	7.15	1.92	1.91	12.06
Median	6.29	1.62	1.61	10.57
Mode	4	1	1	10
Standard deviation	4.576	1.479	1.362	8.411
Range	19	8	7	38
Minimum	1	0	1	2
Maximum	20	8	8	40

Inferential Statistical Analyses of the Sample Population

The inferential statistical analyses of the sample population were based on the research questions for this study. The two main research questions involved a correlation analysis of each pair of the three constructs and a multiple linear regression analysis of the constructs and perceptions of student success. Prior to the conduct of the analyses, I created subscales for each of the three constructs and perceptions of student success by adding the respondent numerical values ascribed to the Likert scale of each survey item. As indicated in Chapter 3, the maximum numerical values for the constructs and perceptions of student success varied as follows:

Student Engagement	65
Self-Regulation Practices	65
Student Satisfaction	25
Perceptions of Student Success	70

The findings from the correlation and regression models are presented separately for each participant group. Due to the low response rate from the faculty participant group, the student group and the faculty group were combined to create a third participant group. The findings are also presented for the combined participant group.

Correlation analysis of the sample population. The correlation between each possible pair of the three constructs was determined to address the first research question and the attendant three sub questions. The overarching correlation question is as follows:

RQ1. What is the relationship among the pairs of constructs of student engagement, self-regulation practices, student satisfaction in online courses?

The sub questions and the associated null and alternate hypotheses are presented under the applicable sections for the construct pairs. The relationship among the pairs of constructs was calculated as the Pearson correlation coefficient, *r* (Field, 2016). The correlation statement is represented by

r(df) =correlation value, $p < .05$ or $p < .01$ where df = degrees of freedom.

This correlation value gives the strength of the association between the variables being measured and ranges from -1 (perfect negative correlation) to +1 (perfect positive correlation). The strength of the association or correlation among variables is related to the Cohen effect size classification levels for correlation analyses (Faul et al., 2007, 2009). The absolute values of these levels are given as 0.10-0.29 (small or weak), 0.30-0.49 (medium or moderate), and 0.50-1.00 (large or strong). The Cohen correlation classification was used to discuss the strength of the relationship between the variable pairs following the computation of the Pearson correlation coefficient, *r*.

The two assumptions of correlation analyses to be satisfied prior to the calculation of *r* were (a) the variables are normally distributed, and (b) the scores for the variables are independent of each other. The first assumption was examined using a scatterplot to confirm that there was a linear relationship between variables of each pair of constructs. The second assumption was determined as being satisfied given that separate participants had completed the student and faculty surveys.

Student engagement and self-regulation practices. Figure 5 and Figure 6 show the relationship between the variables of the constructs of student engagement and self-regulation practices for student and faculty participant groups. Figure 7 shows the relationship between the variables for the combined participant group. An examination of the scatterplots showed that there was a linear relationship between the variables. Consequently, the first assumption for the correlation model for students, faculty, and the combined group was satisfied.

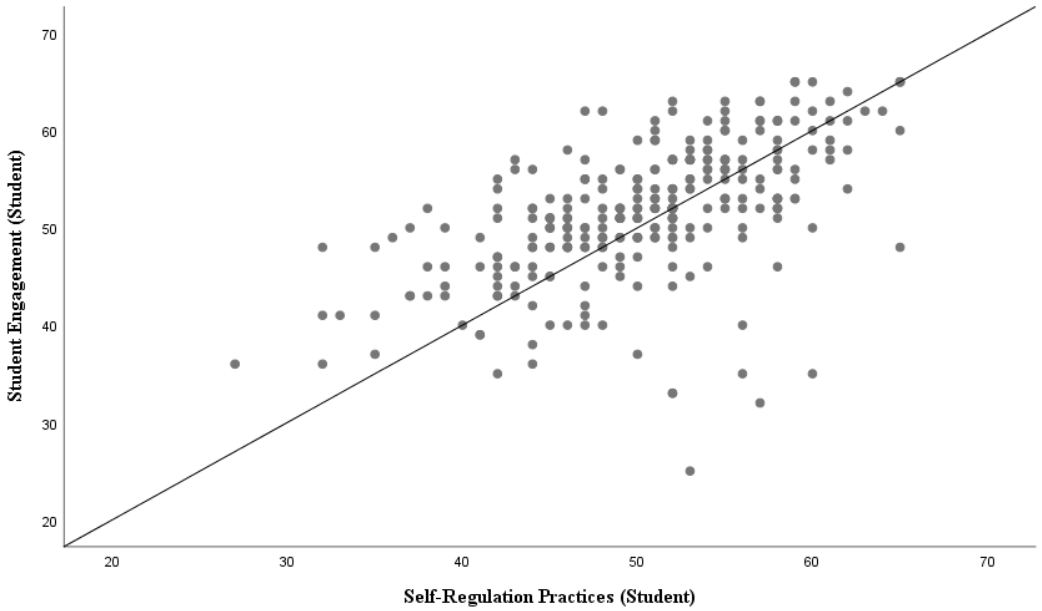

Figure 5. Scatterplot of student engagement and self-regulation practices for student respondents.

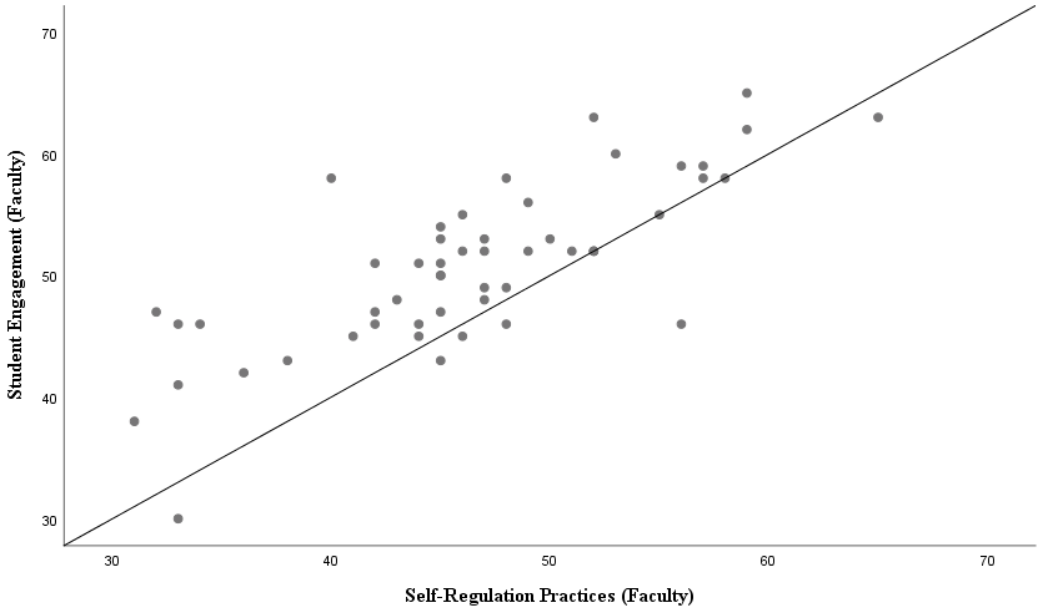

Figure 6. Scatterplot of student engagement and self-regulation practices for faculty respondents.

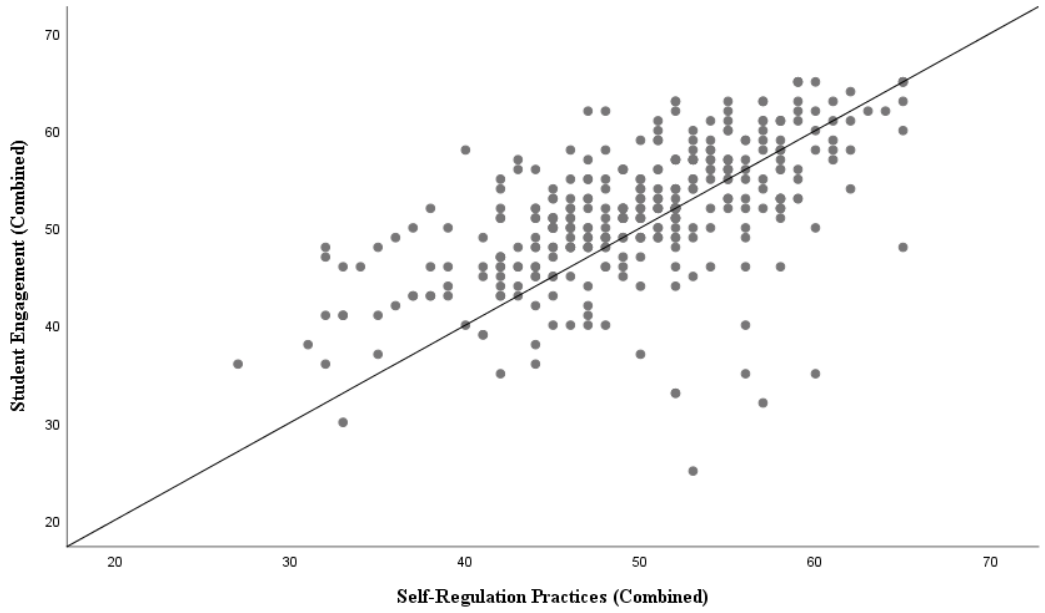

Figure 7. Scatterplot of student engagement and self-regulation practices for the combined participant group.

Table 32

Descriptive Statistics for Student Engagement and Self-Regulation Practices of the Sample Population

Variable	Student group			Faculty group			Combined group		
	Mean	*SD*	N	Mean	*SD*	N	Mean	*SD*	N
Student engagement	51.58	6.808	309	50.66	6.802	53	51.44	6.805	362
Self-regulation practices	50.45	6.729	297	46.52	7.661	52	49.87	7.005	349

Table 32 presents the descriptive statistics for student engagement and self-regulation practices in terms of mean, standard deviation, and the number of responses. The ranges of the mean values for the participation groups varied by 0.92 for the student engagement construct and by 3.93 for the self-regulation practices construct. The differences between the mean values for the two constructs showed that more

respondents indicated a higher level of agreement with the question items for student engagement.

The first correlation research sub question and related null and alternate hypotheses are as follows:

RQ1a: What is the relationship between student engagement and self-regulation practices in online courses?

$H_0$1a. There is no relationship between student engagement and self-regulation practices in online courses.

H_a1a. There is a relationship between student engagement and self-regulation practices in online courses.

Table 33 displays the Pearson correlation coefficient between the variables for student engagement and self-regulation practices. The correlation between student engagement and self-regulation practices was found to be significant ($p < .01$), $r(295) = .58$, p .001 for the student participant group, and the strength of the relationship was strong ($r > .5$). For the faculty participant group, the correlation between the two variables was significant ($p < .01$), $r(50) = .77$, p .001, and the strength of the relationship was strong ($r > .5$). For the combined participant group, the correlation between the two variables was significant ($p < .01$), $r(347) = .61$, p .001, and the strength of the relationship was strong ($r > .5$). The correlation between student engagement and self-regulation practices was highest for the faculty participation group and lowest for the student participant group. The findings showed that there is a strong significant relationship between student engagement and self-regulation practices given that $r > .5$

and $p < .01$. Consequently, I rejected the null hypothesis and supported the alternate hypothesis.

Table 33

Pearson Correlation for Student Engagement and Self-Regulation Practices of the Sample Population

Constructs	Student engagement	Self-regulation practices
Student participant group		
Student engagement	1.000	0.577**
Self-regulation practices	0.577**	1.000
Faculty participant group		
Student engagement	1.000	0.774**
Self-regulation practices	0.774**	1.000
Combined participant group		
Student engagement	1.000	0.605**
Self-regulation practices	0.605**	1.000

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

Student engagement and student satisfaction. Figure 8 and Figure 9 show the relationship between the variables of the constructs of student engagement and student satisfaction for student and faculty participant groups. Figure 10 shows the relationship between the variables for the combined participant group. An examination of the scatterplots showed that there was a linear relationship between the variables. Consequently, the first assumption for the correlation model for students, faculty, and the combined group was satisfied.

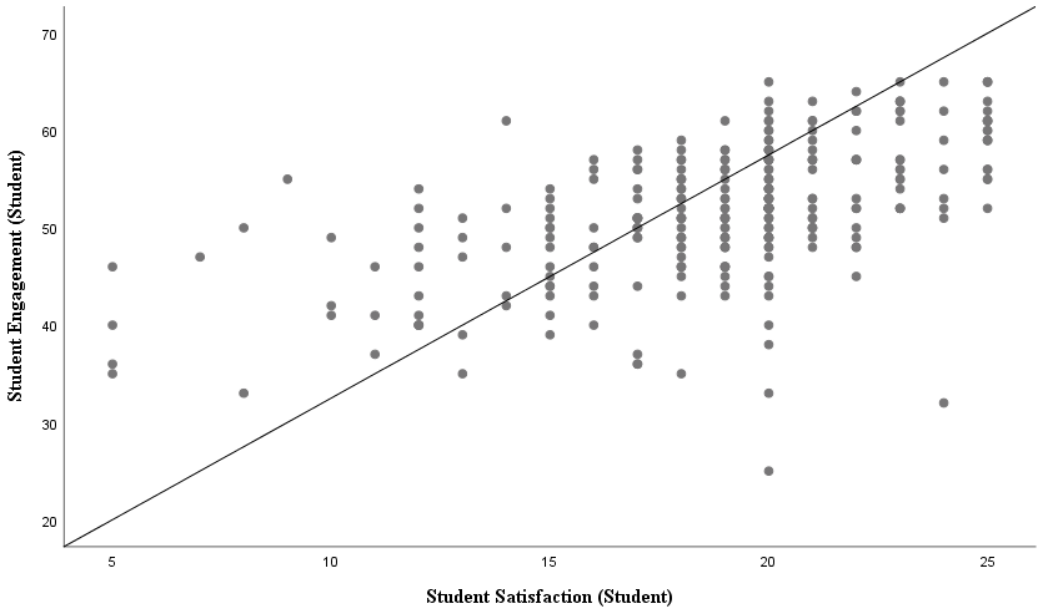

Figure 8. Scatterplot of student engagement and student satisfaction for student respondents.

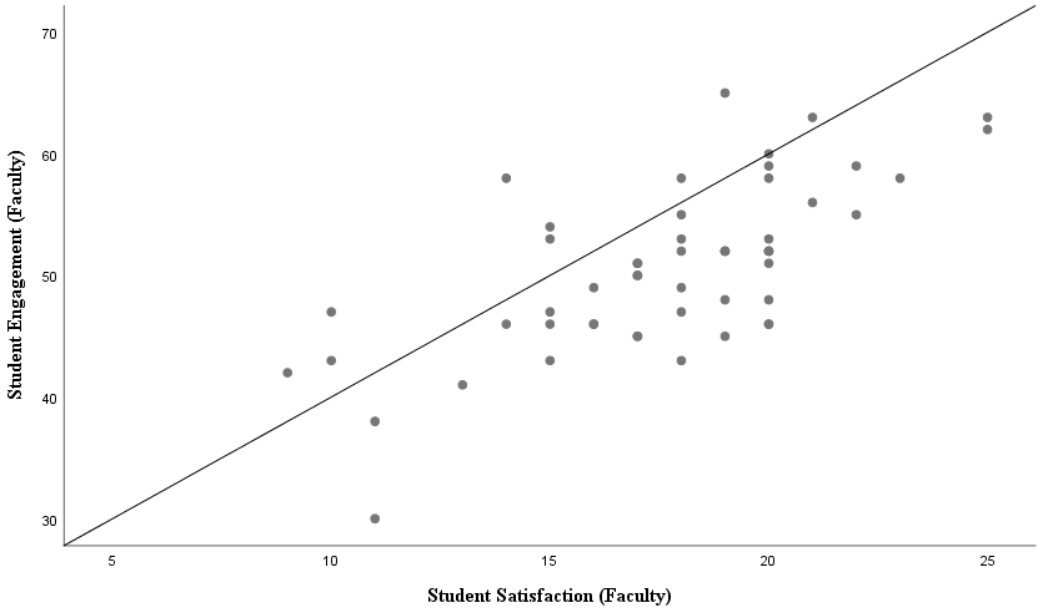

Figure 9. Scatterplot of student engagement and student satisfaction for faculty respondents.

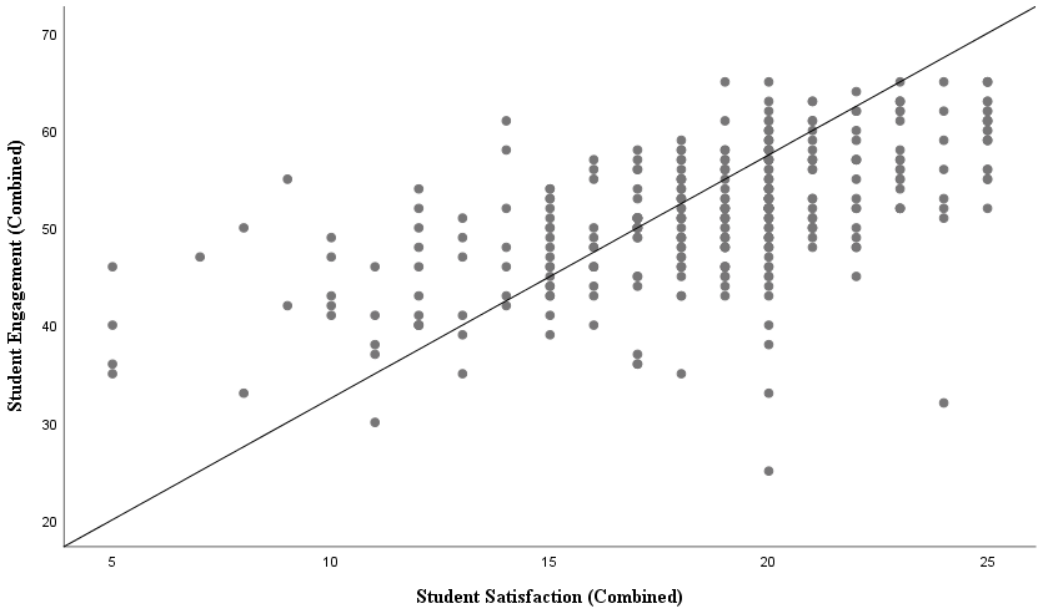

Figure 10. Scatterplot of student engagement and student satisfaction for the combined participant group.

Table 34 presents the descriptive statistics for student engagement and student satisfaction in terms of mean, standard deviation, and the number of responses. The ranges of the mean values for the participation groups varied by 0.92 for the student engagement construct and by 1.16 for the student satisfaction construct. The differences between the mean values for the two constructs showed that more respondents indicated a higher level of agreement with the question items for student engagement.

Table 34

Descriptive Statistics for Student Engagement and Student Satisfaction of the Sample Population

Variable	Student group			Faculty group			Combined group		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Student engagement	51.58	6.808	309	50.66	6.802	53	51.44	6.805	362
Student satisfaction	18.82	3.858	296	17.66	3.519	53	18.64	3.827	349

The second correlation research sub question and related null and alternate hypotheses are as follows:

RQ1b: What is the relationship between student engagement and student satisfaction in online courses?

$H_0$1b: There is no relationship between student engagement and student satisfaction in online courses.

H_a1b: There is a relationship between student engagement and student satisfaction in online courses.

Table 35 displays the Pearson correlation coefficient between the variables for student engagement and student satisfaction. The correlation between student engagement and student satisfaction was found to be significant ($p < .01$), $r(294) = .56$, p .001 for the student participant group, and the strength of the relationship was strong ($r > .5$). For the faculty participant group, the correlation between the two variables was significant ($p < .01$), $r(51) = .69$, p .001, and the strength of the relationship was strong ($r > .5$). For the combined participant group, the correlation between the two variables was significant ($p < .01$), $r(347) = .58$, p .001, and the strength of the relationship was strong ($r > .5$). The correlation between student engagement and student satisfaction was highest for the faculty participation group and lowest for the student participant group. The findings showed that there is a strong significant relationship between student engagement and student satisfaction given that $r > .5$ and $p < .01$. Consequently, I rejected the null hypothesis and supported the alternate hypothesis.

Table 35

Pearson Correlation for Student Engagement and Student Satisfaction of the Sample Population

Constructs	Student engagement	Student satisfaction
Student participant group		
Student engagement	1.000	0.556**
Student satisfaction	0.556**	1.000
Faculty participant group		
Student engagement	1.000	0.691**
Student satisfaction	0.691**	1.000
Combined participant group		
Student engagement	1.000	0.576**
Student satisfaction	0.576**	1.000

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

Self-regulation practices and student satisfaction. Figure 11 and Figure 12 show the relationship between the variables of self-regulation practices and student satisfaction for student and faculty participant groups. Figure 13 shows the relationship between the variables for the combined participant group. An examination of the scatterplots showed that there was a linear relationship between the variables. Consequently, the first assumption for the correlation model for students, faculty, and the combined group was satisfied.

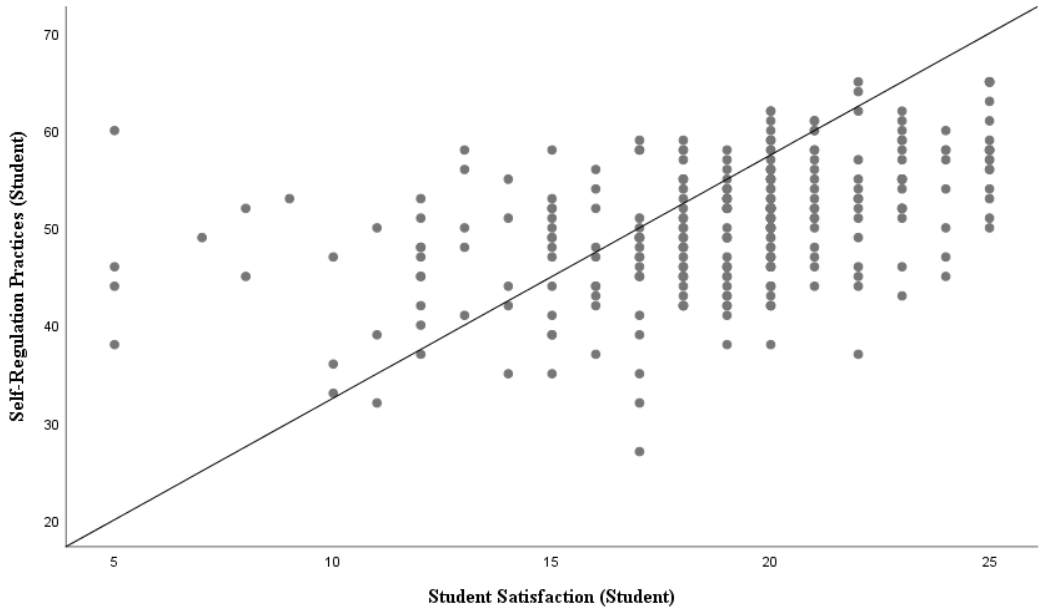

Figure 11. Scatterplot of self-regulation practices and student satisfaction for student respondents.

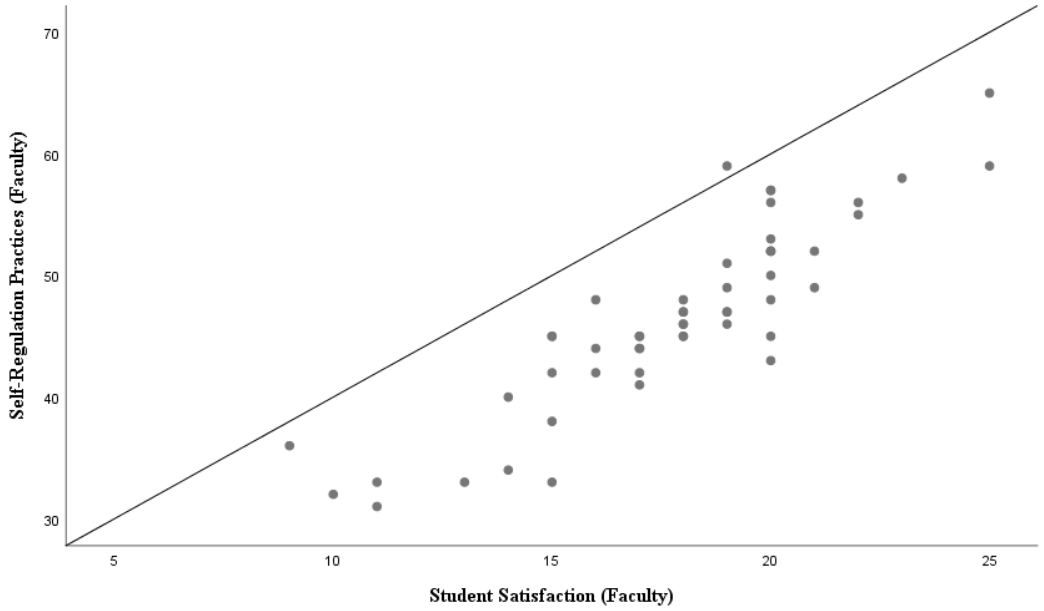

Figure 12. Scatterplot of self-regulation practices and student satisfaction for faculty respondents.

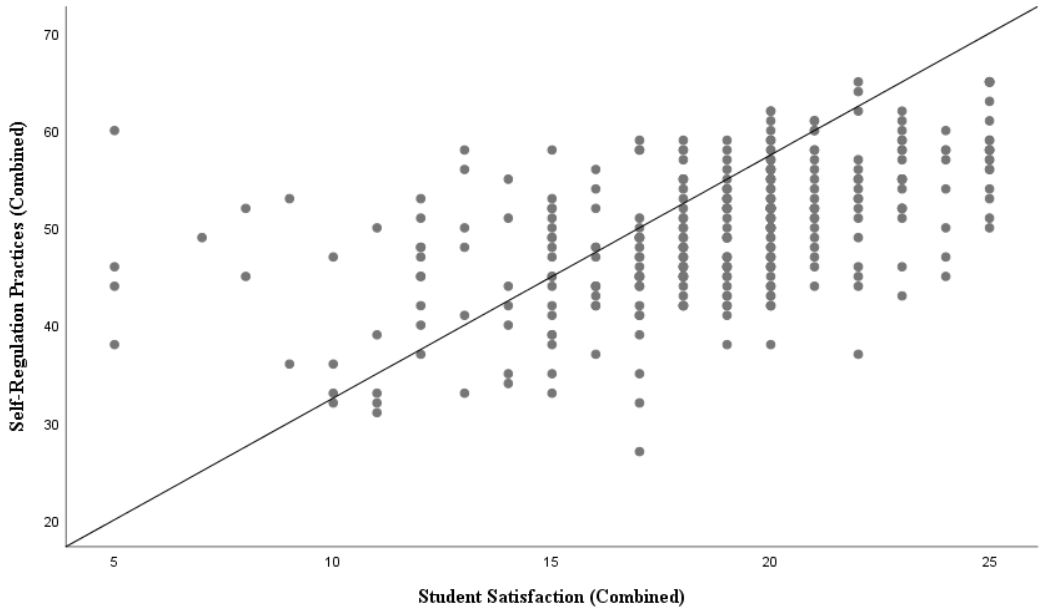

Figure 13. Scatterplot of self-regulation practices and student satisfaction for the combined participant group.

Table 36 presents the descriptive statistics for self-regulation practices and student satisfaction in terms of mean, standard deviation, and the number of responses. The ranges of the mean values for the participation groups varied by 3.93 for the self-regulation practices construct and by 1.16 for the student satisfaction construct. The differences between the mean values for the two constructs showed that more respondents indicated a higher level of agreement with the question items for student satisfaction.

Table 36

Descriptive Statistics for Self-Regulation Practices and Student Satisfaction of the Sample Population

Variable	Student group			Faculty group			Combined group		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Self-regulation practices	50.45	6.729	297	46.52	7.661	52	49.87	7.005	349
Student satisfaction	18.82	3.858	296	17.66	3.519	53	18.64	3.827	349

The third correlation research sub question and related null and alternate hypotheses are as follows:

RQ1c: What is the relationship between self-regulation practices and student satisfaction in online courses?

$H_0$1c: There is no relationship between self-regulation practices and student satisfaction in online courses.

H_a1c: There is a relationship between self-regulation practices and student satisfaction in online courses.

Table 37 displays the Pearson correlation coefficient between the variables for self-regulation practices and student satisfaction. The correlation between self-regulation practices and student satisfaction was found to be significant ($p < .01$), $r(294) = .45$, p. 001 for the student participant group, and the strength of the relationship was moderate ($.3 < r < .5$). For the faculty participant group, the correlation between the two variables was significant ($p < .01$), $r(50) = .89$, p .001, and the strength of the relationship was strong ($r > .5$). For the combined participant group, the correlation between the two

variables was significant ($p < .01$), $r(346) = .52$, p .001, and the strength of the relationship was strong ($r > .5$). The correlation between self-regulation practices and student satisfaction was the strongest for the faculty participation group and lowest for the student participant group. The findings showed that while the relationship between self-regulation practices and student satisfaction was significant ($p < .01$), the relationship was moderate for the student group ($.3 < r < .5$) and strong for the faculty and combined groups ($r > .5$). Consequently, I rejected the null hypothesis and supported the alternate hypothesis.

Table 37

Pearson Correlation for Self-Regulation Practices and Student Satisfaction of the Sample Population

Constructs	Self-regulation practices	Student satisfaction
Student participant group		
Self-regulation practices	1.000	0.450**
Student satisfaction	0.450**	1.000
Faculty participant group		
Self-regulation practices	1.000	0.887**
Student satisfaction	0.887**	1.000
Combined participant group		
Self-regulation practices	1.000	0.518**
Student satisfaction	0.518**	1.000

Note. ** Correlation is significant at the .01 level (two-tailed)

Correlation results of all paired constructs. The correlation results of all paired constructs of student engagement, self-regulation practices, and student satisfaction showed that the relationships were significant but differed in association strength for the participant groups. All construct pairs showed a strong relationship for all participant groups except for the self-regulation practices and student satisfaction pair, which showed a moderate relationship for the student group. Additionally, the relationship

between self-regulation practices and student satisfaction for the faculty group was the highest of all the paired associations. In contrast, I found that the association between self-regulation practices and student satisfaction for the student participant group was the lowest of all the paired associations.

Multiple linear regression analysis of the sample population. The multiple linear regression analysis was conducted between the three constructs as the predictor variables and perceptions of student success as the outcome variable. The regression analysis was conducted to assess the strength of the relationship between the constructs and perceptions of student success, as given in the second research question. This research question and the null and alternate hypotheses state as follows:

RQ2: To what extent do the constructs of student engagement, self-regulation practices, and student satisfaction relate to perceptions of student success in online courses?

$H_0$2: The constructs of student engagement, self-regulation practices, and student satisfaction do not relate to perceptions of student success.

H_a2: The constructs of student engagement, self-regulation practices, and student satisfaction do relate to perceptions of student success.

The assumptions of multiple linear regression to be satisfied were (a) the variables are evenly distributed (normality), (b) a linear relationship exists between the predictor and outcome variables (linearity), (c) the variance of error terms is similar across the predictor variables (homoscedasticity), and (d) the absence of multicollinearity.

The first assumption was confirmed by examining the Q-Q plots of the independent and dependent variables for each participant group. Q-Q plots are used generally to graphically represent the normal distribution of each variable individually (Field, 2016). Figure 14, Figure 15, and Figure 16 showed the patterns of relationship for student engagement for the three participant groups.

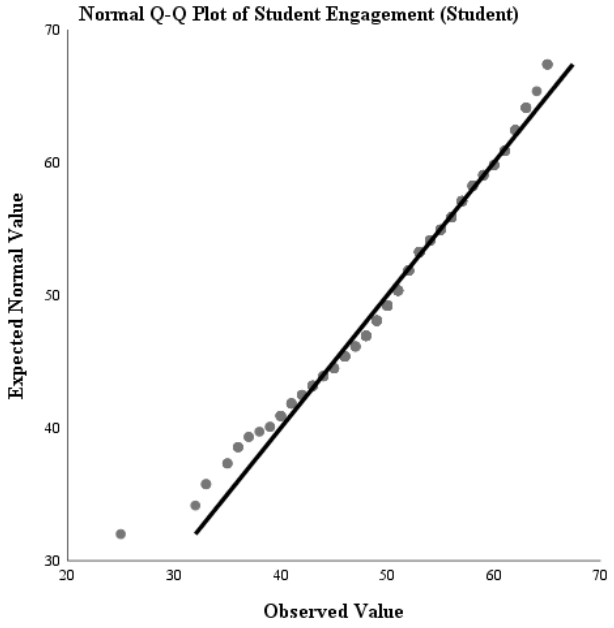

Figure 14. Q-Q plot of student engagement for the student participant group.

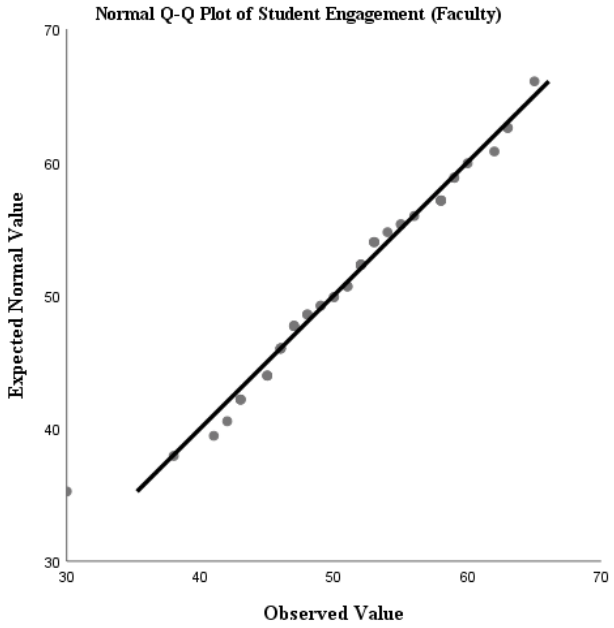

Figure 15. Q-Q plot of student engagement for the faculty participant group.

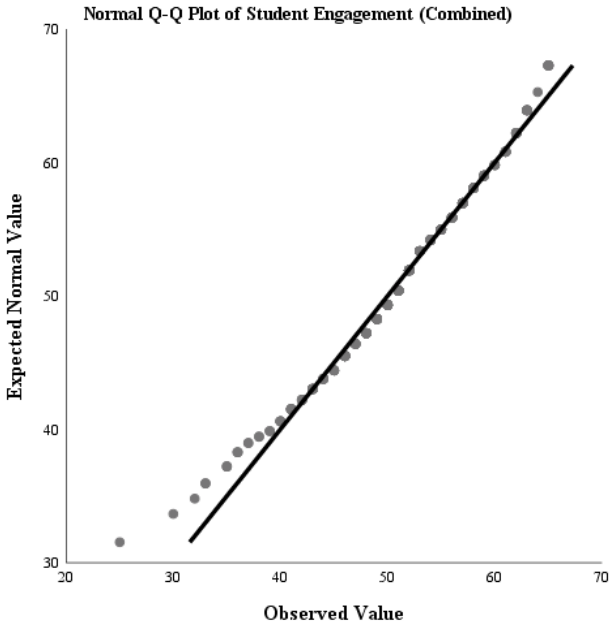

Figure 16. Q-Q plot of student engagement for the combined participant group.

Figure 17, Figure 18, and Figure 19 showed the patterns of relationship for self-regulation practices for the three participant groups.

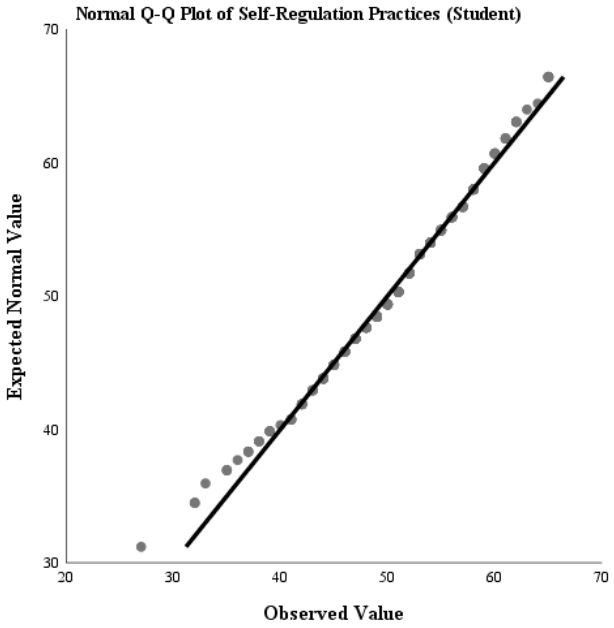

Figure 17. Q-Q plot of self-regulation practices for the student participant group.

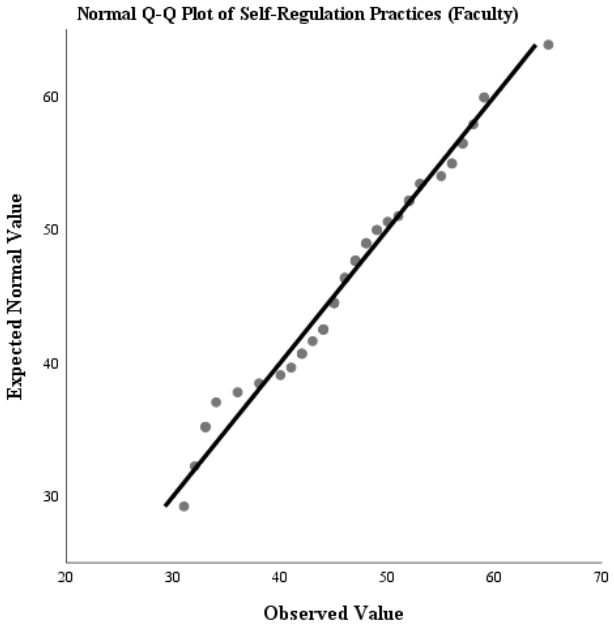

Figure 18. Q-Q plot of self-regulation practices for the faculty participant group.

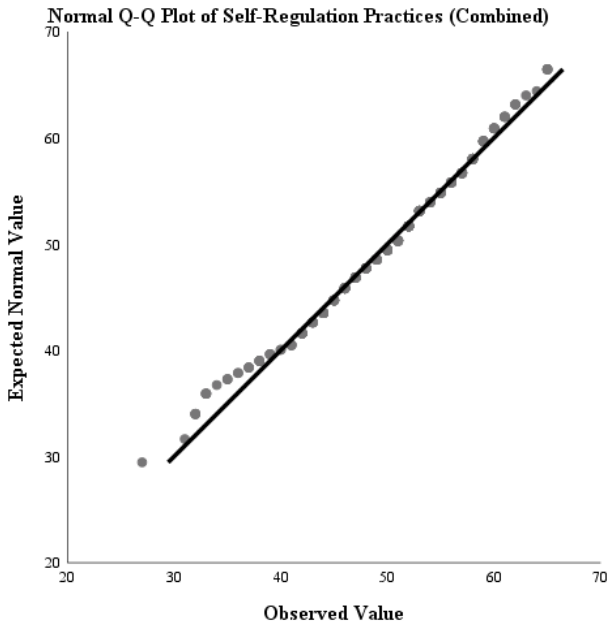

Figure 19. Q-Q plot of self-regulation practices for the combined participant group.

Figure 20, Figure 21, and Figure 22 showed the patterns of relationship for student satisfaction for the three participant groups.

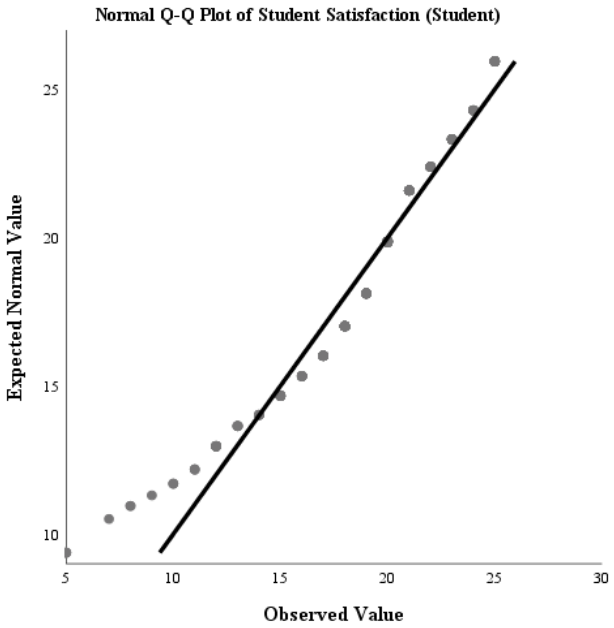

Figure 20. Q-Q plot of student satisfaction for the student participant group.

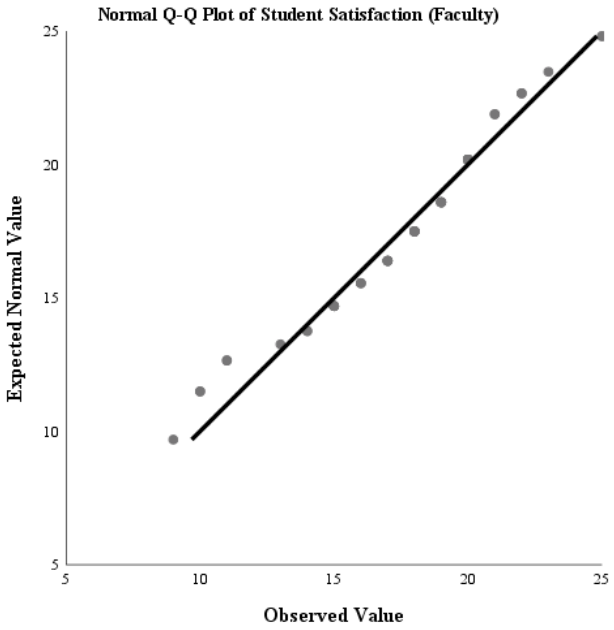

Figure 21. Q-Q plot of student satisfaction for the faculty participant group.

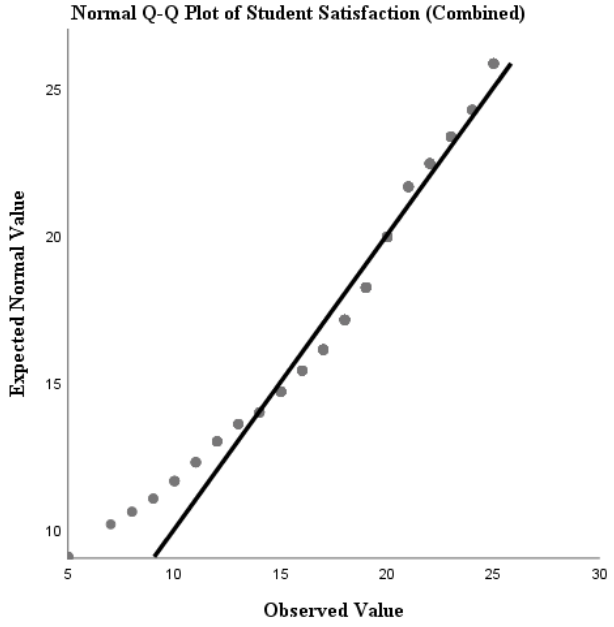

Figure 22. Q-Q plot of student satisfaction for the combined participant group.

Figure 23, Figure 24, and Figure 25 showed the patterns of relationship for perceptions of student success for the three participant groups.

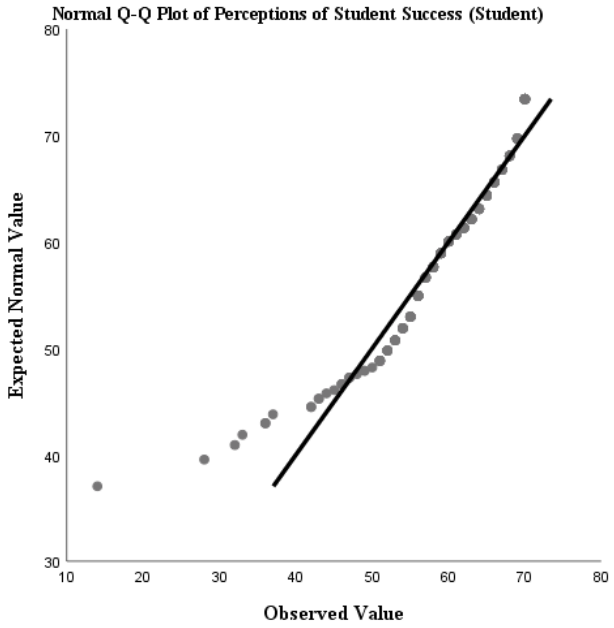

Figure 23. Q-Q plot of perceptions of student success for the student participant group.

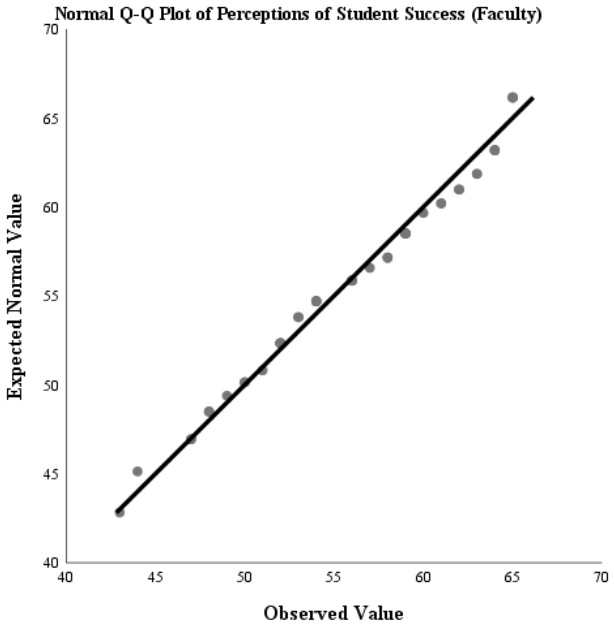

Figure 24. Q-Q plot of perceptions of student success for the faculty participant group.

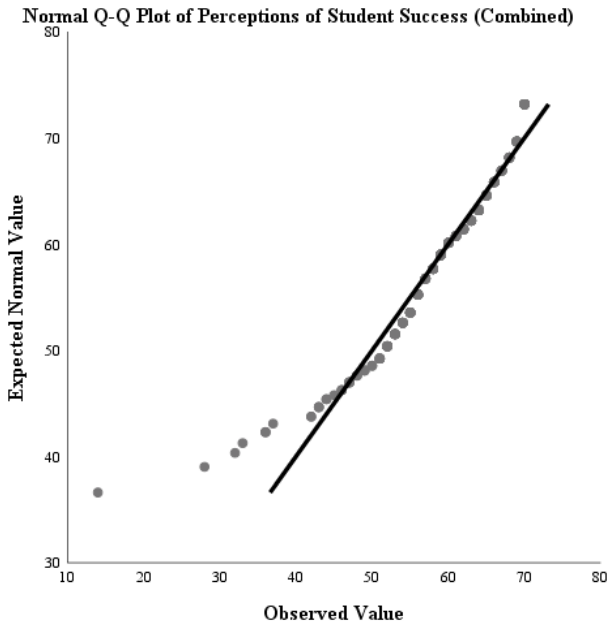

Figure 25. Q-Q plot of perceptions of student success for the combined participant group.

The Q-Q plots for student engagement, self-regulation practices, student satisfaction, and perceptions of student success satisfied the assumption for normality and demonstrated that the variables were evenly distributed. Normal distribution was confirmed from the output of the plots, which showed that the data were close to the diagonal lines for all graphs. While normality was observed in the graphs, the largest deviations occurred with student satisfaction and perceptions of student success for the student and combined groups.

The second assumption for multiple linear regression analysis was examined using a matrix scatterplot diagram to determine the linear relationship of the predictor and outcome variables. The matrix scatterplots for the student, faculty, and combined participant groups are shown in Figure 26, Figure 27, and Figure 28 respectively. Each matrix scatterplot of the four variables is sectionalized into 16 quadrants and shows the

individual relationship of each variable with the other. On examination of the matrix scatterplots, I found that the graphs demonstrated a linear relationship between pairs of all four variables. This linear relationship between the variable pairs confirmed that the second assumption had been met.

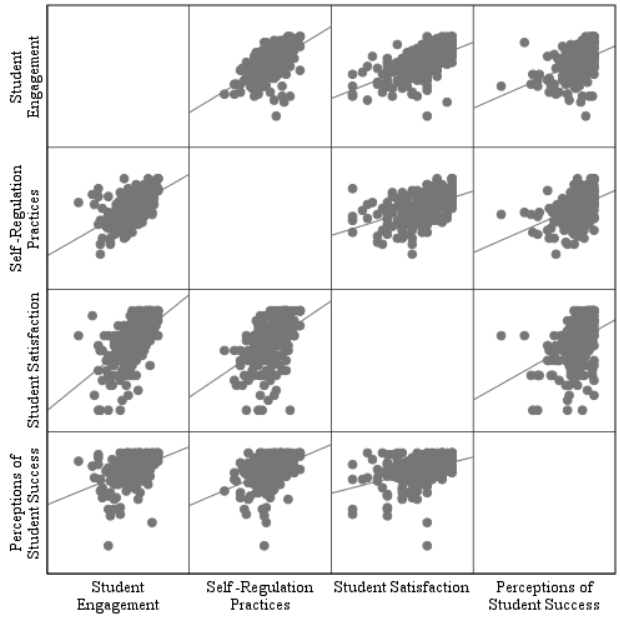

Figure 26. Matrix scatterplot of the three constructs and perceptions of student success for student respondents.

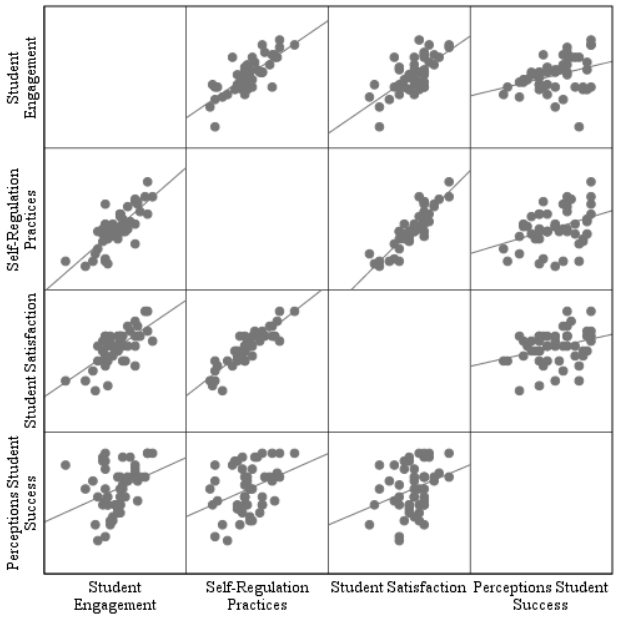

Figure 27. Matrix scatterplot of the three constructs and perceptions of student success for faculty respondents.

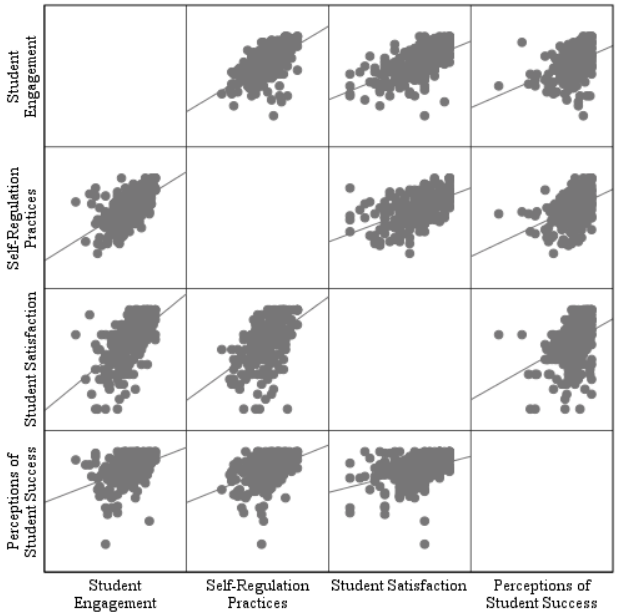

Figure 28. Matrix scatterplot of the three constructs and perceptions of student success for the combined participant group.

The third assumption of homoscedasticity was determined in two ways. The first method used a scatterplot diagram of the residual values against the predicted values to

show that the predictor variables were independent of the outcome variable (Field, 2016). The second method was the computation of the Durbin-Watson statistic. A Durbin-Watson value of over the cut-off point of 1 indicates that the assumption of homoscedasticity is met. Field (2016) suggested that the closer the Durbin-Watson statistic is to the value of 2, the more accurate the independence of the variables. Figure 29, Figure 30, and Figure 31 show the scatterplots of the residual values for each participant group.

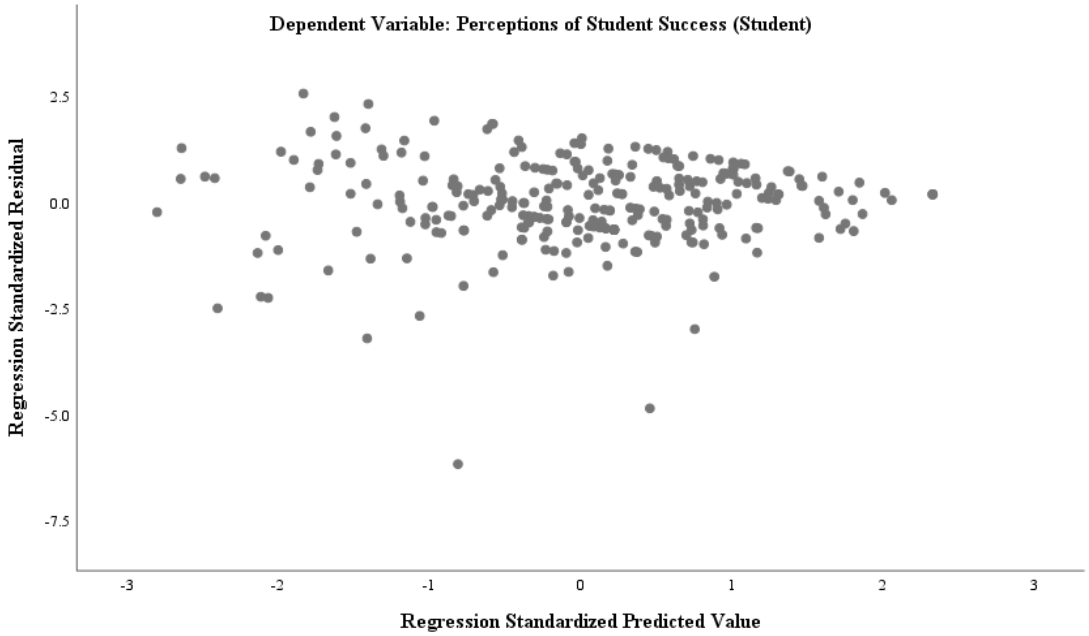

Figure 29. Scatterplot of the residual values for the three independent variables against the dependent variable for the student participant group.

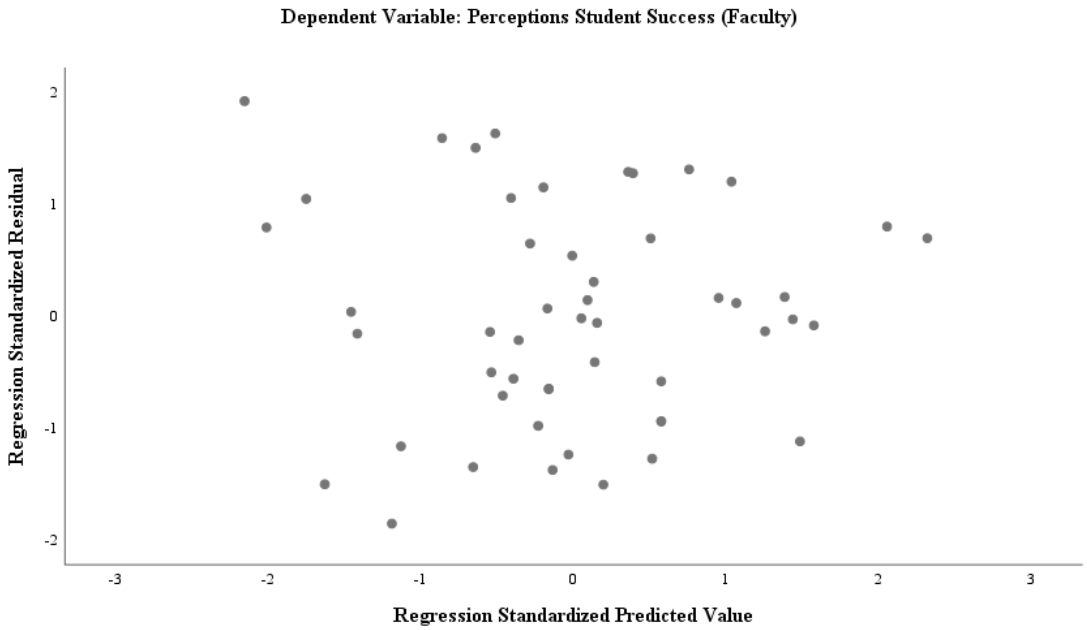

Figure 30. Scatterplot of the residual values for the three independent variables against the dependent variable for the faculty participant group.

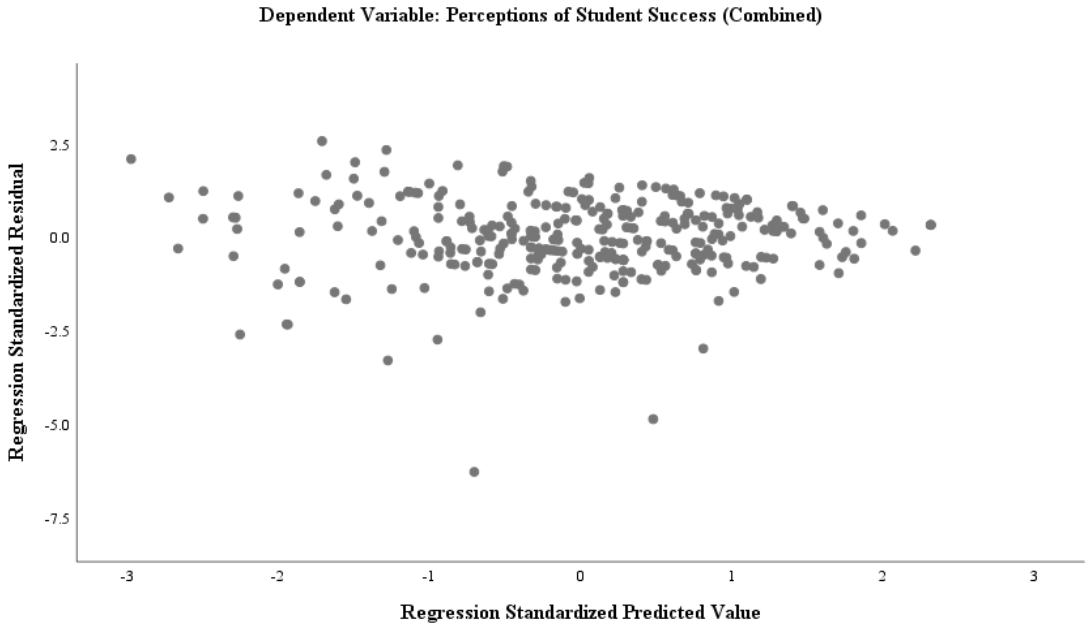

Figure 31. Scatterplot of the residual values for the three independent variables against the dependent variable for the combined participant group.

An examination of the scatterplots for the student and combined participant groups showed heteroscedasticity as the data points were not evenly distributed across all

the values for the three independent variables. The presence of heteroscedasticity indicated that the assumption for homoscedasticity was not met for these two participant groups. Conversely, the scatterplot for the faculty group showed that the assumption for homoscedasticity was met as the data points were evenly distributed. Table 38 shows the Durbin-Watson statistic for the three participant groups. A review of the Durbin-Watson test for the groups gave different results. The results of the test revealed that the residual values were independent for all participant groups as the statistic was greater than 1. Additionally, given that the Durbin-Watson statistic was closer to the value of 2, the test suggested that the assumption for homoscedasticity had been met for all participant groups.

Table 38

Durbin-Watson Statistic of the Independent Variables Against the Dependent Variable

Participant group	Durbin-Watson statistic
Student	1.915
Faculty	2.054
Combined	1.948

The fourth assumption of multicollinearity for the multiple linear regression analysis was confirmed by an examination of the correlation coefficient and the variance inflation factor (VIF) statistic for the independent variables. The absence of multicollinearity signifies that the relationships between the predictor variables are not strongly correlated. Field (2016) states that the coefficient values of the predictor variables should not be greater than 0.8 or 0.9. Table 39, Table 40, and Table 41 show the Pearson correlation coefficient for the four variables for the three participant groups. The

coefficient values for all the three predictor variables pairs for the student and combined participation group were less than 0.8. The coefficient value for the faculty participant group was greater than 0.8 for the self-regulation practices and student satisfaction predictors and less than 0.8 for the remaining predictor pairs. The high correlation between self-regulation practices and student satisfaction was a violation of multicollinearity for the faculty group.

Table 39

Pearson Correlation for the Predictor and Outcome Variables for the Student Group

Constructs	Perceptions of student success	Student engagement	Self-regulation practices	Student satisfaction
Perceptions of student success	1.000	0.423	0.433	0.379
Student engagement	0.423	1.000	0.589	0.567
Self-regulation practices	0.433	0.589	1.000	0.460
Student satisfaction	0.379	0.567	0.460	1.000

Table 40

Pearson Correlation for the Predictor and Outcome Variables for the Faculty Group

Constructs	Perceptions of student success	Student engagement	Self-regulation practices	Student satisfaction
Perceptions of student success	1.000	0.333	0.367	0.309
Student engagement	0.333	1.000	0.774	0.683
Self-regulation practices	0.367	0.774	1.000	0.886
Student satisfaction	0.309	0.683	0.886	1.000

Table 41

Pearson Correlation for the Predictor and Outcome Variables for the Combined Group

Constructs	Perceptions of student success	Student engagement	Self-regulation practices	Student satisfaction
Perceptions of student success	1.000	0.412	0.439	0.381
Student engagement	0.412	1.000	0.615	0.584
Self-regulation practices	0.439	0.615	1.000	0.528
Student satisfaction	0.381	0.584	0.528	1.000

Descriptive statistics for the four variables. Table 42 displays the descriptive statistics for the independent and outcome variables by participant group. The results obtained for the mean and standard deviation for the three constructs were comparable to the results obtained for these statistics in the correlation model for both participant groups. For the comparison of the four variables in the multiple linear regression model, the number of student participants was reduced from 297 to 286. In like manner, the number of faculty respondents was reduced from 52 to 51. The statistics for the standard deviation of the three constructs were similar in value for the two participant groups, and the largest difference was found to be 1.096 for the variable *self-regulation practices*. In contrast, the values of the standards deviation for *perceptions of student success* differed by 2.031 for the two participant groups

Table 42

Descriptive Statistics of the three Constructs and Perceptions of Student Success for the Sample Population

Variable	Student group			Faculty group			Combined group		
	Mean	*SD*	N	Mean	*SD*	N	Mean	*SD*	N
Perceptions of student success	59.52	7.886	286	56.00	5.855	51	58.99	7.710	337
Student engagement	51.74	6.815	286	50.78	6.848	51	51.59	6.819	337
Self-regulation practices	50.56	6.633	286	46.47	7.729	51	49.94	6.954	337
Student satisfaction	18.81	3.913	286	17.78	3.414	51	18.64	3.827	337

Covariates. The possible covariates for this study were identified in Chapter 3 as gender, age group, and years of experience of faculty participants in using an online learning environment. Covariates are those variables that could influence the outcome variable (Field, 2016; Warner, 2013). Controlling for these covariates would give a better predictive value of the independent variables on the dependent variable. The multiple linear regression analyses for the participant groups compared the results for (a) the four variables only, and (b) the four variables and covariates collectively.

Multiple linear regression analyses. The results of the regression analyses were presented in two segments: (a) predictive nature of the model on the dependent variable, and overall model fit; and (b) extent of the effect of each independent variable on the dependent variable. Two multiple linear regression analyses were computed for each set of results for each participant group: student, faculty, and combined. The first regression analysis incorporated the data for the three independent and dependent variables only.

The second regression analysis incorporated the three independent variables, covariates as independent variables and the dependent variable. The effect size classification levels depict the strength of the variability and relationship between the independent and dependent variables in the results for regression analyses (Faul et al., 2007, 2009). The absolute values for the classification levels are 0.02-0.14 (small), 0.15-0.34 (medium) and 0.35 and greater (large).

The extent of the relationship of each independent variable on the dependent variable is given in the correlation tables for each participant group. The correlation tables without covariates show whether the independent variables are significant predictors of the dependent variable. The covariate correlation tables also show if the covariates are significant predictors of the dependent variable for the participant groups.

Multiple linear regression model fit. The multiple linear regression tables present the extent to which the regression model predicts the dependent variable and overall model fit for each participant group. The square of the correlation, R^2, explains the amount and strength of the variance contributed by the independent variables on the dependent variable (Field, 2016). The *F* ratio indicates the extent to which the model predicts the dependent variable and fits the overall participant data. The probability, *p*, determines if the R^2 and the *F* ratio are significant.

Table 43 and Table 44 present the data for the student participant group. For the student group without covariates, $R^2 = .25$, $F(3, 282)$, $p < .001$ and $F(3, 282) = 30.89$, $p < .001$. The R^2 result indicated that the predictor variables of student engagement, self-regulation practices, and student satisfaction explained 25% of the variability of the

outcome variable, perceptions of student success. The variability for this group was moderate and significant ($p < .05$). The *F* ratio result indicated that the regression model was a good fit for the student participant data ($F > 1$ and $p < .05$). For the student group with gender and age group as covariates, $R^2 = .26$, F(5, 280), $p < .001$ and $F(5, 280) = 19.51$, $p < .001$. The R^2 result indicated that there was a slight increase in variability (26%) of the predictor variables on the outcome variable. The variability for this group also was moderate and significant ($p < .05$). Although there was a decrease in the *F* ratio result, the regression model was a good fit for the student participant data while controlling for gender and age group ($F > 1$ and $p < .05$).

Table 43

Model Summary for Perceptions of Student Success (Dependent Variable) with Independent Variables and without Covariates of the Student Participant Group

Model	R[a]	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.497	.247	.239	6.878	.247	30.879	3	282	.000	1.915

Note R[a]. Predictors: (constant), student engagement, self-regulation practices, student satisfaction

Table 44

Model Summary for Perceptions of Student Success (Dependent Variable) with Independent Variables and Covariates of the Student Participant Group

Model	R[a]	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.509	.259	.246	6.849	.259	19.571	5	280	.000	1.916

Note R[a]. Predictors: (constant), student engagement, self-regulation practices, student satisfaction, and covariates, gender, age group

Table 45 and Table 46 present the data for the faculty participant group. For the faculty group without covariates, R^2 = .14, F(3, 47), p = .064 and F(3, 47) = 2.59, p = .064. The R^2 result indicated that the predictor variables of student engagement, self-regulation practices, and student satisfaction explained 14% of the variability of the outcome variable, perceptions of student success. Although the variability for this group was moderate, it also was insignificant ($p > .05$). The F ratio result indicated that the regression model was not a good fit for the faculty participant data given that the ratio was insignificant at $p > .05$. For the faculty group with gender and age group as covariates, R^2 = .16, F(6, 44), p = .223 and F(6, 44) = 1.43, p = .223. The R^2 result indicated that although there was a slight increase in variability (16%) of the predictor variables on the outcome variable, the result was insignificant ($p > .05$). The F ratio result showed that the regression model was not a good fit for the faculty participant data while controlling for gender, age group, and years teaching.

Table 45

Model Summary for Perceptions of Student Success (Dependent Variable) With Independent Variables and Without Covariates of the Faculty Participant Group

Model	R[a]	R square	Adjusted R square	Std. error of the estimate	Change statistics					Durbin-Watson
					R square change	F change	df1	df2	Sig. F change	
1	.376	.142	.087	5.595	.142	2.585	3	47	.064	2.054

Note R[a]. Predictors: (constant), student engagement, self-regulation practices, student satisfaction

Table 46

Model Summary for Perceptions of Student Success (Dependent Variable) With Independent Variables and Covariates of the Faculty Participant Group

Model	R[a]	R square	Adjusted R square	Std. error of the estimate	Change statistics					Durbin-Watson
					R square change	F change	df1	df2	Sig. F change	
1	.404	.164	.049	5.708	.164	1.434	6	44	.223	1.909

Note R[a]. Predictors: (constant), student engagement, self-regulation practices, student satisfaction and covariates, gender, age group, years teaching

Table 47 and Table 48 present the data for the combined participant group. For the combined group without covariates, $R^2 = .24$, $F(3, 333)$, $p < .001$ and $F(3, 333) = 34.78$, $p < .001$. The R^2 result indicated that the predictor variables of student engagement, self-regulation practices, and student satisfaction explained 24% of the variability of the outcome variable, perceptions of student success. The variability for this group was moderate and significant ($p < .05$). The *F* ratio result indicated that the regression model was a good fit for the combined participant data given that $F > 1$ and $p < .05$. For the combined group with gender and age group as covariates, $R^2 = .26$, F(3, 333), $p < .001$ and $F(3, 333) = 19.57$, $p < .001$. The R^2 result indicated that there was a slight increase in variability (26%) of the predictor variables on the outcome variable. The variability for this group also was moderate and significant ($p < .05$). Although there was a decrease in the *F* ratio result, the regression model was a good fit for the student participant data while controlling for gender and age group given that $F > 1$ and $p < .05$.

Table 47

Model Summary for Perceptions of Student Success (Dependent Variable) With Independent Variables and Without Covariates of the Combined Participant Group

Model	R[a]	R square	Adjusted R square	Std. error of the estimate	Change Statistics					Durbin-Watson
					R square change	F change	df1	df2	Sig. F change	
1	.488	.239	.232	6.758	.239	34.781	3	333	.000	1.948

Note R[a]. Predictors: (constant), student engagement, self-regulation practices, student satisfaction

Table 48

Model Summary for Perceptions of Student Success (Dependent Variable) With Independent Variables and Covariates of the Combined Participant Group

Model	R[a]	R square	Adjusted R square	Std. error of the estimate	Change Statistics					Durbin-Watson
					R square change	F change	df1	df2	Sig. F change	
1	.509	.259	.246	6.849	.259	19.571	5	280	.000	1.916

Note R[a]. Predictors: (constant), student engagement, self-regulation practices, student satisfaction and covariates, gender, age group

The tables for the student and combined participant groups showed a high degree of similarity between the results regression model for the independent and dependent data set without the inclusion of the covariates. The tables for these two participant groups also showed a high degree of similarity between the results regression model for the independent and dependent data set controlling for the covariates of gender and age group. Consequently, the constructs of student engagement, self-regulation practices, and student satisfaction significantly and moderately predict perceptions of student success. Additionally, the overall regression model was found to fit the independent and dependent data set for the two groups. For the faculty participant group, the three

independent variables did not statistically predict the dependent variable. The contrast in results between the student and combined groups and the faculty group may have been due to the small number of respondents for the faculty group.

Statistical significance of the three constructs. Table 49 and Table 50 present the correlation data for the independent variables separately with and without covariates for the student participant group. For the student group without covariates, the results of the unstandardized coefficient, *B*, showed that each independent variable predicted perceptions of student success. Perceptions of student success varied positively and significantly by 0.21 (moderate) for student engagement ($B = .21$, $t(282) = 2.62$, $p < .01$), 0.30 (moderate) for self-regulation practices ($B = .30$, $t(282) = 3.87$, $p < .001$) and 0.32 (moderate) for student satisfaction ($B = .32$, $t(282) = 2.49$, $p < .05$). Consequently, the outcome variable, perceptions of student success, was moderately and significantly predicted by student engagement, self-regulation practices, and student satisfaction. Based on the findings, student satisfaction was the best predictor of perceptions of student success, followed by self-regulation practices, and then student engagement.

Table 49

Coefficients for the Student Participant Group[a] Without Covariates

Model		Unstandardized coefficients		Std. coeff.	t	Sig.	95.0% Confidence interval for B		Collinearity statistics	
		B	Std. error	Beta			Lower bound	Upper bound	Tolerance	VIF
1	(Constant)	27.335	3.501		7.807	.000	20.443	34.227		
	Student engagement	.213	.081	.184	2.617	.009	.053	.373	.541	1.847
	Self-regulation practices	.300	.077	.252	3.871	.000	.147	.452	.630	1.588
	Student satisfaction	.321	.129	.159	2.492	.013	.067	.574	.654	1.529

Note [a]. Dependent variable: perceptions of student success

For the student group with covariates, the results of the unstandardized coefficient, *B*, showed that each independent variable predicted perceptions of student success. Covariate results for *B* showed that gender did not predict the outcome variable, but age group predicated perceptions of student success. Perceptions of student success varied positively and significantly by 0.20 (moderate) for student engagement ($B = .20$, $t(280) = 2.42$, $p < .05$), 0.29 (moderate) for self-regulation practices ($B = .29$, $t(280) = 3.80$, $p < .001$) and 0.32 (moderate) for student satisfaction ($B = .32$, $t(280) = 2.49$, $p < .05$). For the covariates, perceptions of student success varied positively and significantly by 0.97 (high) for age group ($B = .97$, $t(280) = 2.10$, $p < .05$), but not significantly for gender ($B = .36$, $t(280) = .30$, $p > .05$). Hence, the outcome variable, perceptions of student success, was moderately and significantly predicted by student engagement, self-regulation practices, and student satisfaction while controlling for the covariates.

Table 50

Coefficients for the Student Participant Group[a] With Covariates

Model		Unstandardized coefficients		Std. coeff.	t	Sig.	95.0% Confidence interval for B		Collinearity statistics	
		B	Std. error	Beta			Lower bound	Upper bound	Tolerance	VIF
1	(Constant)	25.845	4.130		6.259	.000	17.716	33.974		
	Student engagement	.197	.081	.170	2.422	.016	.037	.357	.536	1.866
	Self-regulation practices	.293	.077	.247	3.801	.000	.141	.445	.629	1.590
	Student satisfaction	.320	.128	.159	2.493	.013	.067	.572	.654	1.530
	Gender	.361	1.218	.015	.297	.767	-2.036	2.758	.982	1.018
	Age group	.971	.462	.110	2.103	.036	.062	1.880	.962	1.040

Note [a]. Dependent variable: perceptions of student success

Table 51 and Table 52 present the correlation data for the independent variables separately with and without covariates for the faculty participant group. For the faculty group without covariates, the results of the unstandardized coefficient, *B*, showed that each independent variable did not predict perceptions of student success. Perceptions of student success varied positively and insignificantly by 0.10 (low) for student engagement ($B = 0.10$, $t(280) = .57$, $p > .05$), 0.26 (moderate) for self-regulation practices ($B = .26$, $t(280) = 1.00$, $p > .05$) and negatively by 0.12 for student satisfaction ($B = -.12$, $t(280) = -0.25$, $p > .05$). Consequently, the outcome variable, perceptions of student success, was not significantly predicted by student engagement, self-regulation practices, and student satisfaction ($p > .05$).

Table 51

Coefficients for the Faculty Participant Group[a] Without Covariates

Model		Unstandardized coefficients		Std. coeff.	t	Sig.	95.0% Confidence interval for B		Collinearity statistics	
		B	Std. error	Beta			Lower bound	Upper bound	Tolerance	VIF
1	(Constant)	41.080	5.932		6.925	.000	29.146	53.014		
	Student engagement	.103	.183	.121	.566	.574	-.264	.471	.400	2.498
	Self-regulation practices	.256	.255	.337	1.002	.321	-.258	.769	.161	6.210
	Student satisfaction	-.124	.501	-.073	-.249	.805	.067	.883	.214	4.664

Note [a]. Dependent variable: perceptions of student success

For the faculty group with covariates, the results of the unstandardized coefficient, *B*, showed that each independent variable and covariate did not predict perceptions of student success. Perceptions of student success varied positively and insignificantly by 0.11 (low) for student engagement ($B = .11$, $t(280) = .55$, $p > .05$), 0.21 (moderate) for self-regulation practices ($B = .21$, $t(280) = .79$, $p > .05$) and negatively by 0.06 (low) for student satisfaction ($B = -.06$, $t(280) = -.121$, $p > .05$). For the covariates, perceptions of student success varied positively and insignificantly by 1.71 (high) for gender ($B = 1.71$, $t(280) = .90$, $p > .05$), 0.60 (high) for age group ($B = .60$, $t(280) = 59$, $p > .05$), and negatively by 0.06 (low) for years teaching ($B = -.06$, $t(280) = -.25$, $p > .05$). Hence, the outcome variable, perceptions of student success, was not significantly predicted by student engagement, self-regulation practices, and student satisfaction while controlling for age group ($p > .05$). The insignificance of the constructs while controlling

for the covariates for the faculty group may have been due to the small number of respondents.

Table 52

Coefficients for the Faculty Participant Group[a] With Covariates

Model		Unstandardized coefficients		Std. coeff.	t	Sig.	95.0% Confidence interval for B		Collinearity statistics	
		B	Std. error	Beta			Lower bound	Upper bound	Tolerance	VIF
1	(Constant)	37.339	7.550		4.945	.000	22.122	52.556		
	Student engagement	.108	.197	.127	.550	.585	-.289	.506	.357	2.798
	Self-regulation practices	.209	.267	.276	.785	.437	-.328	.746	.153	6.516
	Student satisfaction	-.063	.523	-.037	-.121	.904	-1.116	.990	.205	4.882
	Gender	1.714	1.911	.129	.897	.375	-2.137	5.566	.921	1.086
	Age group	.599	1.012	.104	.593	.557	-1.439	2.638	.616	1.623
	Years teaching	-.055	.216	-.044	-.253	.801	-.490	.381	.643	1.554

Note [a]. Dependent variable: perceptions of student success

Table 53 and Table 54 present the correlation data for the independent variables separately with and without covariates for the combined participant group. For the combined group without covariates, the results of the unstandardized coefficient, *B*, showed that each independent variable predicted perceptions of student success. Perceptions of student success varied positively and significantly by 0.19 (moderate) for student engagement ($B = .19$, $t(333) = 2.55$, $p < .05$), 0.29 (moderate) for self-regulation practices ($B = .29$, $t(333) = 4.12$, $p < .001$) and 0.29 (moderate) for student satisfaction ($B = .29$, $t(333) = 2.40$, $p < .05$). Consequently, the outcome variable, perceptions of student success, was moderately and significantly predicted by student engagement, self-regulation practices, and student satisfaction. Based on the findings, self-regulation

practices and student satisfaction were the best significant predictors of perceptions of student success.

Table 53

Coefficients for the Combined Participant Group[a] Without Covariates

Model		Unstandardized coefficients		Std. coeff.	t	Sig.	95.0% Confidence interval for B		Collinearity statistics	
		B	Std. error	Beta			Lower bound	Upper bound	Tolerance	VIF
1	(Constant)	29.410	3.054		9.630	.000	23.403	35.418		
	Student engagement	.190	.074	.168	2.548	.011	.043	.336	.528	1.893
	Self-regulation practices	.287	.070	.259	4.119	.000	.150	.424	.578	1.730
	Student satisfaction	.293	.122	.146	2.396	.017	.052	.533	.614	1.629

Note [a]. Dependent variable: perceptions of student success

For the combined group with covariates, the results of the unstandardized coefficient, *B*, showed that each independent variable predicted perceptions of student success. Covariate results for *B* showed that gender and age group did not predict the outcome variable. Perceptions of student success varied positively and significantly by 0.18 (moderate) for student engagement ($B = .18$, $t(331) = 2.40$, $p < .05$), 0.29 (moderate) for self-regulation practices ($B = .29$, $t(331) = 4.12$, $p < .001$) and 0.29 (moderate) by student satisfaction ($B = .29$, $t(331) = 2.14$, $p < .05$). For the covariates, perceptions of student success varied positively and insignificantly by 0.94 (high) for gender ($B = .94$, $t(331) = .89$, $p > .05$), and 0.38 (high) for age group ($B = .38$, $t(331) = 1.02$, $p > .05$). Hence, the outcome variable, perceptions of student success, was moderately and

significantly predicted by student engagement, self-regulation practices, and student satisfaction while controlling for gender and age group.

Table 54

Coefficients for the Combined Participant Group[a] With Covariates

Model		Unstandardized coefficients		Std. coeff.	t	Sig.	95.0% Confidence interval for B		Collinearity statistics	
		B	Std. error	Beta			Lower bound	Upper bound	Tolerance	VIF
1	(Constant)	27.255	3.640		7.489	.000	20.096	34.415		
	Student engagement	.180	.075	.159	2.397	.017	.032	.327	.520	1.923
	Self-regulation practices	.288	.070	.260	4.124	.000	.151	.426	.576	1.736
	Student satisfaction	.294	.122	.147	2.404	.017	.053	.534	.614	1.630
	Gender	.936	1.051	.043	.891	.374	-1.132	3.004	.972	1.029
	Age group	.381	.372	.050	1.023	.307	-.352	1.114	.955	1.047

Note [a]. Dependent variable: perceptions of student success

Multiple linear regression results of all participant groups. The multiple linear regression results of the three participant groups showed a high degree of similarity between the student and combined groups. These two groups demonstrated that the constructs of student engagement, self-regulation practices, and student satisfaction moderately and significantly predicted perceptions of student success. The regression results for the faculty group showed that the three independent variables did not predict the outcome variable. Although the faculty regression result was insignificant, the faculty and student groups combined revealed that the independent variables do relate to the outcome variable. The difference in results suggested that the respondent numbers for the faculty group were too small for the multiple linear regression analysis. The statistical

significance of the analyses was therefore based on the results for the student and combined groups only. Consequently, the null hypothesis for question 2 is rejected. The alternate hypothesis that the constructs of student engagement, self-regulation practices, and student satisfaction relate to perceptions of student success is supported.

Summary

A new instrument for each of the participant groups was developed to explore the correlation relationship between pairs of the constructs of student engagement, self-regulation practices and student satisfaction, and the regression relationship between the constructs and perceptions of student success. A pilot study was conducted to determine the reliability of the instrument at two institutions, which were different from the actual study site. Only 10 students and three faculty responded to the pilot study. As a result, the reliability of the instrument was calculated using the data set from the research site.

The instrument for the student and faculty participant groups was found to be reliable using the data sets from the actual study. The Cronbach statistic was used to determine internal reliability and measured between 0.794 and 0.906. Additionally, preliminary factor analysis was conducted to determine the construct validity of the instrument. The factor analysis confirmed the four-factor question item design for student engagement and self-regulation practices. Conversely, the analysis contradicted the intended four-factor question item design for student satisfaction. Additionally, the factor analysis identified a three-factor design for perceptions of student success. The question items for perceptions of student success had not been categorized into factors for the study.

The number of responses for the student and faculty participant groups varied. Initially, 385 students and 61 faculty responded. After the demographic data were cleaned, a total participant sample of 352 and 53 resulted. The minimum sample size of 138 for each participant group was achieved only for the student group. As a result of the small respondent numbers for the faculty group, a combined participant group was created by merging the results of the student and faculty groups.

Descriptive statistical analysis of the responses summarized the data for each demographic variable. These variables comprised gender, age group, country of residence, name and level of program, full-time and part-time status, number of online courses, and number of hours spent online. The variables were measured using frequency tables, mean, standard deviation, and the number of respondents for the online programs.

The two main research questions related to correlation and regression models. For the correlation analysis research question, the relationships between pairs of the three constructs were determined separately. The results showed that the construct pairs correlated significantly with each other, but the strength of the relationships between the pairs varied. The correlation strength was strong for all pairs of all participant groups except for the self-regulation practices and student satisfaction pair, which showed a moderate correlation for the student group. The null hypotheses for each of the pairs were rejected given that $p<.01$. Consequently, the alternate hypotheses were supported as follows:

H_a1a. There is a relationship between student engagement and self-regulation practices in online courses.

H_a1b: There is a relationship between student engagement and student satisfaction in online courses.

H_a1c: There is a relationship between self-regulation practices and student satisfaction in online courses.

The multiple linear regression analysis showed that there was a distinct difference in results for the student, faculty, and combined groups. For the student and combined participant groups, the null hypothesis was rejected as the three constructs as independent variables moderately and significantly predicated perceptions of student success as the dependent variable. For the faculty participant group, all the predictor variables were statistically insignificant. Consequently, only the results for the student and combined participant groups were used to measure the relationship between the constructs and perceptions of student success. The alternate hypothesis supported the results as follows:

H_a2: The constructs of student engagement, self-regulation practices, and student satisfaction do relate to perceptions of student success.

These findings are further analyzed in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this non-experimental quantitative cross-sectional study was two-fold. The first part of the research was a correlation study to explore the innovative relationship between the constructs of student engagement, self-regulation practices, and student satisfaction. The second part of the research was a regression study to examine the relationship between the three constructs and perceptions of student success. The correlation and regression relationships were measured separately from the perspectives of both students and faculty who self-reported their experiences in the online environment at an English-speaking Caribbean higher education institution. The exploration of the relationships of the three constructs and student success in a single research study in higher education was a gap in the literature.

A newly constructed instrument was used to capture data separately for students and faculty using two questionnaires. Content validity was determined using content experts. The reliability of the instrument was calculated using the Cronbach alpha statistic. The results of the reliability test showed strong internal reliability of the question items for the four variables of student engagement, self-regulation practices, student satisfaction, and perceptions of student success. Construct validity of the instrument revealed that the question items were based on a four-factor design for student engagement and self-regulation practices as desired. The four-factor design was not evident for the question items for student satisfaction. The number of question item factors for perceptions of student success were not predetermined, and a three-factor

design emerged. Prior to conducting the research study, the instrument was field tested at two other higher education institutions.

The results of the correlation study between pairs of the three constructs showed statistical significance for the student, faculty, and combined participant groups. The strength of the association between the pairs varied. The results of the regression study of the relationship between the three constructs and perceptions of student success showed statistical significance. These results were obtained for the student and combined participant groups. The regression results for the faculty participant group were insignificant, perhaps because of the small sample size, which was below the required minimum sample size of 138. Consequently, the faculty data were not used in the interpretation of the regression findings.

Interpretation of the Findings

The findings are interpreted for the internal reliability and construct validity of the instrument and the correlation and the multiple linear regression analyses of the study. For the correlation analysis, the results are discussed for all participant groups: student, faculty, and student and faculty combined. For the multiple linear regression analysis, the results are discussed for the student and combined participant groups. The regression analysis results of the faculty participant group were not consistent with those obtained for the student and combined groups, and it was concluded that the difference was a result of the low response rate from the faculty group.

Internal Reliability and Construct Validity of the Instrument

The internal reliability and construct validity of the new instrument were calculated using the data provided by the actual study participant groups, as the pilot study response rate was low. Given that content validity was already established in Chapter 3, the strength of the internal reliability of the scales for the three constructs and perceptions of student success confirmed the instrument's acceptability for use in the study. Content validity of the scale items verified the intent of the measures for each construct and perceptions of student success. The results of construct validity showed that the questions items for the interaction subdivisions of learner-content, learner-instructor, learner-learner, and learner-online platform were not consistent for the three constructs.

Correlation Analysis of the Construct Pairs

The results of the correlation between the pairs of the three constructs of student engagement, self-regulation practices, and student satisfaction verified that each association was positively significant. Previous studies conducted on the relationship between student engagement and self-regulation practices showed a positive correlation (Boekaerts, 2016; Mello, 2016; Pellas, 2014; Zhang et al., 2015). Studies conducted on the relationship between student engagement and student satisfaction gave mixed results (Jackson, 2015; Johnson et al., 2016; Kuh et al., 2007; Larose, 2010). Studies conducted on the relationship between self-regulation practices and student satisfaction showed a positive correlation (Puzziferro, 2008; Wang et al., 2013). The correlation results between the construct pairs are discussed separately below.

Although previous studies showed an overall positive correlation between student engagement and self-regulation practices (Mello, 2016; Pellas, 2014; Zhang et al., 2015), mixed results were obtained when the constructs were subdivided into smaller components. My findings were consistent with the overall correlation results of previous research. The mixed results in previous studies confirmed that the operational definition was a key factor in determining the relationship between this pair of constructs. I did not explore the correlational relationship between the subcomponents of any pair of constructs, as this part of the analysis was beyond the scope of my study.

The mixed relationship between student engagement and student satisfaction in previous studies appeared to be related to the learning environment. Jackson (2015) and Kuh et al. (2007) reported a positive correlation in the traditional environment. Larose (2010) reported a negative correlation between the two constructs at the community college level in the online environment. Furthermore, studies using the NSSE survey instrument were conducted at the undergraduate level in the traditional setting, and there was no partiality observed for ethnicity (Jackson, 2015; Johnson et al., 2016). Webber et al. (2013) reported a positive relationship between dimensions of student engagement and student satisfaction. Although I explored the relationship collectively for seven higher education program levels, my overall results corresponded to the positive correlation findings of previous studies.

Studies between self-regulation practices and student satisfaction have shown a positive correlation (Puzziferro, 2008; Wang et al., 2013). These studies were conducted in the online learning environment using community college students (Puzziferro, 2008)

and undergraduate and graduate students (Wang et al., 2013). Researchers reported that self-regulated activities associated with online learning contribute to higher student satisfaction rates (Inan et al., 2017; Nicol, 2009). My correlation results were consistent with the previous studies for this pair of constructs. Of all the studies on the correlation relationship between the three construct pairs, the correlation findings between self-regulation practices and student satisfaction were more comparable to my study in terms of learning environment and range of student participation.

Previous studies on the pairs of constructs were not conducted in the same research study at the higher education level. One study explored the three constructs at the same time, but this study was conducted in youth sports academies (Tadesse et al., 2018). Furthermore, the study was conducted to validate the factors of the scale items for student engagement, self-regulation, and psychological need satisfaction of adolescents and youths. Although this study used a three-factor model for student engagement, a four-factor model of self-regulation, and a three-factor model for student satisfaction, the researcher did not explore the association between the constructs. Consequently, my study closed the gap in the exploration of the correlation relationship between pairs of the three constructs in a single study.

Multiple Linear Regression Analysis Between the Three Constructs and Student Success

The results of the multiple regression analysis verified that there was a positive and significant relationship between each of the three constructs and perceptions of student success. The findings showed that the constructs predicted perceptions of student

success while controlling for the covariates of age and gender. The strength of predictive relationships was either low or moderate. There were no previous studies found on the use of a regression model to explore the relationship between the three constructs and perceptions of student success at the same time. Nonetheless, previous studies reported on the relationship between pairs of constructs and student success, as discussed below.

Prior studies examined student engagement, student satisfaction, and student success (Burrow & McIver, 2012; Korobova & Starobin, 2015; Webber et al., 2013) in a single study. The study by Webber et al. (2013) reported that the dimensions of the student engagement associated with academic activities predicted higher levels of student success (cumulative GPA). The other studies examined predictors within each construct and not the relationship between constructs and student success (Burrow & McIver, 2012; Korobova & Starobin, 2015). The results of the Webber et al. (2013) study confirmed the predictive nature of student engagement on student success obtained in my current study.

Studies showed a positive relationship between student engagement, self-regulation, and student success (Fong et al., 2017; Rahal & Zainuba, 2016). Self-regulation led to higher levels of student performance and predicted student success. This finding was more noticeable in high achievers as opposed to low achievers (Rahal & Zainuba, 2016). Furthermore, the researchers noted that self-regulation was not a high predictor for all dimensions of student success. Other studies showed a positive relationship between self-regulation, student satisfaction, and student success in online and blended learning environments (Inan et al., 2017; Nicol, 2009). These studies also

confirmed self-regulation as a predictor of higher student success rates. The influence of self-regulation practices on perceptions of student success was evident in my findings, where the predictive level was determined to be moderate.

Discussion of the Findings

The findings of this study add to the current literature as it relates to the exploration of the three constructs and perceptions of student success within the Caribbean context. Further, the study adds to the body of knowledge in the examination of (a) the three constructs together, and (b) the three constructs and perceptions of student success in a single study. First, the findings show the correlation relationship between pairs of the three constructs in a Caribbean institution and contribute to the understanding of the association of each construct with the other. Second, the findings illustrate the predictive relationship between the three constructs and perceptions of student success and the importance of the constructs to student persistence. Third, the correlation and predictive relationships have the potential to assist other Caribbean institutions in designing online learning spaces that are responsive to the needs of students.

The study measured the self-reported scores of both students and faculty. While previous studies focused on the correlation of construct pairs based on students' responses, there were no studies that measured faculty responses. Consequently, the study adds to the current literature on faculty's self-reported views on the extent to which students are engaged in the online learning environment, apply self-regulation practices, and are satisfied with their online experiences.

The measurement of each construct and factors of student success in previous studies have used separate questionnaires. There have been no studies that combined the constructs and perceptions of student success in a single questionnaire and single study. My research study was predicated on the development of an instrument to measure all three constructs and perceptions of student success at the same time. As a result, my study has added to the current literature in the use of a single questionnaire that can produce comparable results to the use of separate questionnaires for the same constructs and factors of student success.

The development of the questionnaire sections for student engagement, self-regulation practices, and student satisfaction used Moore's (1989) three interaction model of (a) learner-content, (b) learner-instructor, and (c) learner-learner as part of the common operational definition. The interaction model was enhanced by adding a fourth interaction to represent the web-based technology presence. This new interaction was designated as the learner-online platform interaction and was included in the operational definition. The enhanced interaction model has added to the body of literature on interactions likely to be found in the online learning environment.

Limitations of the Study

The study had several limitations. These limitations are presented as follows:

The study was conducted at one higher education institution in the English-speaking Caribbean. The selection of this institution was due to the limited number of Caribbean institutions offering online programs.

A convenience sample method was used to obtain student and faculty responses. This sampling strategy did not facilitate the determination of a cause and effect relationship between the predictor and outcome variables. Although the sampling method supported the testing of a new instrument, the method did not allow the results to be generalized for the target population as respondents were treated as volunteers.

The response rate for the pilot study was very low. Although the pilot study involved two institutions, a total of 10 students and three faculty members responded. The low response made it difficult to conduct internal reliability and factor analyses on the data obtained. Instead, these analyses were performed on the actual research study's data.

Data collection was dependent on the support of the institution's liaison. I had no control over the distribution of the invitation to participate, follow-up letters, and the link to the questionnaires. In one instance, I was informed that one of the follow-up letters was not distributed as intended, and I extended the length of the survey to accommodate this oversight.

The minimum sample size of 138 was not achieved for the faculty respondents. Initially, a total of 61 faculty members responded. After the data clean-up exercise, 53 faculty responses remained. Additionally, due to the online learning modality of the program offerings, the survey was distributed only to adjunct faculty members.

The timing of the survey distribution exercise affected the possible number of available responses. The questionnaires were distributed during the summer term, which had fewer program offerings when compared to the September and January terms. In

order not to wait out an entire term following the pilot testing exercise, the research study was conducted during the summer period.

The preliminary factor analysis revealed that the factor loading of the question items for the three constructs did not all correspond to the pre-determined interaction factors. Although the interaction factors of (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-online platform were not explored as separate dimensions, the factors formed the basis of the operational definitions for the constructs.

Students had to approximate their responses to questions requesting information on their relationships with more than one instructor and more than one student. Faculty had to approximate their responses to an entire class of students.

The multiple linear regression analysis for the faculty participant group exhibited insignificant results ($p > .05$). These results appeared to be due to the small number of responses obtained given that the combination participant group gave significant results. The findings of the faculty group were omitted from the final reporting of the regression analysis results.

Recommendations

There are several recommendations for further research in the study of student engagement, self-regulation practices, student satisfaction, and perceptions of student success in online learning environments. First, recommendations are presented for the improvement of the new instrument as follows:

The questions items for the constructs of student engagement and self-regulation practices should be re-organized using the factor loading suggestions given in the preliminary factor analysis.

The question items for student satisfaction should be expanded and improved so that they represent more accurately the four-factor design of the (a) learner-content, (b) learner-instructor, (c) learner-learner, and (d) learner-online platform interactions.

The question items for the learner-online platform interaction should be expanded beyond one question each for the constructs.

The question items for perceptions of student success should be categorized based on the suggested factor ladings of the items in the factor analysis.

A confirmatory factor analysis should be conducted on the constructs of student engagement, self-regulation practices, student satisfaction, and perceptions of student success once the adjustments to the question items have been completed.

Second, recommendations are presented for future research as follows:

The initial study was distributed to only adjunct faculty facilitating online programs of study. A future study of full-time and adjunct faculty would allow for a better representation of the faculty participation group. This study would confirm or refute also the multiple linear regression research question.

Future research involving a comparison of the interaction factors would allow for a greater understanding of how these factors relate within the constructs and between the constructs.

Comparisons of the responses to individual question items for the student and faculty groups would determine if there are any statistical differences between the two groups. The comparisons would also determine if there are any deviations from the overall findings obtained for the constructs and perceptions of student success. For the multiple linear regression model, the comparison would determine which questions items are better predictors of the student success.

Implications

The implications for this research study are presented for positive social change and practical considerations that could arise from the results and findings. The positive social change is presented in relation to the transition from traditional to online learning environments in higher education institutions in the Caribbean. The practical implications take into account the collection of data for more than one construct in a single study and how this approach may help in reducing questionnaire fatigue in students and faculty.

Positive Social Change

The combination of questions items for the three constructs and perceptions of student success in a single is an innovative approach to studying self-reported responses of students and faculty. Higher education institutions' academic environments constantly review the responses of stakeholders, particularly students, to policy changes, structural changes, and academic programs. A model that is designed to alleviate questionnaire fatigue among survey respondents can be regarded as a positive response to this problem. Furthermore, a single questionnaire model incorporating several concepts could change

the way that the design of questionnaires is viewed, particularly those questionnaires intended to give a preliminary account of stakeholder feedback.

The findings of the correlation and regression analyses compared favorably with the results from similar studies. The instrument could be used as a preliminary model in higher education institutions in the Caribbean, wanting to obtain information on the predictors of student success based on their engagement and self-regulation activities and levels of student satisfaction. Furthermore, the findings from the single instrument study could lead to a better understanding of student responses to the online learning environment and the development of policies to ensure student success.

The research would be particularly useful to faculty and administrators in the design of instructional approaches that foster the alignment between student engagement, self-regulation practices, and student satisfaction. In addition, the research would be useful in determining how these constructs predict student success. The potential findings could lead to positive social change in the way that universities approach the process of learning and instruction in online learning environments.

Practical Implications

The use of a single questionnaire can give the institutions a quick overview of the correlation among the pairs of the three constructs and the predictive nature of the constructs on perceptions of student success. The single questionnaire model could accommodate the conduct of several analyses and reporting of findings at one time or the reporting of the findings at different times. The instrument could be used by the

ministries of education in the Caribbean territories to develop a baseline for the three constructs and perceptions of student success and evaluate responses over time.

Conclusion

The findings from the study presented the results for the internal reliability and construct validity of the instrument. The internal reliability of the instrument scales was above 0.7, which is the acceptable statistic for the internal consistency of a scale. The construct validity confirmed the original four-factor design of the instrument for student engagement and self-regulation practices but contradicted the number of factors identified for student satisfaction.

The findings of the innovative relationship between the constructs of student engagement, self-regulation practices, and student satisfaction, and the relationship between the three constructs and perceptions of student success were consistent with findings from previous research studies. Pairs of the three constructs were positively and significantly correlated to each other. Additionally, the three constructs significantly predicted perceptions of student success. The same predictive result was obtained while controlling age and gender as covariates.

The positive social impact of my study is aligned with the innovative approach to studying self-reported responses of students and faculty for the three constructs and perceptions of student success. The new instrument could be used as a preliminary model in higher education institutions in the Caribbean to learn about the predictors of student success. A useful practical implication pertained to the establishment of baseline data for the three constructs and perceptions of student success and evaluating trends over time.

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Appendix A: Draft Student Questionnaire

The following questionnaire is to be administered to students enrolled in online programs and is sectionalized into two parts. Part I pertains to demographic information and Part II relates to student engagement, self-regulation practices, student satisfaction, and student success.

Part I: Student Demographic Information

Please complete the following section by selecting or writing your answers

Gender: Male ☐ Female ☐

Age group: Under 30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ Over 60 ☐

Country of Residence _____

Name of Program:_____

Level of Program: Certificate ☐ Diploma ☐ Bachelors ☐ Masters ☐

Year of Program: _____

Cohort Status: Full-time ☐ Part-time ☐

Expected Year of Graduation: _____

Number of online courses currently taking _____

Number of hours spent online per week _____

Part II: Student Survey

The following is a list of statements related to student engagement, self-regulation, student satisfaction, and perceptions of student success. Please read each statement and

rate your experience using 'Strongly Agree' (5), Agree (4), Neither Agree nor Disagree (3), Disagree (2), Strongly Disagree' (1). There are no right or wrong answers.

Student Engagement – Rate the extent to which the following statements apply to you. I …

1. Apply critical thinking skills to the course activities
2. Integrate my own views with that of others when learning the course material
3. Prepare study notes to understand the course material
4. Apply my learning of the course material to real-life situations
5. Interact with my instructors at least once a week about the course material
6. Discuss academic performance and other matters related to the achievement of academic goals with my instructors
7. Obtain meaningful feedback on assignments from instructors
8. Understand difficult concepts and content better after interacting with instructors
9. Collaborate with my peers in a one-to-one or group relationship
10. Interact with peers on mastering the course material at least once a week
11. Respect peer differences
12. Value peer differences
13. Use the online learning space to participate in the course activities

Self-Regulation Practices – Rate the extent to which the following statements apply to you. I …

1. Give myself enough time to review the course material
2. Develop plans to achieve my learning goals
3. Implement plans to achieve my learning goals
4. Complete course activities assigned by the given deadline
5. Check the online learning space for course material updates at least twice weekly
6. Initiate communication with my instructors
7. Use more than one way to communicate with my instructors
8. Develop a plan to assist peers in understanding the course material
9. Implement a plan to assist peers in understanding the course material
10. Monitor interactions with peers about the course material
11. Reflect on interactions with peers about the course material
12. Take the initiative to respond to contributions by my peers in the online learning space
13. Use the online course activities to guide my own learning of the course material

Student Satisfaction – Rate the extent to which you are satisfied with the following statements. I am satisfied with the …

1. Quality of my learning experiences
2. Alignment of course activities to my expectations of the course
3. Interactions with instructors
4. Interactions with peers

5. Orientation program provided for online learning

Perceptions of Student Success – Rate the extent to which you agree with the following statements. Academic success in an online course is influenced by

1. Obtaining better grades
2. Engaging in course activities
3. Participating in programs that assist in improving my understanding of the course material
4. Self-directed learning
5. Interacting with instructors
6. Interacting with peers
7. Feeling of a sense of belonging to the online learning community
8. Meeting of course expectations
9. Being motivated intellectually
10. Feeling of a personal sense of accomplishment
11. Relevancy of course goals to professional goals
12. Relevancy of course goals to personal goals
13. Being satisfied with the delivery of the course content
14. Being satisfied with the support given to achieving academic goals.

Appendix B: Draft Faculty Questionnaire

The following questionnaire is to be administered to faculty members who teach online programs and is sectionalized into two parts. Part I pertains to demographic information and Part II relates to student engagement, self-regulation practices, student satisfaction, and student success.

Part I: Faculty Demographic Information

Please complete the following section by selecting or writing your answers

Gender: Male ☐ Female ☐

Age group: Under 30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ Over 60 ☐

Country of Residence _____

Complete for each program you are currently teaching:

Name of Program:_____

Level of Program: Certificate ☐ Diploma ☐ Bachelors ☐ Masters ☐

Year of Program: _____

Teaching Status: Full-time ☐ Part-time ☐

Number of years teaching online: _____

Number of online courses currently teaching _____

Number of hours spent teaching online per week _____

Part II: Faculty Survey

The following is a list of statements related to student engagement, self-regulation, student satisfaction, and perceptions of student success. Please read each statement and

rate your experience with students using 'Strongly Agree' (5), Agree (4), Neither Agree nor Disagree (3), Disagree (2),Strongly Disagree' (1). There are no right or wrong answers.

Student Engagement – Rate the extent to which the following statements apply to your students. Students …

1. Apply critical thinking skills to the course activities
2. Integrate their own views with that of others when learning the course material
3. Indicate that they prepare study notes to understand the course material
4. Apply their learning of the course material to real-life situations
5. Interact with me as instructor at least once a week about the course material
6. Discuss academic performance and other matters related to the achievement of academic goals with me as instructor
7. Indicate that they obtain meaningful feedback on assignments from me as instructor
8. Understand difficult concepts and content better after interacting with me as instructor
9. Collaborate with their peers in a one-to-one or group relationship
10. Interact with their peers on mastering the course material at least once a week
11. Respect peer differences
12. Value peer differences
13. Utilize the online learning space to participate in the course activities

Self-Regulation Practices – Rate the extent to which the following statements apply to your students. Students …

1. Allow enough time to review the course material
2. Develop plans to achieve their learning goals
3. Implement plans to achieve their learning goals
4. Complete course activities assigned by the given deadline
5. Check the online learning space for course material updates at least twice weekly
6. Initiate communication with me as instructor
7. Use more than one way to communicate with me as instructor
8. Indicate that they develop a plan to assist their peers in understanding the course material
9. Indicate that they implement a plan to assist their peers in understanding the course material
10. Monitor interactions with their peers about the course material
11. Reflect on interactions with their peers about the course material
12. Take the initiative to respond to contributions made by their peers in the online learning space
13. Use the online course activities to guide their own learning of the course material

Student Satisfaction – Rate the extent to which your students are satisfied with the following statements. Students report/indicate that they are satisfied with the …

1. Quality of learning experiences
2. Alignment of course activities to their expectations of the course
3. Interactions with instructors
4. Interactions with peers
5. Orientation program provided for online learning

Perceptions of Student Success – Rate the extent to which you agree with the following statements about your students. Students' academic success is influenced by

1. Obtaining better grades
2. Engaging in course activities
3. Participating in programs that assist in improving their understanding of the course material
4. Self-directed learning
5. Interacting with instructors
6. Interacting with peers
7. Feeling of a sense of belonging to the online learning community
8. Meeting of course expectations
9. Being motivated intellectually
10. Feeling of a personal sense of accomplishment
11. Relevancy of course goals to professional goals
12. Relevancy of course goals to personal goals
13. Being satisfied with the delivery of the course content
14. Being satisfied with the support given to achieving academic goals

Appendix C: Content Review Invitation

Dear Colleague:

I am a PhD student in The Richard W. Riley College of Education and Leadership at Walden University, United States. I am conducting a research study to understand the importance that faculty and students place on the relationship between the constructs of student engagement, self-regulation practices, and student satisfaction and how this relationship is aligned to student success in online learning at English-speaking Caribbean higher education institutions.
You are being invited to review a questionnaire developed for use as the data collection instrument for this study as a Content Expert. Your review of the question items will assist in determining the validity of the instrument.

If you agree to conduct this evaluation, you will be sent the Content Expert Review document with the question items and asked to comment on the comprehension and relevance of each item and provide suggestions for improvement (if necessary). You will also be asked to comment on any of the sections that are inadequately represented for the intended purpose of the overall questionnaire. To perform the role of Content Expert, you should have been teaching online courses/programmes at the higher education level for at least five years where you would have been exposed to students' levels of engagement, satisfaction, and success, and students' abilities to self-regulate (self-direct) their learning.

Please indicate your agreement to act as Content Expert of the survey instrument for this research project by replying to this email with the words "I agree to perform the role of Content Expert for this questionnaire". Kindly note that your participation is voluntary and you may discontinue your involvement in the study at any time. If you have any questions about the research project, you may contact me at marcia.commissiong@waldenu.edu or at (868) 298-7509.

Should you be in agreement, I look forward to receiving your evaluation within one week of sending you the Content Expert Review document.

Yours sincerely,

Marcia Commissiong

Appendix D: Letter for Approval to Conduct Research

Dear XXX,

It was a pleasure speaking with you briefly this morning. This email is to (1) request initial permission to conduct research at your institution, and (2) if you are in agreement, to obtain information about your institution's research approval process.

I am enrolled in the doctoral programme at the Richard W. Riley College of Education and Leadership, Walden University, Minnesota, United States where I am specializing in Learning, Instruction, and Innovation. My research study will focus on the importance that students and faculty place on the relationship between the constructs of student engagement, self-regulation practices, and student satisfaction and how this relationship is aligned to student success in online learning at English-speaking Caribbean higher education institutions. For this study, I have designed my own survey instrument for two participant groups: students and faculty.

I am requesting initial approval to conduct the research study at YYY Campus. This project will require support from your institution in the form of displaying/distributing the study invitation and survey instrument online on my behalf. Since the survey instrument is new, I will field test the instrument at another institution in order to determine its validity and reliability prior to conducting the actual study at YYY Campus.

If you are generally in agreement with the study being conducted at your institution, I will send an official request for your formal approval. In the interim, I am required to start the application process for the IRB approval from Walden University. For the Walden University IRB application, I am required to gather information about the IRB or research approval process of your institution where I will conduct my study. The information required will be the answers to the following questions (Yes/No):

- Does your institution have its own IRB (or other formal research approval system)?
- Does your institution's IRB process indicate that the Walden University IRB should serve as the "IRB of Record" for my project?
- Does your institution's IRB indicate that collecting data from your students and faculty are exempt from your institution's IRB review process?
- Does your institution's IRB process indicate that it wishes to serve as the "IRB of Record" for my project?

If your institution requires that I apply for approval from your institution's IRB, that is, your institution will serve as the "IRB of Record", please respond to the following with Yes/No:

- Does your institution's IRB wish to conduct its IRB review before the Walden IRB approval of my project?

- Does your institution's IRB wish for the Walden IRB approval of my project to occur first?

I will need to provide Walden University's IRB with supporting documentation of your institution's position as it relates to the six questions above. This documentation can be in the form of an email, memo, or copy of your university's policy. Your response by email to the questions above will be sufficient.

I thank you for your kind attention and look forward to a favorable response at your earliest convenience.

Sincerely,

Marcia Commissiong
PhD student at Walden University and Principal Researcher

Dear Ms Commissiong

My apologies for the delay . As discussed I am supportive of this research. Copied on this email is AAA who is Chair of our Ethics Committee. I am directing your email to her for follow up directly with you. Please make contact with her.

I am hopeful that the process will be quick and smooth to enable your research.

Kind regards
XXX

Dear Ms. Commissiong

Re: Research Ethics Approval for Conduct of Research Proposal- "Student Engagement, Self-Regulation Practices, Student Satisfaction and Student Success in Online Learning Environments"

Thank you again for submitting the above-named proposal for review by CCC Research Ethics Committee and for addressing comments sent to you on March 8, 2019.

We are satisfied that you have addressed all matters raised. We therefore convey approval for you to proceed with the conduct of your study as detailed in the documents submitted to the CCC Research Ethics Committee on April 7, 2019.

Dear Ms Commissiong

Further to your previous correspondence and our telephone conversation before I went on my break, the CCC campus will be happy to assist in the distribution of this survey questionnaire to our online degree students. I will advise of the date on which it is sent out in due course.

All the best.

Kind regards,

Appendix E: Preliminary Factor Analysis Tables

Table E1

Correlation Matrix of Student Engagement Question Items

	SE1	SE2	SE3	SE4	SE5	SE6	SE7	SE8	SE9	SE10	SE11	SE12	SE13
SE 1	1.0	.65	.47	.55	.19	.16	.29	.23	.17	.07	.22	.22	.22
SE 2	.65	1.0	.39	.56	.18	.18	.21	.23	.14	.09	.28	.23	.26
SE 3	.47	.39	1.0	.43	.29	.28	.25	.25	.19	.29	.08	.11	.27
SE 4	.55	.56	.43	1.0	.23	.21	.31	.32	.18	.15	.22	.18	.20
SE 5	.19	.18	.29	.23	1.0	.67	.48	.48	.23	.27	.02	.13	.22
SE 6	.16	.18	.28	.21	.67	1.0	.56	.52	.20	.30	.09	.17	.17
SE 7	.29	.20	.25	.31	.48	.56	1.0	.67	.21	.22	.14	.19	.14
SE 8	.23	.23	.25	.32	.48	.52	.67	1.0	.18	.18	.13	.18	.21
SE 9	.17	.14	.19	.18	.23	.20	.21	.18	1.0	.65	.39	.41	.34
SE 10	.07	.09	.29	.15	.27	.30	.23	.18	.65	1.0	.26	.33	.29
SE 11	.22	.28	.08	.23	.02	.09	.14	.13	.38	.26	1.0	.81	.43
SE 12	.22	.23	.11	.18	.13	.17	.19	.18	.41	.33	.81	1.0	.51
SE 13	.23	.26	.27	.20	.22	.17	.14	.21	.34	.29	.43	.51	1.0

Table E2

Kaiser-Meyer-Olkin and Bartlett Measures for Student Engagement

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.778
Bartlett's Test of Sphericity	Approx. Chi-Square	1755.942
	df	78
	Sig.	.000

Table E3

Principal Components Analysis for Student Engagement

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.393	33.792	33.792	4.393	33.792	33.792	3.251
2	2.017	15.513	49.305	2.017	15.513	49.305	2.599
3	1.732	13.322	62.627	1.732	13.322	62.627	3.084
4	1.080	8.308	70.935	1.080	8.308	70.935	2.213
5	.752	5.784	76.719				
6	.596	4.588	81.306				
7	.524	4.032	85.339				
8	.461	3.543	88.881				
9	.380	2.922	91.804				
10	.339	2.610	94.414				
11	.286	2.200	96.613				
12	.271	2.085	98.699				
13	.169	1.301	100.000				

Table E4

Pattern Matrix of Question Item Loading for Student Engagement

	Component			
	1	2	3	4
SE6	.835			
SE8	.831			
SE7	.829			
SE5	.759			
SE11		.916		
SE12		.902		
SE13		.533		
SE1			-.859	
SE2			-.829	
SE4			-.765	
SE3			-.664	.348
SE10				.879
SE9				.761

SE1-SE4: Learner-Content
SE5-SE8: Learner-Instructor
SE9-SE12: Learner-Learner
SE13: Learner-Online Platform

Table E5

Correlation Matrix of Self-Regulation Practices Items

	SR1	SR2	SR3	SR4	SR5	SR6	SR7	SR8	SR9	SR10	SR11	SR12	SR13
SR 1	1.0	.47	.53	.38	.26	.32	.21	.32	.28	.21	.25	.36	.36
SR 2	.47	1.0	.83	.32	.25	.24	.15	.34	.30	.29	.35	.33	.27
SR 3	.53	.83	1.0	.35	.30	.27	.18	.38	.33	.31	.37	.38	.34
SR 4	.38	.32	.35	1.0	.38	.21	.20	.22	.19	.19	.21	.40	.29
SR 5	.26	.25	.30	.38	1.0	.25	.19	.16	.13	.30	.25	.39	.35
SR 6	.32	.24	.27	.21	.25	1.0	.56	.39	.39	.30	.32	.39	.29
SR 7	.21	.15	.18	.20	.19	.56	1.0	.35	.35	.12	.11	.20	.20
SR 8	.32	.34	.38	.22	.16	.39	.35	1.0	.93	.44	.47	.29	.17
SR 9	.28	.30	.33	.19	.13	.39	.35	.93	1.0	.43	.47	.29	.16
SR 10	.21	.29	.31	.19	.30	.30	.12	.44	.43	1.0	.70	.49	.30
SR 11	.25	.35	.37	.21	.25	.32	.11	.47	.47	.70	1.0	.51	.32
SR 12	.36	.32	.38	.40	.39	.39	.20	.29	.29	.49	.51	1.0	.47
SR 13	.36	.27	.34	.29	.35	.29	.20	.17	.16	.30	.32	.47	1.0

Table E6

Kaiser-Meyer-Olkin and Bartlett Measures for Self-Regulation Practices

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.805
Bartlett's Test of Sphericity	Approx. Chi-Square	1984.478
	df	78
	Sig.	.000

Table E7

Principal Components Analysis for Self-Regulation Practices

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.990	38.386	38.386	4.990	38.386	38.386	2.306
2	1.593	12.250	50.636	1.593	12.250	50.636	3.375
3	1.264	9.722	60.358	1.264	9.722	60.358	2.737
4	1.237	9.519	69.877	1.237	9.519	69.877	3.554
5	.786	6.048	75.924				
6	.677	5.211	81.136				
7	.603	4.640	85.776				
8	.519	3.991	89.767				
9	.431	3.312	93.079				
10	.374	2.878	95.957				
11	.291	2.237	98.194				
12	.168	1.293	99.487				
13	.067	.513	100.000				

Table E8

Pattern Matrix of Question Item Loading for Self-Regulation Practices

	Component			
	1	2	3	4
SR5	.642			
SR13	.610			
SR12	.571	-.421		
SR4	.442			-.348
SR10		-.855		
SR11		-.842		
SR9	-.392	-.594	.454	
SR8	-.380	-.572	.436	
SR7			.915	
SR6			.743	
SR2				-.937
SR3				-.925
SR1				-.670

SR1-SR5: Learner-Content
SR6-SR7: Learner-Instructor
SR8-SR12: Learner-Learner
SR13: Learner-Online Platform

Table E9

Correlation Matrix of Student Satisfaction Items

	SS1	SS2	SS3	SS4	SS5
SS1	1.0	.81	.67	.47	.48
SS2	.81	1.0	.71	.44	.48
SS3	.67	.71	1.0	.53	.51
SS4	.47	.44	.53	1.0	.47
SS5	.48	.48	.51	.47	1.0

Table E10

Kaiser-Meyer-Olkin and Bartlett Measures for Student Satisfaction

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.820
Bartlett's Test of Sphericity	Approx. Chi-Square	763.653
	df	10
	Sig.	.000

Table E11

Principal Components Analysis for Student Satisfaction

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.252	65.043	65.043	3.252	65.043	65.043
2	.698	13.960	79.003			
3	.534	10.676	89.678			
4	.335	6.702	96.381			
5	.181	3.619	100.000			

Table E12

Correlation Matrix of Perception of Student Success Items

	PSS 1	PSS 2	PSS 3	PSS 4	PSS 5	PSS 6	PSS 7	PSS 8	PSS 9	PSS 10	PSS 11	PSS 12	PSS 13	PSS 14
PSS 1	1.0	.46	.37	.39	.28	.21	.22	.39	.33	.36	.36	.35	.34	.26
PSS 2	.46	1.0	.74	.47	.52	.54	.50	.53	.50	.43	.47	.46	.43	.40
PSS 3	.37	.74	1.0	.43	.48	.51	.53	.56	.53	.56	.54	.51	.41	.40
PSS 4	.39	.47	.43	1.0	.28	.30	.28	.44	.51	.38	.43	.41	.33	.38
PSS 5	.28	.52	.48	.28	1.0	.64	.62	.48	.42	.34	.44	.45	.50	.45
PSS 6	.21	.54	.51	.30	.64	1.0	.71	.45	.41	.44	.41	.44	.40	.39
PSS 7	.22	.50	.53	.28	.62	.71	1.0	.51	.39	.44	.45	.44	.49	.47
PSS 8	.39	.53	.56	.44	.48	.45	.51	1.0	.61	.52	.55	.50	.43	.46
PSS 9	.33	.50	.53	.51	.42	.41	.39	.61	1.0	.57	.62	.54	.41	.42
PSS 10	.36	.43	.56	.38	.34	.44	.44	.52	.57	1.0	.68	.63	.43	.43
PSS 11	.36	.47	.54	.43	.44	.41	.45	.55	.62	.68	1.0	.80	.61	.60
PSS 12	.35	.46	.51	.41	.45	.44	.44	.50	.54	.63	.80	1.0	.61	.60
PSS 13	.34	.43	.41	.33	.50	.40	.49	.43	.41	.43	.61	.61	1.0	.83
PSS 14	.26	.40	.40	.38	.45	.39	.47	.46	.42	.431	.60	.60	.83	1.0

Table E13

Kaiser-Meyer-Olkin and Bartlett Measures for Perceptions of Student Success

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.904
Bartlett's Test of Sphericity	Approx. Chi-Square	2518.262
	df	91
	Sig.	.000

Table E14

Principal Components Analysis for Perceptions of Student Success

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.139	50.996	50.996	7.139	50.996	50.996	5.047
2	1.236	8.827	59.823	1.236	8.827	59.823	4.805
3	1.156	8.258	68.081	1.156	8.258	68.081	5.090
4	.825	5.894	73.976				
5	.657	4.694	78.670				
6	.553	3.952	82.621				
7	.511	3.649	86.271				
8	.442	3.156	89.427				
9	.355	2.538	91.964				
10	.299	2.135	94.099				
11	.276	1.971	96.070				
12	.212	1.512	97.582				
13	.181	1.290	98.872				
14	.158	1.128	100.000				

Table E15

Pattern Matrix of Question Item Loading for Perceptions of Student Success

	Component		
	1	2	3
PSS4	.718		
PSS1	.716		
PSS9	.619		
PSS2	.568	-.504	
PSS3	.568	-.440	
PSS8	.523		
PSS10	.492		-.379
PSS6		-.871	
PSS7		-.827	
PSS5		-.771	
PSS14			-.883
PSS13			-.861
PSS12			-.695
PSS11	.356		-.684