AN INVESTIGATION OF THE IMPACT OF STUDENT SATISFACTION ON STUDENT OUTCOMES AMONG UNDERGRADUATE STUDENTS IN A BLENDED LEARNING ENVIRONMENT IN UNIVERSITY A

by

Andrea Michelle Marshall

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

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ABSTRACT

The purpose of this study was to examine the impact of student satisfaction on student outcomes among undergraduate students in a blended learning environment in University A. It was a quantitative predictive correlational design, with predictor variables satisfaction with course, sex, age and race/ethnicity, and criterion variable end-of-course score. The Corona Virus pandemic highlighted the central role of blended and online learning in educational processes globally. The technological revolution in education characterized by the infusion of digital technologies in classrooms, indicates that blended learning will continue to feature prominently in educational settings. Student satisfaction in blended learning redounds to the benefit of students and educational institutions since it could contribute to improved pedagogical and curricular practices, goodwill, enhanced reputation, and increased enrollment. Participants for this study were drawn from a convenience sample of 330 undergraduate students enrolled in a blended general education course at University A. Data collection procedures for predictor variables were accomplished through the online administration of the Satisfaction with Blended eLearning Systems (BELS) Questionnaire, while criterion variable data was garnered from student records. Applying multiple linear regression analysis, a statistically significant relationship was found between the linear combination of satisfaction with course, sex, age, race/ethnicity and end-of-course score. However, satisfaction with course emerged as the only significant predictor of the end-of-course score. Course satisfaction in blended learning settings influences performance. Further investigations are needed in other tertiary level institutions in the Caribbean, across different disciplines, and different blended learning delivery methods.

Keywords: blended learning, student satisfaction, student outcomes, multiple regression, social cognitive theory, theory of transactional distance, general education courses.

Dedication

This dissertation is dedicated to my children Abayomi, Nyela, and Jelani, whom I pray will be inspired to strive for excellence in all things and fulfill their God-ordained destinies.

Acknowledgments

I express sincerest gratitude to my husband, best friend and confidant, Ian, for his unswerving love, devotion, and support throughout my doctoral journey. He is always there to encourage, listen and share ideas, inspire me to be the best that I can be, and most of all to lift me up in prayer. I also say special thanks to my father Stanley Pollard, and to my children Abayomi, Nyela, and Jelani for their patience, understanding and support. My mother Jemmaline Pollard has transitioned to glory, but I know that this would have been a proud moment for her.

Heartfelt thanks are expressed to my Chair, Dr. Kevin Struble, and Committee Member, Dr. Michelle Barthlow, for their expert guidance, encouragement and support throughout the process. Their assistance with framing this study by asking the pertinent questions, offering suggestions and giving advice was invaluable. I wish them every blessing and success as they continue “Training Champions for Christ”.

I am also grateful to my colleagues, Mr. Troy Carrington and Dr. Rodney Worrell, who managed the data collection process. To my dear friend, Dr. Kay Thompson, I say “Thank You” for her support, encouragement, enthusiasm and prayers that made the journey that much easier and all the more worthwhile.

Most of all I thank my Lord and Savior for His undying love for me. He birthed in me this desire to pursue doctoral studies and led me to undertake this work with Liberty University. At each stage of my doctoral journey, He provided everything that I needed at the given time. I return to Him all the glory, honor, and praise. He is truly awesome!

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List of Abbreviations

Audience Response Systems (ARS)

Blended Learning (BL)

Blended and Team-based Learning (BTBL)

Blended Workplace Learning (BWL)

Blended Synchronous Courses (BSC)

Expectation-Confirmation Model (ECM)

Information and Communication Technology (ICT)

Learning Management System (LMS)

Massive Open Online Courses (MOOC)

National Education Technology Plan (NETP)

Organization for Economic Co-operation and Development (OECD)

Prescriptive Learning Dashboard (PLD)

Process-Oriented Guided Inquiry Learning (POGIL)

Rich Environment for Active Learning (REAL)

Science Technology Engineering and Mathematics (STEM)

Task Technology Fit (TTF)

Teaching English as a Foreign Language (TEFL)

Technology Acceptance Model (TAM)

Unified Theory of Acceptance and Use of Technology (UTAUT)

United Nations Educational, Scientific and Cultural Organization (UNESCO)

Web-based English Learning (WBEL)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this quantitative, predictive, correlational study is to examine the impact of student satisfaction on student outcomes among undergraduate students in a blended learning setting. Chapter One furnishes the background that contextualizes blended learning pedagogy within the global technological revolution in education, viz-à-viz the Corona Virus pandemic. The background also incorporates a synopsis of the theoretical framework for this study. The problem statement considers the scope of current literature on the topic. The purpose statement of the study is followed by the significance of the current study. The research question is then presented, and the terms pertinent to this study are defined.

Background

More than 850 million students globally have experienced disruptions to their usual educational processes and procedures on account of the Corona Virus pandemic (Chen et al., 2020). Moreover, the UNESCO Global Education Coalition (2021) reported that the number of learners that are or have been impacted by school and university closures because of the pandemic exceeds 1.5 billion. As countries all over the world closed their borders to travelers and implemented emergency protocols including stay-at-home orders to combat the effects of this dreaded illness, educational institutions were compelled to engage online and blended learning modes of delivery as replacements for the traditional face-to-face teaching. Blended learning pedagogy is associated with positive student learning outcomes including improved student performance, academic achievement, and student satisfaction (Cheng & Hwang, 2019; Harahap et al., 2019; Shyr & Chen, 2018). However, there are reported challenges in blended learning environments where students experience difficulties with self-regulation, heavy

cognitive load engagement, navigation of virtual learning environments, and finding support for digital study (Naeem & Khan, 2019; Safford & Stinton, 2016).

Historical Overview

For centuries, formal education and instruction were delivered through the physical presence and interactions among learners and instructors usually in brick-and-mortar teaching spaces (Nortvig et al., 2018; Schaber et al., 2010). With technological advancements, in the 1990s online learning surfaced as an economically viable method by which learners could complete their studies without being physically present in classrooms, and educational institutions could expand enrollment in their programs. In this regard, many administrators and scholars reasoned that online learning could fully replace the traditional face-to-face learning (Chen et al., 2011; Singh et al., 2021). However, the expected returns on the investment were not achieved since in that era online learning seemed to be a mere replication of the ineffective classroom instructional practices that portrayed learning only as the transfer of information (Schaber et al., 2010). Subsequently, blended learning—the intentional merger of traditional and online instruction materialized as an instructional strategy along the pedagogical continuum from traditional face-to-face to online learning.

Pappas (2015) traced the genesis of blended learning to the 1840s when the first distance education course was introduced by Sir Isaac Pitman, who mailed postcards with shorthand text to his students. Students were required to complete the exercises and send the postcards back for feedback and grading. The author highlighted the emphasis on feedback and assessment even in the absence of computers and mobile devices. More than a century later, the 1960s and 1970s saw the development the mini-computer, mainframe training, and computer-based training. This transformed workplace training as the need for in person attendance at training sessions and the

reliance on printed materials were eliminated. Furthermore, in the 1970s and 1980s video networking was adopted as the approach for employee training. Since instructors were not physically present at the workplace, this technology allowed learners to connect with their colleagues, watch the instructor on TV and make inquiries, as necessary. This method enabled Stanford University to simultaneously deliver classes to several locations, as well as facilitate students in the submission of assignments online (Pappas, 2015).

The expansion of blended teaching and training approaches continued as educational information technology rapidly developed and distance education was modernized to eLearning (Chen et al., 2011). In the 1980s and 1990s educational institutions and businesses utilized CD-ROMs with video and sound to deliver increased amounts of information while affording students and staff more interactive learning experiences. Also, during this period Learning Management Systems (LMS) that supported tracking and monitoring of learner progress and completion of courses and training were pioneered. Computers became an essential tool within organizations, and were readily available to ordinary citizens (Pappas, 2015).

Overtime in the decades commencing in the year 2000, CD-ROM use was diminished as upgraded computer systems with better interactivity and other superior features became available. Web-based instruction began to flourish presenting learners with easy access to course and training material, assignments, and assessments (Pappas, 2015). Today blended learning is central to the education landscape with a steady growth of research publications spanning a range of topics (Yan & Chen, 2021).

Society-at-Large

The infusion of digital technology into classroom teaching has transformed education at all levels globally over the past two and a half decades. Many countries enacted national

education technology policies (Machmud et al., 2021) that undergird the application and use of technological tools in educational institutions, for example the National Education Technology Plan, NETP (1996, 2000, 2005, 2010, 2017) in the United States. Moreover, the paradigmatic shift from teacher-centered to learning and learner-centered education has impelled many educators to utilize digital technology to revolutionize their instruction with a view to enhancing student learning outcomes. Furthermore, with the ubiquitous use of the Internet and the World Wide Web, and the exigencies of the pandemic, personal computers, smartphones, laptops, and tablets are now commonplace in educational institutions, and in many homes.

Blended Learning (BL) is a pedagogy that is situated within this technological revolution in education. It captures the combination of the established face-to-face instruction and online instruction. The fundamental principle is that face-to-face oral communication and online written communication are optimally amalgamated such that the strong suits of each are coalesced into a distinctive learning experience consistent with the context and envisioned educational purpose (Garrison & Vaughan, 2008). Put another way, blended learning "designates the range of possibilities presented by combining internet and digital media with established classroom forms that require the physical co-presence of teacher and students" (Friesen, 2012, p. 1). Also titled hybrid learning, blended learning (BL) involves the consolidation of traditional formal studying approaches—working in classrooms, theoretical material study with informal ones, characterized by discussions via email and Internet meetings. It is a grouping of dissimilar, ostensibly, conventional, and unconventional learning, face-to-face and online interaction, directed actions and autonomous selection of the path, the utilization of automated references and connections with colleagues to realize their goals and the goals of the organization (Ushatikova et al., 2019). The benefits of BL include improved pedagogy, student engagement in learning, added

flexibility; a rich context for interactions and communication, motivation, and participation; reducing dropout rates and raising exam pass rates (Gedik et al., 2012; López-Pérez et al., 2011; Masalela, 2009).

Theoretical Background

Social Cognitive Theory

This study is grounded in Social Cognitive Theory (Bandura 1991, 1999) to facilitate an appreciation of the determinants of student satisfaction with their learning while studying in blended learning environments. This prominent theory is authenticated and commonly accepted for understanding and predicting human behavior and pinpointing approaches by which behavioral change can be realized (Wu et al., 2010). Social cognitive theory emphasizes that human progress results from successive interactions with the external environment, and that the external environment must be exposed to the individuals' cognitive processes before it can affect their behavior. It purports that there is triadic reciprocal causation among internal personal factors manifested by cognitive, affective, and biological events; physical and social external environmental factors; and human behavior, with each influencing the other in both directions (Bandura, 1999).

Since human behavior is influenced through the individuals' cognitive processes, social cognitive theory contends that there are two fundamental cognitive dynamics—performance expectations, and self-efficacy, that bear upon behavior. Individuals form beliefs about their abilities and capabilities, predict the possible effects of their actions, engage in goal setting, and formulate plans that are expected to generate the desired outcomes. On the other hand, self-efficacy describes individuals' thinking about how they can exert control over how they perform, and exercise control over the occurrences that shape their lives. Therefore, self-efficacy guides

individuals' choices, aspirations, effort on tasks, perseverance in difficult situations, overall mindset, reaction to stressful occurrences, and vulnerability to depression (Bandura, 1991). According to social cognitive theory, self-efficacy impacts performance expectations and performance expectations impacts behavior, thus self-efficacy and performance expectations are regarded as the chief cognitive causes of individual behavior.

Theory of Transactional Distance

In addition, this study is framed by Moore's (1997) Theory of Transactional Distance for exploring student satisfaction with blended learning pedagogy with reference to the online component of blended instruction. The Theory of Transactional Distance is a— "concept describing the universe of teacher-learner relationships that exist when learners and instructors are separated by space and/or by time" (Moore, 1997, p. 22). It contemplates the program structure, the interaction between learners and teachers, and the character and extent of autonomy of the learner. The separation of teacher and learners elicits distinctive characteristics of learner and teacher behaviors; overwhelmingly impacts teaching and learning, resulting in a psychological and communications gap—the transactional distance that must be bridged. The transactional distance is influenced by the program structure—the rudiments of course design, or the methods by which instruction is organized so that it can be delivered via diverse communications media. The special interpersonal interaction between teachers and learners also known as dialogue impacts the transactional distance. Dialogue is characterized by respect and active listening, with each person making comments and building on the contributions of others (Moore & Diehl, 2019). Learner autonomy the extent to which in the teaching-learning relationship, the learner as opposed to the teacher determines the goals, the learning experiences, and the assessment choices of the learning program also shapes the transactional distance.

BL pedagogy merges the best that the conventional face-to-face instruction and the online setting proffer, while diminishing the negative features of both elements. It positively influences student academic achievement in higher education substantiated by its methodologies and its application to various subjects. To ensure its permanency in education learners' apprehensions to this relatively new mode of instruction must be addressed.

Problem Statement

The current COVID-19 pandemic has placed blended and online learning at the center of education globally. BL is associated with positive student outcomes—the utilization of BL methodologies like the flipped classroom and rotational blended learning style have enhanced student performance (Talan & Gulsecen, 2019; Yang & Newman, 2019; Zhang et al., 2019). When applied across various disciplines BL positively influenced students' academic achievement (Harahap et al., 2019; Shyr, & Chen, 2018; Vo et al., 2017). Moreover, the literature revealed that students are generally satisfied with BL (McCutcheon et al., 2018; Yen et al., 2018); and held positive perceptions of BL courses (Morton et al., 2016).

In contrast Thompson and McDowell (2019), and Viola et al., (2019) uncovered student challenges in the BL environment. Students were challenged regarding the lack of participation by peers in group assignments in the blended and online settings; as well as with isolation in the online setting, missing the in-person interaction with teachers and peers. Additionally, Rasheed et al. (2020) revealed that student challenges in BL environments related mostly to self-regulation, and challenges with the effective use of technology when studying.

Moreover, in a study that compared students' learning, satisfaction, and other success outcomes in a mathematics course offered in three different learning environments online, blended, and face-to-face, Thompson and McDowell (2019) found that while students were

satisfied with their learning experiences, there was no difference in student achievement based on the modality. Additionally, Yen et al., (2018) reported no significant difference in student academic achievement across the three modalities; and that students were equally satisfied with their experiences in all three modalities.

Research into educational practices during the pandemic unveiled that students and faculty were confronted with inadequate infrastructure and resources for effective teaching and learning, the absence of "hands-on" experiences, increased workload, and inadequate planning, design, and development of instructional programs (Adedoyin & Soykan, 2020; Baloran, 2020; Pather et al., 2020). However, Qamar et al. (2021) proposed that despite the difficulties experienced, e-learning during the pandemic proved beneficial on account of flexible timings, the enhancement of learners' self-efficacy, faculty transformation, conditional recognition, and it occasioned the development of blended e-curricula.

Given the foregoing incongruities further investigation into the impact of BL on student outcomes is warranted. What is more, most studies investigated BL in STEM disciplines (Harahap et al., 2019; Talan, & Gulsecen, 2019; Vo et al., 2017; Zhang et al., 2019), and non-STEM disciplines like cognitive psychology, psychology, and child development (Shyr, & Chen, 2018; Viola et al, 2019; Vo et al., 2017). The problem is that there is a dearth of research on BL in general education undergraduate courses.

Purpose Statement

The purpose of this study is to examine the impact of student satisfaction on student outcomes among undergraduate students in a blended general education course in University A. It is a quantitative predictive correlational design, with predictor variables satisfaction with course, sex, age and race/ethnicity, and criterion variable end-of-course score. Satisfaction is

defined as "the state felt by a person who has experienced a performance (or outcome) that has fulfilled his or her expectations. Satisfaction is thus a function of relative levels of expectation and perceived performance" (Horn, 2002, p. 4). A course is the basic component of an academic program. This is sometimes referred to as a subject or a topic or a unit of study (Rogers & Smith, 2011). For this study satisfaction with course is defined as the state felt by a person who has experienced a performance (or outcome) that has fulfilled his or her expectations of the course. Satisfaction with course is thus a function of relative levels of expectation and perceived performance in the course (Horn, 2002; Rogers & Smith, 2011).

Sex (male and female) refers to a set of biological attributes in humans and animals. It is primarily associated with physical and physiological features including chromosomes, gene expression, hormone levels and function, and reproductive/sexual anatomy. Sex is usually categorized as female or male but there is variation in the biological attributes that comprise sex and how those attributes are expressed (Canadian Institutes of Health Research, 2019). On the other hand, age (in years) refers to the interval of time between the day, month and year of birth and the day and year of occurrence of the event expressed in the largest completed unit of solar time such as years for adults and children and months, weeks, days, hours, or minutes of life, as appropriate, for infants under one year of age (Gregorian calendar), (OECD, 2021).

Race “implies inheritable biological and genotypic traits” (Pan et al., 1999, p. 730). Ethnicity depicts the social group a person belongs to, and either identifies with or is identified with by others, because of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race (Bhopal, 2004). End-of-course grade is assigned by a teacher to a student at the culmination of a set period of coursework (Marzano, 2000 cited in Rickets, 2010). End-of-course grades appear on a student transcript.

End-of-course numerical scores will be used for this study. The population comprises undergraduate students, while the sample consists of 330 students enrolled in a general education course at University A.

Significance of the Study

The changing demographics of the student population, the current economic climate, global and societal trends together with the Corona Virus pandemic dictate that universities and colleges all over the world facilitate teaching and learning experiences, as well as grow admittance to their programs by way of distance and online learning. Blended learning as a pedagogy succeeds on account of its perceived benefits to educational institutions in general, and students in particular; and the urge to use technology more effectively to reach students undergirds an evolution of blended learning that is well underway (Horn & Freeland Fisher, 2017).

However, student dissatisfaction with any aspect of blended learning pedagogy has the potential to negatively impact student motivation; and subsequent student retention, progression, and completion of their studies (Safford & Stinton, 2016). Among the most significant influences promoting student satisfaction in BL environments are students' perceived task value, instructor expertise and students' perceived achievement; and student engagement (Diep et al., 2017; Sahni, 2019). Moreover, self-paced personalized settings are instrumental for improving learner satisfaction (Zhai et al., 2017).

Several BL methods are employed to create valuable and efficient learning experiences for learners, with the flipped classroom being the most popular and rotational BL style gaining in popularity. A comparison of the face-to-face method of teaching and the flipped classroom indicates that the flipped classroom enhanced student academic performance (Shyr & Chen,

2018; Talan & Gulsecen, 2019; Zhang et al., 2019). It is critical that students' voices are heard regarding how they experience BL. Student satisfaction (Talan, & Gulsecen, 2019; Thompson, & McDowell, 2019; Yang, & Newman, 2019; Yen et al., 2018; Zhang et al., 2019), challenges with BL (Thompson, & McDowell, 2019; Viola et al., 2019) and self-regulation (Al Fadda, 2019; Shyr & Chen, 2018) were some of the subthemes that emerged from the students' perceptions of BL literature. Research on BL has been conducted in Pakistan (Naeem & Khan, 2019), China (Zhang et al., 2019), and Queens New York, USA (Thompson & McDowell, 2019), but how do undergraduate students at University A in the Caribbean, view blended learning pedagogy?

Several researchers have explored BL pedagogy and general education courses in a range of subject areas inclusive of English, (Ayob et al., 2021; Banditvilai, 2016; Fola-Adebayo, 2019; García-Sánchez, 2016; Inal & Korkmaz, 2019; Kim et al., 2020; Simonova, 2019; Sriwichai, 2020; Xu et al., 2020; Xu et al., 2021) History, Project activity foundations, Psychology, Scientific Literacy, and the STEM disciplines (Bylieva et al., 2019; Hutson et al., 2015; Monaghan-Geernaert, 2019; Olt, 2018; Son, 2016; Swap & Walter, 2015). The investigations focused primarily on academic performance, attitudes, course redesign, critical literacy skills, enhancing language skills, interactive communication, language acquisition, student behavior, student engagement, student participation in the course, and student readiness.

However, there is limited research that examined the associations among BL, satisfaction, and general education courses at the undergraduate level. For example, Fisher et al. (2021) researched the relationship between flipped learning and BL, student engagement, performance, and satisfaction, in a business and management course. On the other hand, Taghizadeh and Hajhosseini (2021) probed graduate students' attitudes, interactions and satisfaction, and the degree to which attitude, interaction, and teaching quality influenced student satisfaction in a

blended TEFL course. The researchers indicated that further investigations on the linkages among satisfaction, age, gender, online experience, and background knowledge of online education are needed. In addition, Chen and Chau (2016) analyzed the relationship between students' learning styles and online participation, as well as the associations of their online participation with learning achievement and with course satisfaction in a blended Digital Citizenship general education course. The authors recommended further research utilizing a variety of courses and other educational institutions.

With the emphasis on student satisfaction in a blended general education course, and its impact on student outcomes operationalized by the end-of-course score, this study seeks to fill the gaps identified in the BL literature. Given the importance of general education courses to all other disciplines and the overall undergraduate experience, investigation in this area is warranted with a view to enriching students' learning experiences, as necessary. Favorable and pleasant experiences among current undergraduate students would redound to the benefit of the students specifically, and to the institution as well, since current students could precipitate increased enrollment because of sharing their positive experiences with potential students. The study would be of importance to lecturers, administrators, course developers, curriculum and instructional designers, and policy planners, as the results could be used to inform curricular and pedagogical decisions that would galvanize reputation enhancement, goodwill, and be beneficial to University A and other educational institutions at all levels.

Research Question

RQ: How accurately can the end-of-course numerical score be predicted from a linear combination of satisfaction with course, sex, age, and race/ethnicity for undergraduate students at University A?

Definitions

1. *Age* – the interval of time between the day, month and year of birth and the day and year of occurrence of the event expressed in the largest completed unit of solar time such as years for adults and children and months, weeks, days, hours, or minutes of life, as appropriate, for infants under one year of age (Gregorian calendar) (OECD, 2021)
2. *Course* – the basic component of an academic program. This is sometimes referred to as a subject or a topic or a unit of study (Rogers & Smith, 2011).
3. *End-of-Course Grade* – an end-of-course grade is assigned by a teacher to a student at the culmination of a set period of coursework (Marzano, 2000 cited in Rickets, 2010). End-of-course grades appear on a student transcript. End-of-course numerical scores will be used for this study.
4. *Ethnicity* – the social group a person belongs to, and either identifies with or is identified with by others, because of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race (Bhopal, 2004).
5. *Race* – "implies inheritable biological and genotypic traits" (Pan et al., 1999, p. 730).
6. *Sex* – a set of biological attributes in humans and animals. It is primarily associated with physical and physiological features including chromosomes, gene expression, hormone levels and function, and reproductive/sexual anatomy. Sex is usually categorized as female or male but there is variation in the biological attributes that comprise sex and how those attributes are expressed (Canadian Institutes of Health Research, 2019).
7. *Satisfaction* –"the state felt by a person who has experienced a performance (or outcome) that has fulfilled his or her expectations. Satisfaction is thus a function of relative levels of expectation and perceived performance" (Horn, 2002, p. 4).

8. *Satisfaction with course* – for this study satisfaction with course is defined as the state felt by a person who has experienced a performance (or outcome) that has fulfilled his or her expectations of the course. Satisfaction with course is thus a function of relative levels of expectation and perceived performance in the course (Horn, 2002; Rogers & Smith, 2011).

CHAPTER TWO: LITERATURE REVIEW

Overview

The purpose of this literature review is to present the critical components of blended learning (BL) pedagogy and to examine the factors that determine student satisfaction in BL environments. This chapter commences with explanations of the theoretical frameworks that ground this study, followed by a synthesis of related literature that substantiates this proposed research and its significance. The literature review considers the definitions and classifications of blended learning, some general outcomes of blended learning (BL), satisfaction in BL and the contributing factors to satisfaction in blended learning settings categorized by Wu et al. (2010) relative to students' cognitive beliefs (computer self-efficacy, performance expectations), the technological environment (system functionality, content feature) with reference to the learning management system, and the social environment (interaction, learning climate). The chapter culminates with a summary that coalesces the affirmative outcomes of satisfaction in blended learning environments.

Theoretical Framework

Social Cognitive Theory

Albert Bandura's (1991, 1999) social cognitive theory centers on the idea that personal growth stems from consecutive exchanges between individuals and the external environment. Following exposure to individuals' cognitive processes, the external environment then influences their behavior. Furthermore, social cognitive theory asserts that there is triadic reciprocal causation among internal personal factors manifested by cognitive, affective, and biological events; physical and social external environmental factors; and human behavior, with each affecting the other in both directions (Bandura, 1999). The author contends that human behavior

is shaped by two critical cognitive dynamics—performance expectations and self-efficacy.

Performance expectations speak to how individuals form beliefs about their abilities and capabilities, predict the possible effects of their actions, engage in goal setting, and formulate plans that are expected to generate the desired outcomes. In contrast, self-efficacy illustrates individuals' thinking about how they can exercise control over how they perform and manage the events that affect their lives. Therefore, self-efficacy directs individuals' choices, ambitions, effort on tasks, perseverance in difficult situations, overall mindset, reaction to stressful occurrences, and vulnerability to depression (Bandura, 1991).

Several studies (Diep et al., 2017; Hamdan et al., 2021; Knaggs et al., 2017; Prifti, 2020; Shorey et al., 2017; Thai et al., 2020; Zainol et al., 2018) are grounded in social cognitive theory. Warren et al., (2020) investigated the role of blended learning regarding the mathematics self-efficacy of students who specialized in mathematics and students who did not specialize in mathematics. They discovered that blended learning increased academic self-efficacy in mathematics as well as the students' performance. Similarly, Thai et al., (2017) researched the differential impact of the flipped classroom relative to the blended learning, traditional learning, and e-Learning settings on learning performance, self-efficacy beliefs, intrinsic motivation, and perceived flexibility and found that flipped classroom positively influenced self-efficacy and intrinsic motivation.

Social cognitive theory is usually applied with a view to understanding and predicting how individuals behave, along with determining the procedures that lead to behavioral change (Wu et al., 2010). In this study it enables the comprehension and appreciation of the contributing factors to student satisfaction with their learning accomplishments as they engage the learning process in a blended learning setting.

Theory of Transactional Distance

Moore's (1997) Theory of Transactional Distance conceptualizes the relationship between teachers and learners when they are disconnected on account of their locations and/or by time, as exemplified by distance and online learning situations. Moore argues that the disconnection between teachers and learners provokes a psychological and communication gap—the transactional distance, a consequence of distinctive characteristics of learner and teacher behaviors resulting from the physical separation. He maintains that this transactional distance immensely influences teaching and learning; and as such it must be bridged.

With a focus on program structure, interactions between instructors and learners, and learner autonomy, Moore's theory of transactional distance underpins many research studies in blended, distance and online learning (Gleason, 2021; Kuo & Belland, 2016; Kumar et al., 2021; Oyarzun et al., 2018; Quong et al., 2018; Zhang & Lin, 2020) to facilitate understanding of learner perceptions of themselves, and the learning process. For example, a study of the subjective feelings about the learning process (feelings of threat/challenge, self-efficacy, and motivation) in students in virtual courses and blended courses unearthed an association between students' feelings regarding the learning process in both settings and feelings of threat/challenge, motivation, and self-efficacy (Zilka et al., 2019). On the other hand, an investigation of interactions in the social presence of a blended synchronous learning setting comprising online and face-to-face students, uncovered differing social presence encounters in which interaction materialized (Szeto & Cheng, 2016). The theory of transactional distance is applied to this study to explore student satisfaction with the online component of blended instruction with respect to course structure, learner autonomy and interactions.

General Education Courses

Across the globe a requirement for the attainment of undergraduate degrees is successful completion of general education courses. General education courses are core courses that allow students the opportunity to acquire knowledge and skills outside of their major specialist areas, enabling the development of well-rounded students, and functional and productive citizens (Aderibigbe, 2020). These multi-disciplinary courses facilitate the communication of the cultural, economic, educational, and social ideals and aims (Zai, 2015). They usually account for about 30-35% of the overall undergraduate credit hours preceding graduation, and include—English, fine arts, foreign language, history, humanities, mathematics, natural science with a lab component, and social science. General education courses may also include courses that are designed to ensure students' persistence and success in college, as well as courses that prepare them for workplace success (Lei & Lei, 2019). For example, Liberty University (n. d.) asserts that general education courses nurture graduates' effective communication, critical thinking, accurate research skills, and the application of a biblical worldview to every aspect of their lives. The interrelatedness of the areas of study lays the foundation for future successful careers. General education courses can unearth passions that lead to the selection of minors or majors, as well as ensure that all graduates of the institution possess the same essential graduate attributes (Lei & Lei, 2019).

However, challenges associated with general education courses are documented in the literature. Head (2014) reported that some people deem general education courses unnecessary because they do not support their professional goals. Similarly, Rutledge and Lampley (2017) indicated that from the students' standpoint general education courses are considered irrelevant because the students may not understand or appreciate the purpose of general education within

the curriculum. The researchers revealed that course revisions to include active learning strategies did not positively influence students' perceptions of the importance of the general education program. Still, Klauke (2019) noted that students perceive general education as needless classes to obtain a passing grade with very little effort; a stance that Rutledge and Lampley (2017) find disquieting. On a different plane, with specific reference to a general education foreign language course, Barski and Wilkerson-Baker (2019) contended that it was inadequate in supporting students' intercultural competence development—a goal of the general education curriculum. The authors proposed the reconceptualization of the curriculum, instruction, and assessment to focus on culture to circumvent the approaching irrelevance of foreign language courses in general education.

Nevertheless, general education is critical to student retention, satisfaction, success, and graduation (Lei & Lei, 2019). General education courses are compulsory, and many have large numbers of students. Web-enhanced, blended, and online delivery modalities are often utilized to enhance the student experience and teaching quality in general education courses. Yang et al. (2018) ascertained that combining the traditional lecture method with computer-supported collaborative learning CSCL, improved teaching quality; increased students' motivation; enhanced students' interactions with the instructor, content, and classmates; and facilitated the achievement of students' deep understanding in a mandatory Philosophy of Science course. The compulsory general education course has been selected for this study on account of its mode of delivery, its contribution to student success beyond graduation, and to determine the effect of student satisfaction on student outcomes in a blended setting in undergraduate education.

Related Literature

Blended Learning

The current COVID-19 pandemic highlights the usefulness of blended learning pedagogy in today's educational arena. Many students and educators faced and continue to face challenges with e-Learning during this time (Baloran, 2020; Dhawan, 2020; Pather et al., 2020), and blended learning has been proposed to mitigate some of these educational challenges (Adedoyin & Soykan, 2020; Dua et al., 2020; Qamar et al., 2021).

However, there is no consensus on the definition and taxonomy for blended learning in the literature (Cuesta Medina, 2018; Hrastinski, 2019; Margulieux et al., 2016). For example, blended learning is defined with respect to the combination of teaching modalities, amalgamating teaching methods, and integrating face-to-face and online teaching (Graham 2006, cited in Hrastinski, 2019); the delivery medium and instruction type (Margulieux et al., 2016); thoughtfully combining classroom face-to-face and online learning experiences (Garrison & Kanuka, 2004); and according to the quantity of face-to-face and online learning.

Allen and Seaman (2010) described a blended or hybrid course as one that merges face-to-face and online delivery with 30 to 79% of the content delivered online, using online discussions, and having a reduced number of face-to-face engagements. On the other hand, Sáiz-Manzanares et al. (2020) investigated different BL types with 80% and 20% online delivery respectively, while Diep et al. (2017) compared blended approaches with 25% and 50% online delivery. In contrast, Cronje (2020) defined BL as "The appropriate use of a mix of theories, methods and technologies to optimize learning in a given context" (p. 120). In view of the variations in the definition of BL, Hrastinski (2019) contended that researchers and educators carefully articulate their meaning of BL.

Nevertheless, advancements in information and communication technology (ICT) have facilitated the evolution of blended learning practice. Through videoconferencing, web conferencing, and virtual world, students in remote locations are permitted to attend classes with students in traditional classrooms in real time (Lakhal et al., 2021). Students are not confined to a particular course delivery method but may choose how they will access their courses—whether in person or online, synchronously, or asynchronously (Beatty, 2019). Irvine et al. (2013) maintained that such learner autonomy places students rather than the instructor or the institution at the center of the learning experience. The simultaneous mix of students in differing learning modalities is referred to in the literature as *Blended Synchronous Learning* (Bower et al., 2015; Laforune & Lakhal, 2019; Wang & Huang, 2018; Wang et al., 2017; Wang et al., 2018); *Here or There Instruction* (Zydney et al., 2019); *Hybrid-Flexible (HyFlex) Course Design* (Beatty, 2019); *Multi-access Learning* (Irvine et al., 2013); *Synchromodal Learning* (Bell et al., 2014); or *Synchronous Hybrid Learning* (Raes et al., 2020).

Blended learning pedagogy is declared beneficial because it positively impacts students learning experiences, and performance. For example, Bouilheres et al. (2020) researched the benefits of blended learning concerning students' learning experiences with particular focus on student engagement with peers, instructors and content, and the extent to which these interactions are perceived as contributing to a positive learning experience. The findings indicated that the blended learning environment positively influenced students' perceptions of their learning experiences together with their interactions with classmates, lecturers, and course materials.

Pertaining to performance Casselman et al. (2020) applied a randomized control trial to compare the impact of the pre-class online learning environment to the in-class collaborative

activities in the flipped classroom. They wanted to determine the performance increases in the flipped classroom that could be credited to the pre-class online activities; and how the structure of pre-class online learning and face-to-face collaborative group problem solving affect student performance compared to the structure of face-to-face passive lecture and individual homework problem solving. The results revealed that the improvement in the posttest scores is attributed to the online component or pre-class activities in the flipped classroom.

Similarly, Moon and Hyun (2019) utilized a randomized control design to determine whether blended learning is effective in improving nursing students' knowledge, attitude, and self-efficacy in cardiopulmonary resuscitation (CPR) education. They predicted that following blended CPR education participants will demonstrate improved performances measured by increased scores on CPR knowledge, attitude, and self-efficacy, in comparison to the control group across these categories. The blended CPR education group achieved significantly higher knowledge and attitude scores than the control group, but there was no difference between the intervention and control groups on self-efficacy.

On a different plane, Asarta and Schmidt (2020) sought to ascertain whether prior experience with online and blended courses affect student outcomes in a subsequent blended course for transfer and native students and across ranges of grade point averages. They learned that prior experience with online and blended courses did not generally impact students' outcomes in the subsequent blended learning courses. However, consideration of transfer status and grade point averages indicated that prior online and blended experience produced a marginal effect on outcomes for transfer students who were high achievers.

Wilczewski et al. (2022) applied a mixed methods design to explore student perspectives of their online learning experience during the COVID-19 pandemic. Engaging a cohort of

domestic and international students at a large university in Poland, the researchers sought to determine the relationships between different aspects of the student online learning experience (SOLE) and their academic adjustment, satisfaction, performance, and loyalty; as well as how students made sense of their experience. The results of the study revealed that students' online learning experience supported adjustment, loyalty, performance, and satisfaction; academic adjustment predicted loyalty, performance, and satisfaction; student loyalty was predicted by both academic performance and student loyalty; and satisfaction was predicted by academic performance.

On the other hand, Bancroft et al. (2020) employed the social constructivist lens to examine the effect of the flipped classroom on students' performance in general chemistry based on their race/ethnicity and socioeconomic status, and in comparison, to the traditional teaching method. The findings unveiled that in terms of race/ethnicity the traditionally marginalized students in the flipped classroom showed medium and significant improvement in their performance, while students classified by SES had small but significant increases in their grades as well. However, while no significant increases in performance were reported across race/ethnic groups for students in the flipped classroom group compared to the traditional group, a significant difference emerged between low-SES students and their mid- to high SES colleagues in the flipped classroom, notwithstanding their overall improved performance.

There is a plethora of literature pertaining to student engagement in BL environments. For example, with a focus on the conversion of traditional courses to blended courses, Serrano et al. (2019) offered suggestions to develop student engagement in both the online and face-to-face components of blended courses. They proffered the inclusion of audience response systems (ARS), peer- and self-assessments, flipped classroom methods, as well as recorded lectures. In

the authors' estimation ARS can track student learning, support both formative and summative assessments and generally improve student engagement. Additionally, they advanced that peer- and self-assessment and the flipped classroom approach occasion individualized feedback to learners while reducing instructor workload. Learners are empowered to develop transferable skills inclusive of communication, autonomy, and lifelong learning together with the facilitation of a collaborative learning culture. Lecture recordings are effective for engaging large classes and in particular international students who may exhibit deficient language skills because the language of instruction is not their native language (Serrano et al., 2019).

By the same token, Holbrey (2020) adopted a game-based blended learning method to explore the association between student favored technologies and learning in higher education. In a mixed-methods action research project, the researcher incorporated Kahoot! into traditional lecture theatres with a view to enhancing student engagement and the general student experience. More specifically, she sought to grasp how students experienced Kahoot! and to investigate the degree to which involvement with this synchronous technology shaped their concentration, engagement, and retention. The results indicated that the game-based strategy successfully facilitated active participation and interactive learning, enhanced students' concentration, and engagement, but improved their retention to a lesser degree.

Similarly, Northey et al. (2018) applied the "here and now" learning concept utilizing Facebook as the collaboration platform to examine the impact of mobile technology and computer-supported collaboration on student academic achievement and student engagement. The results indicated that student engagement behavior demonstrated by participation in learning activities positively affected both academic achievement and students' perceived levels of engagement, and that students' mobile collaboration positively impacted students' perceived

levels of engagement. Academic achievement was found to be significantly and positively influenced by perceived engagement. On another plane, Georgakopoulos et al. (2020) analyzed student engagement data with a view to determine risk factors that contribute to student non-performance in blended courses. The authors established that the e-learning component plays a meaningful role in student performance in blended courses, and that student performance is critically impacted by study material completed, tests grades and lecture attendance.

Analogously, Edwards et al. (2020) investigated distinctive student engagement attributes among weak performing students in a blended learning-to-learn course. They sought to ascertain the student engagement factors that distinguished students achieving improvement in performance (Movers) from those who did not improve their academic performance (Stayers) in the course. In concert with Georgakopoulos et al. (2020) the researchers discovered that completing more instructional activities, regular course attendance and frequent course access substantiated students' behavioral, cognitive, and agentic engagement resulting in improved performance. Better quality and greater quantity of cognitive engagement preceded enhanced performance.

However, the findings related to emotional engagement suggested that no improvement in performance was linked to positive deactivating emotions, while better performance was associated with added negative activating and negative deactivating emotions; stronger emotions and more emotions that occasioned challenging goal accomplishment. Overall, improved performance was found to be a consequence of more significantly engaged Movers when compared to less engaged Stayers. Also, Pacheco-Pereira et al. (2020) examined students' behavioral, cognitive, and emotional engagement in two blended dental education courses. They observed that in general students were engaged with the BL elements of their courses and

reported enhanced understanding of course concepts. However, the authors revealed that students were more cognitively and emotionally engaged than they were behaviorally engaged.

On the other hand, Heilporn et al. (2021) applied the qualitative method to explore the strategies that teachers employ to promote students' behavioral, cognitive, and emotional engagement in BL (traditional BL courses, blended online courses, blended synchronous courses) at both the undergraduate and graduate levels, across several disciplines. The authors revealed that teachers' strategies were largely associated with "(i) the course structure and pace; (ii) the selection of teaching and learning activities; and (iii) the teacher's role and course relationships" (p.8). In particular, the results indicated that a well-defined, continuous, and cohesive course structure facilitated students' behavioral and emotional engagement, whereas maintaining a constant pace in both the synchronous and asynchronous elements of the course also roused student engagement.

What is more, teachers planned active and collaborative teaching and learning activities, while focusing on activities, topics and resources that were relevant to student needs and experiences and permitting student choice among the same together with assignment formats to foster student engagement. The authors found that clear communication of the course organization, objectives, and expectations for both elements of the course; and forming trusting relationships among teachers and learners from the start of the course nurtured learners' behavioral and emotional BL engagement. Student engagement was also facilitated when teachers guided students synchronously and asynchronously throughout the semester.

Researchers (Grønlien et al., 2021; Kazanidis et al., 2019) frequently explore blended learning in comparison to other learning modalities. However, the research results are conflicting. For example, Yu et al. (2021) focusing on case-based learning, compared the impact

of blended and offline pedagogy on the academic performance and critical thinking capability of undergraduate nursing students. The results verified that case-based blended learning positively influenced students' academic performance, while both the blended and offline case-based approaches effected improvements in undergraduate nursing students' critical thinking self-confidence. Similarly, Taliaferro and Harger (2022) compared students' performance and satisfaction in blended online laboratory instruction in a radiation health and physics class to traditional lecture and laboratory teaching. While the students in the blended group reported higher levels of satisfaction and enjoyment with the delivery mode than did the traditional group, there was no difference in the exam performances between the groups.

Monk et al. (2020) conducted unique research in which they assessed the value of blended learning by comparing a traditional management information systems course with the blended format of same course in which 33% of the face-to-face classes were substituted by online resources and activities. Both formats utilized the same content and exact classroom exercises and were delivered by the same instructor. Affective and perceived success indicators were attained through formative assessments. The researchers wanted to verify the changed outcomes for a true blended class that keeps the content and instructor constant while varying only the learning modality; whether the blended learning environment aided outstanding learning as assessed by assignment, exam, and final course grades; and if a significant difference in learning existed for international students with a native language that differed from the instructional language. There was no difference in performance between the students in the traditional format and the blended format of the management information systems course.

Likewise, Jafar and Sitther (2021) compared student outcomes and evaluations of a traditional and a blended class in Introductory Anatomy and Physiology taught by the same

instructor. They found that there was no difference in student outcomes measured by scores on summative examinations, but that student evaluations of the blended course were more positive than those for the traditional class. Goode et al. (2018) compared blended and face-to-face teaching in an undergraduate advanced research design and analysis psychology course that centered on critical thinking through writing, along with writing mechanics. Unlike previously mentioned studies (Casselman et al., 2020; Moon & Hyan, 2019; Yu et al., 2021) the researchers discovered that students in the blended learning group were outperformed on quantitative skills by students in the face-to-face group, though the effect size was quite small.

In another vein Thai et al. (2020) compared students' learning performance in face-to-face learning, fully e-learning, blended learning, and the flipped classroom environments. They hypothesized that compared to the face-to-face setting students will perform better; and demonstrate improved self-efficacy beliefs, intrinsic motivation, and perceived flexibility, that will positively impact learning performance following instruction in flipped classroom, blended learning, and fully online settings. Unlike Monk et al. (2020) and Jafar and Sitther (2021) significant differences were found among the four learning conditions and students attained higher scores in the flipped classroom and in blended learning respectively relative to the fully online setting. However, there were no significant differences regarding self-efficacy beliefs, intrinsic motivation, and perceived flexibility.

Over time Dziuban et al. (2018) explored student access by examining success and withdrawal rates in blended learning courses relative to face-to-face and online courses. The researchers examined the differences in success and withdrawal rates with students' minority status. They considered student end-of-course ratings for blended learning and the other course modalities to create strong if-then decision rules about the class features and instructor attributes

that influenced students to describe their educational experience as “excellent”. The findings revealed that blended learning generally supports or improves access for students and engenders increased success rates for both minority and non-minority students. In addition, regarding their opinions about learning environment effectiveness students ranked blended learning above the other course modalities. Well-defined course objectives and progress towards the same, establishing an effective learning atmosphere, and instructors’ effective communication were the characteristics that effected excellent educational experiences for students.

Student perceptions of BL is another area that is well researched. Dang et al. (2020) compared students’ perception differences of BL relative to social and demographic characteristics including gender, international versus domestic students, and first-generation college students versus non-first-generation college students. The findings indicated that female students, international students, and first-generation college students held more positive views of BL than their respective male, domestic and non-first-generation counterparts.

On the other hand, applying a qualitative design to survey student perspectives of BL, Margolis et al. (2017) distinguished ten instructional best practices, that should feature prominently in blended learning course design and management. Namely, setting the stage, consistency when team teaching, posting materials in a timely manner, time on tasks, accountability for online activities, utilizing well thought-out active learning, instructor use of feedback on student preparation, integrating student feedback into the course, short reviews of online materials during face-to-face sessions, and ensuring technologies are user friendly.

As well, Fola-Adebayo (2019) investigated undergraduates’ perceptions of the relationship between BL exposure and online critical literacy skills development. More precisely the author wanted to find out the benefits that students derived if any, from BL instruction;

students' perceived relationship between BL teaching and online critical literacy skills development; the extent to which BL contributed to students' online critical literacy skills development; and the students' perceptions of the difficulties associated with using the Moodle LMS. Most of the students indicated their preference for BL and reported that it was beneficial to them in terms of enhancement of ICT skills, gaining additional knowledge after class, better time management, improved expression, development of literacy skills and the creation of communities of inquiry. A statistically significant positive association was revealed between BL teaching and online critical literacy development; while most of the students informed that the BL method impacted their online critical literacy skills development to a large degree. Internet access and navigating Moodle despite the orientation to the LMS were some of the challenges that students experienced.

Similarly, Almasi and Zhu (2020) applied a mixed method design to explore students' perceptions of cognitive presence in BL; the extent to which students' perception of cognitive presence predict their learning performance in BL courses; and the ways in which students demonstrate the various phases of cognitive presence while accomplishing the intended learning outcomes. Students testified of high cognitive presence with integration receiving the highest ranking, while application and exploration were similarly ranked. However, the high ranking for integration in the survey was not supported in the focus group interviews. Student performance was significantly predicted by cognitive presence; and students manifested various degrees of all the cognitive presence phases—exploration, integration, and resolution, mostly prompted by teaching presence. The researchers concluded that when there is the alignment of students' learning activities and assessments, cognitive presence is associated with their academic performance.

Applying a comparative posttest, quasi-experimental design, Molnar (2017) researched the impact of flipping the classroom on undergraduates' perceptions and grades in an introductory business course that centered on computer applications. Data were garnered from two different instructors who taught the course utilizing the traditional web-enhanced classroom method in one semester, followed by flipped classroom method in the following semester. In each instance the same content was covered, identical course materials were used, and the same teaching assistants were employed. The course goals, learning outcomes and assessment methods remained unchanged. An end-of-semester survey was administered to gather course perceptions data, whilst student grades were determined by course exams—three written exams, a hands-on exam in Excel and Access and the overall course grade. The results indicated that in general, undergraduates' perceptions of the face-to-face and the flipped classrooms showed no significant differences regarding the four factors—course, using technology, soft skills, and time. However, for instructor 1 students viewed the face-to-face class more favorably than the flipped class, but they held more positive perceptions of soft skills in the flipped classroom than in the face-to-face classroom. There were no differences in student perceptions for the using technology and time factors.

Conversely, for instructor 2 students perceived the flipped class more favorably than the face-to-face class. However, no differences in student perceptions were found for the other factors—using technology, soft skills, or time. Also, the consideration of differences between instructors indicated that instructor 2 received more positive responses on the course factor than did instructor 1; while instructor 1 received more positive responses on the soft skills factor. There were no significant differences between instructors on the using technology and time factors. For students taking classes with instructor 1, significant differences were found between

performances on the first two written exams in support of the flipped classroom, whereas face-to-face classroom students performed better than their counterparts on the hands-on Excel and Access examinations. No significant differences between teaching approaches were revealed for the third written exam and the overall score.

Much literature centers on BL adoption and implementation. For example, through a systematic review of the literature, Brown (2016) considering the instructor perspective sought to determine the factors that influence instructors' adoption of online tools in face-to-face teaching. The researcher unearthed six effects of blended instructional practice that shaped instructors' adoption and use of the online tools, categorized as external influences—interactions with technology, academic workload, institutional environment and interactions with students, and internal influences—instructor attitudes and beliefs, and instructor learning through opportunities for professional development. Similarly, concentrating on faculty satisfaction, Previtali and Scarozza (2019) investigated the bases of BL adoption in universities. Student-related matters emerged as the most influential determinants of faculty satisfaction, whereas concerns associated with instructors and with the institution particularly, appeared to be of lesser significance.

Anthony Jr et al. (2019) investigated the impact of BL on students' academic effectiveness together with teaching effectiveness in BL relative to students', lecturers', and administrators' perceptions of BL adoption. The researchers discovered that BL adoption is significantly influenced by students' perceptions, while students' adoption of BL is influenced by lecturers' responsiveness, and that lecturers' perceptions impact the BL initiatives that are adopted. They found that management policies influence students' and lecturers' perceptions concerning BL adoption as well as teaching and learning effectiveness. In addition, learning

effectiveness was found to be affected by the BL practices that students adopted, whereas teaching effectiveness was impacted by the BL initiatives that lecturers adopted.

Through a review of literature and good practices Galvis (2018) explored influential factors that lead to the institutional implementation of BL. He determined that sustainable and expandable BL integration is facilitated by well-informed strategic decision making built on the identity and strengths, potential associates, and the pedagogical, curricular, and technological opportunities of the institution, undergirded by institutional commitment to this teaching modality. He advanced that institutional knowledge and commitment to BL are realized through pilot testing at the course level and/or consulting benchmarking studies, stressing the need for financial resources to sustain the creation of quality blended courses and/or programs along with the requisite pedagogical and technological supports. Furthermore, he advanced that this learning modality may require higher education institutions to modify their educational, operational and/or business models to facilitate better understanding and development of blended learning initiatives, with a view to achieving institutional adoption through the application of appropriate change strategies. Importantly, decisions about the interrelated educational, operational, and business models frame blended course and program design, ensuring the alignment of technologies, organizational structures, and change strategy with the blended learning vision (Galvis, 2018).

Satisfaction with Blended Learning

Satisfaction is perceived as the gratification of needs and desires after participating in a particular endeavor, and learning satisfaction is critical to the development of online learning (Lin et al., 2008). From the student standpoint, Lo (2010) defined student satisfaction as the subjective perceptions that students hold about how well a learning environment supports

academic success. The author suggested that high levels of student satisfaction indicate that appropriately challenging instructional methods are applied to activate students' thinking and learning. Additionally, Weerasinghe and Fernando (2018) reported that the quality of university facilities, the quality of the degree program and the university image are predictors of student satisfaction, with the university image as the strongest predictor.

Contemplating the online learning environment Asoodar et al. (2016) investigated the key factors that affect successful e-learning and e-learner satisfaction, for the purpose of furnishing guidelines for appropriate e-learning implementation in e-learning institutes. The researchers developed and validated an instrument that was administered to undergraduate students. The results indicated that e-learner satisfaction was significantly and positively predicted by diversity in assessment, e-learning course flexibility, instructor's ability in Internet-based courses, instructor presence and guidance, learner interaction with others, perceived usefulness, technology quality, and university support and services. Learner interaction with others was identified as the strongest predictor of e-learner satisfaction. Asoodar et al. (2016) disclosed six dimensions of e-learner satisfaction, specifically, learner dimension, instructor's dimension, course dimension, technology dimension, design dimension, and the environment dimension.

By the same token, Rajabalee and Santally (2021) considered the associations between students' engagement, overall performances, and levels of satisfaction in an online general education course taken by first year university students from several disciplines. The authors wanted to find out the extent to which students' performances and engagement in the course influenced their satisfaction in the course, as well as their thoughts on the course delivery, their learning outcomes and their overall experience with the course. The researchers unearthed a significant, positive relationship between satisfaction and engagement, and a weak positive

significant association between students' satisfaction and engagement, with their overall grades. Irrespective of how they performed in the course, students reported satisfaction with the learning design philosophy of the course. However, unsatisfactory tutor support, and difficulties with the technology were some of the challenges that students pinpointed.

In addition, Lakhal et al. (2020) examined the characteristics that promote the academic and social integration of students in blended synchronous courses (BSC) in graduate programs. They sought to ascertain the teaching, learning and assessment strategies that fostered students' satisfaction and by extension their academic and social integration in BSC, together with the instructor skills and attitudes that nurture student satisfaction and hence enable the academic and social integration of all students (face-to-face and online) in BSC. The results revealed that students' academic and social integration in BSC is dependent on the suitability of the teaching approaches and BSC to students' training requirements inclusive of the course content, instructional, learning, and assessment methods. Participants' attitudes, experience, and instructors' skills for facilitating online students' presence were also deemed instrumental to students' satisfaction, academic and social integration in BSC. However, challenges associated with instructors' and teaching assistants' attitudes and expertise with BSC, instructors' technological abilities, the viewpoints of the face-to-face students regarding the online students in BSC, and the mindsets and technological proficiency of the online students in BSC hampered students' satisfaction, academic and social integration in BSC.

Associations exist among learner competencies and learner satisfaction and experience generally and in eLearning environments. For example, Dinh and Nguyen (2022) considered the effect of students' self-regulated learning and Internet self-efficacy on their satisfaction and performance in the online setting. More specifically, the authors examined the degree to which

Internet self-efficacy predicted higher education students' satisfaction and academic achievement, in addition to the degree to which self-regulated learning strategies predicted higher education students' satisfaction and academic achievement. Direct positive associations between Internet self-efficacy, help-seeking and goal setting and both student satisfaction and academic achievement were uncovered. Also, while self-evaluation positively impacted student satisfaction, it had no bearing on academic achievement. No statistically significant linkages were found for the self-regulated strategies of elaboration, environment structuring and task strategies and academic achievement nor student satisfaction. However, a direct positive relationship between students' satisfaction and academic achievement was revealed.

Focusing on learner characteristics in an effort to facilitate improvement in students' involvement and performance in the online setting given the constraints of the COVID-19 pandemic, Butt et al. (2023) explored higher education students' perceptions, preferences, insights and inclinations concerning learning in the online environment using four models—the Task Technology Fit (TTF), the DeLone and McLean Model of Information Systems Success (DMISM), the Technology-to-Performance Chain model (TPC) and the Technology Acceptance Model (TAM). The results showed that performance was positively predicted by learner characteristics with user satisfaction and task technology fit as mediating functions. With user satisfaction and actual system usage as mediating functions, learner characteristics positively and significantly impacted students' academic performance. The association between learner characteristics and user satisfaction was moderated by perceived learning.

Learner satisfaction and experience are significant indicators for gauging the cost-effectiveness of blended learning space implementation and can therefore inform institutions' decision making relating to infrastructural investments (Xiao et al., 2020). Therefore, the

researchers investigated the predictive learning competencies (learning motivation, engagement, digital literacy, time management) for students' satisfaction and experience in blended learning settings. Cognitive engagement was determined to be the only predictor of student satisfaction and experience. Alternatively, Kintu and Zhu (2016) explored learners' level of use and satisfaction with design features in a blended learning environment. Noticeably, learners utilized the tools and resources and thought that they were beneficial. They were mostly satisfied with the technology and blended learning design features, but overall, they indicated a preference for the continuation of face-to-face support in the blended learning setting.

As it relates to course satisfaction Chen et al. (2016) examined this construct in relation to learning outcomes measured by final grades, and gender differences in a flipped learning precalculus course. Course satisfaction was assessed using the factors course design, system quality, course arrangement and online assessment. The results showed that of the four factors studied only course design and content arrangement were significantly associated with the final grade. Further analysis confirmed course design to be the only predictor of the final grade among the course satisfaction factors. On a different note, Kazanidis et al. (2019) applied a quasi-experimental design to investigate whether for instructional media design courses the flipped classroom approach led to better training satisfaction than the traditional teaching lecture-based method. The findings indicated that student training satisfaction was significantly higher for the flipped classroom experimental group than for the lecture-based control group.

Zainol et al. (2018) examined the factors contributing to satisfaction in blended learning among undergraduate students in Malaysia. The results revealed that perceived ease of use, perceived value; learning climate and student instructor interactions influenced satisfaction in blended learning environments. Analogously, Muñoz-Carril et al. (2021) sought to distinguish

the elements influencing student satisfaction and their perceived impact on learning in a Computer Supported Collaborative Learning (CSCL) setting. The positive and significant influencers of students' satisfaction with CSCL identified were confirmation, perceived enjoyment and perceived usefulness; whereas attitude was significantly and positively impacted by perceived usefulness and perceived ease of use. The perceived impact of learning was affected by both attitude and perceived enjoyment.

Still, Wu et al. (2010) contended that satisfaction is by and large the acknowledged measure of teaching and learning quality and effectiveness. They proposed a research model to detect the factors that impact students' learning satisfaction in blended e-learning settings and unearthed computer self-efficacy, performance expectations, system functionality, content feature, interaction, and learning climate as the main determinants of student learning satisfaction. Correspondingly, Venkatesh et al. (2019) explored the predictors of learning satisfaction for medical students engaged in a blended integrated learning method, and the students' views of how the blended approach affected their learning. They found that computer self-efficacy, performance expectations, system functionality, content feature, interaction, and learning climate were significantly and positively associated with learning satisfaction, with the strongest associations being performance expectations and learning climate. While the participants lauded the improvement in the quality of their learning in the blended modality, they disliked the loss of sense of community that the blended method apparently encouraged.

The predictors of student learning satisfaction in blended learning environments relating to students' cognitive beliefs (computer self-efficacy, performance expectations), the technological environment (system functionality, content feature), and the social environment

(interaction, learning climate) espoused by Wu et al. (2010) are considered in the sections that follow.

Cognitive Beliefs: Computer Self-efficacy

Computer self-efficacy describes individuals' beliefs in their capabilities to use a computer. Emphasizing dimensions of magnitude, strength and generalizability, it considers what individuals could do in the future rather than what they would have done in the past (Compeau & Higgins, 1995). Computer self-efficacy is associated with academic success. In order to ascertain how goal setting, metacognitive strategies and computer self-efficacy directly impact the attainment of improved academic success, or indirectly through social interactions in the online setting, Puška et al. (2021) conducted a study in higher education institutions in Bosnia and Herzegovina. They posited that social interaction in the online modality together with the respective competencies of goal setting, metacognitve strategies and computer self-efficacy lead to students' academic success. While the results confirmed that academic success is directly affected by computer self-efficacy and metacognitive strategies, goal setting was not shown to directly bear upon academic success.

On the other hand, Zhang et al. (2016) systematically examined the impact of various factors (computer self-efficacy, motivation, instructor characteristics, teaching method) on students' intention to learn in the blended and flipped classroom settings. They projected that each identified factor would in turn positively influence students' intention to learn in the blended and flipped classroom. However, they found that while computer self-efficacy, students' motivation, and teaching method greatly impacted students' intention to learn, instructor characteristics did not influence students' intention to learn. In another vein, Arrosagaray et al. (2019) performed an analysis and comparison of adult attitudes to information and

communication technologies (ICT) in different learning modalities—face-to-face, blended, and distance, and language modes, by assessing students' computer self-efficacy, how ICT influences their learning and their perception of ICT's learning potential. The results revealed a connection between computer self-efficacy and distance language learning, while students generally conceded that ICT was benefical to their learning.

Several studies (Al-Rahmi et al., 2020; Parkman et al., 2018; Thongsri et al., 2020; Turan & Cetintas, 2020) grounded in the Technology Acceptance Model (TAM) (Davis et al., 1989) have explored and confirmed positive associations with computer self-efficacy and various TAM constructs—Perceived Usefulness, Perceived Ease of Use, and Behavioral Intention. For example in a comparison of STEM and non-STEM students' perceptions of computer self-efficacy and intention to embrace e-learning, Thongsri et al. (2020) discovered that STEM students showed greater gains on computer self-efficacy, percevied ease of use and behavioral intention than non-STEM students. Similarly, Al-Rahmi et al. (2020) researched student plans to use information and communication technology and their satisfaction with such use. They found significant associations between computer self-efficacy, subjective norms and perceived enjoyment— major contributing factors to perceived ease of use and perceived usefulness.

Taking computer self-efficacy and perceived user resources into account, Parkman et al. (2018) studied preservice teachers' acceptance and intention to use technology-rich learning environments in their pending teaching practice. Computer self-efficacy and perceived usefulness emerged as the strongest predictors of pre-service teachers' intention to use technology rich environments. Establishing their research in the Technology Acceptance Model (TAM) (Davis et al., 1989) and the Diffusion of Innovation Theory (Rogers, 1985, 1995, 2003) Turan and Cetintas (2020) examined the factors that shaped undergraduate students' acceptance

of video lessons regarding ease of use, usefulness, enjoyment, intention, computer self-efficacy and relative advantage. The authors discovered that ease of use and computer self-efficacy significantly influenced usefulness of video lessons; but perceived ease of use, perceived usefulness and computer self-efficacy showed no effect on the intention to use video lessons.

Cognitive Beliefs: Performance Expectations

Social cognitive theory (Bandura 1991, 1996) posits that performance expectations relate to the ways in which individuals form beliefs about their abilities and capabilities, envisage the possible consequences of their actions, engage in goal setting, and devise plans that they anticipate will engender the desired results. Wu et al. (2010) likened performance expectations to the perceived usefulness concept of Davis' (1989) technology acceptance model (TAM), hence in this section performance expectations and perceived usefulness are used synonymously.

Performance expectations also called performance expectancy or perceived usefulness in blended and online learning environments is an area that is well researched, with conflicting findings often unveiled, as exemplified below. For example, Tanis (2020) examined faculty and alumni perceptions of the importance of the seven principles of online learning espoused by Chickering and Ehrmann (1996) to their teaching and learning. The seven principles included active learning techniques, appropriate time for tasks, faculty-student communication and collaboration, student-student communication and collaboration, high performance expectations, prompt feedback, and respect for diverse learning styles (preferences). High performance expectations emerged as the highest ranked principle that both faculty and alumni deemed critical for teaching and learning, especially when instructors demand high standards from learners in terms of performance, academic integrity, and professional conduct.

On the other hand, Fagan (2019) investigated students' acceptance of iPads for m-learning by extending the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et al., 2003) to incorporate hedonic motivation operationalized by enjoyment when using the technology, and social influence. The UTAUT model assumes that individuals' adoption of technology is directly impacted by a) performance expectancy—the extent to which an individual believes that system use will occasion job performance gains; effort expectancy—the ease of system use; and social influence—the extent to which an individual senses that significant others believe that he or she should use the system; and b) usage is directly determined by facilitating conditions—the degree to which a student is assured that the system he or she will use is supported by ample resources. The author postulated that effort expectancy, performance expectancy, and social influence will demonstrate significant positive associations with intention to use iPad for m-learning; hedonic motivation will have a significant positive impact on intention as well as a significant indirect association with performance and effort expectancy; and that there will be a significant positive connection between social influence and performance expectancy. The findings indicated that performance expectancy positively influenced intention to use the iPad for m-learning, social influence positively impacted performance expectancy, and hedonic motivation positively influenced both performance and effort expectancy, respectively.

Analogously, Prasad et al. (2018) applied the UTAUT model to ascertain international students' proficiencies and intentions in handling online material in an unfamiliar blended learning environment. In a similar vein to Fagan (2019), the researchers uncovered that social influence significantly impacted both performance expectancy and effort expectancy, but not behavioral intention; effort expectancy and performance expectancy significantly influenced

behavioral intention; and behavior intention and facilitating conditions significantly affected user behavior. They deduced that while students' adoption of blended learning was shaped by positive associations among perceived ease of use, perceived usefulness, and attitudes towards usage, students demonstrated considerable intrinsic motivation to utilize the new technology.

Likewise, Daneji et al. (2019) utilized the Expectation-Confirmation Model (ECM) to analyze the factors affecting higher education students' MOOC continuance intention. According to the investigators, the ECM presupposes that perceived usefulness and satisfaction are central influences of continuance intention; while perceived usefulness and confirmation impact satisfaction, and confirmation affects perceived usefulness. They unearthed positive relationships among confirmation and perceived usefulness of and satisfaction with MOOC, as well as significant effects with perceived usefulness and satisfaction on MOOC continuance intention, respectively. Satisfaction was deemed the greatest predictor of MOOC continuance intention.

By the same token while utilizing interactive game-based courses delivered in a blended learning setting, Huang (2021) studied the factors influencing students' learning satisfaction relative to perceived usefulness, perceived ease of use, and learning motivation. The author found that perceived usefulness was positively impacted by perceived ease of use, while both variables positively influenced learning motivation. Additionally, learning motivation positively impacted learning satisfaction, and perceived usefulness positively mediated the association between perceived ease of use and learning motivation.

In a study that centered on students' perceptions of BL in higher education, Keržič et al. (2019) sought to determine the factors impacting students' perceived usefulness of an e-course while preparing for the final examination. The researchers further analyzed the impact factors—technology acceptance, face-to-face instruction, and e-teaching, across student subgroups

classified by the demographic attributes of gender, year of study, study program, and regular weekly spare-time obligations. They discovered that e-teaching and face-to-face instruction were the factors that directly influenced students' perceived usefulness of the e-course. More specifically, teacher engagement and performance, the learning activities, and students' attitudes to the teacher and subject matter positively influenced the students' e-course perceived usefulness. Technology acceptance was found to indirectly impact the e-course perceived usefulness. No differences were revealed across the student subgroups according to gender, year of study, and weekly spare-time obligations. Conversely, for the study program—university or professional, there was a greater impact of the face-to-face instruction on e-teaching effect for professional-program students. The authors concluded that this could indicate that university-program students are better at self-regulating than their professional-program colleagues.

Also, Cha and Kwon (2018) considered the relationship between the technology acceptance model (TAM) and e-learning, by exploring the key elements that lead students to utilize e-learning in their educational pursuits, and the extent to which these important factors predicted their overall adoption of e-learning devices. The factors identified were instructor characteristics, teaching materials, perceived connectedness, perceived ease of use, perceived mobility, and perceived usefulness. The researchers hypothesized that students' perceived usefulness of e-learning is positively associated with instructor characteristics, teaching materials and perceived ease of use in turn, whereas perceived ease of use is positively impacted by perceived mobility. They assumed that learners' intent to use e-learning is positively affected by their perceived usefulness and perceived connectedness. The findings showed positive associations between perceived usefulness and instructor characteristics and perceived ease of use; between perceived mobility and perceived ease of use; as well as between perceived

connectedness and intent to use e-learning. However, teaching materials did not positively influence learners' perceived usefulness of e-learning. Moreover, unlike other studies (Daneji et al., 2019; Fagan, 2019; Prasad et al., 2018) learners' perceived usefulness did not contribute to their intent to use e-learning.

From the instructor perspective Cai et al. (2019) examined the associations among five important influential factors—computer self-efficacy, perceived ease of use, perceived organizational support, perceived technological pedagogical content knowledge, and perceived usefulness; and instructors continued use of the flipped classroom teaching method. They posited that instructors continued use of the flipped classroom method will be positively affected by the level of computer self-efficacy, perceived technological pedagogical content knowledge, perceived usefulness, and perceived organizational support respectively, but not by the perceived ease of use. They advanced that the instructors perceived usefulness of the flipped classroom will be influenced by the level of perceived ease of use, and computer self-efficacy respectively; and that the level of computer self-efficacy and perceived organizational support will positively impact instructors perceived technological pedagogical content knowledge.

Cai et al. (2019) disclosed that instructors continued use of the flipped classroom method was clearly influenced by their perceived technological pedagogical content knowledge, and perceived organizational support only, and not by the instructors' computer self-efficacy, perceived usefulness, or perceived ease of use. In addition, the findings showed that perceived usefulness was positively affected by the perceived ease of use, and computer self-efficacy, whereas computer self-efficacy and perceived organizational support positively impacted instructors perceived technological pedagogical content knowledge.

Also, Al-Maroof et al. (2021) investigated continuous use intention of e-learning platforms from both teachers' and students' vantage points. From the teachers' perspective the factors influencing continuous use were technological pedagogical content knowledge, technology self-efficacy, perceived usefulness, perceived ease of use, and perceived organizational support, whereas technology self-efficacy, perceived usefulness, perceived ease of use and controlled motivation were the factors impacting students' continuous use of e-learning. The researchers defined controlled motivation as a cause of negative perception resulting from internal and external pressure brought to bear on students, which could lead to maladaptive outcomes that provoke related negative effects, perceptions of incompetence, and dissatisfaction.

The findings indicated that apart from perceived ease of use, all the factors identified significantly influenced both teachers' and students' continuous use intention of the e-learning system. These findings from the instructors' perspective are contrary to those of Cai et al., (2019) who revealed that perceived usefulness had no effect on instructors continued use of the flipped classroom method. Similarly, from the students' standpoint the results oppose those of Cha and Kwon (2018) who indicated that perceived usefulness did not contribute to students' intention to use e-learning. However, the results corroborate those of Daneji et al., (2019); Fagan, (2019); and Prasad et al., (2018), which also confirmed positive relationships between students' performance expectations or perceived usefulness and continued use intention.

Technological Environment: The Learning Management System (LMS)

Generally, the system functionality and content feature constructs of learning satisfaction in blended eLearning systems relate directly to the learning management systems (LMS) utilized in BL settings. Learning management systems are software applications intended to champion teaching and learning; and used for administering, recording, following, reporting, and delivering

e-learning courses in educational arenas (Alanazi et al., 2020; Sayfouri, 2016). Pituch and Lee (2006) identified three critical characteristics for the development of good e-learning systems—system functionality, interactivity, and response time. System functionality centers on the perception that the e-learning system can provide flexible access to instructional and assessment media that permits students to access course content, submit assignments, and complete online quizzes and tests. Interactivity provides opportunities for exchanges among the students themselves, as well as interactions between instructors and students, and the exchanges that result from these associations. The response time relates to the learners' perception of the speed, consistency, and reasonableness of the response from the e-learning system (Pituch & Lee, 2006).

Modern day e-learning technologies like learning management systems have removed the "distance" from distance education (Bervell et al. 2020) by facilitating real time interactions among students and their classmates, and students and their instructors, while at the same time allowing students the flexibility of working at their own pace and in their own space. Therefore, the LMS plays a vital role in the blended and online learning experience. Sayfouri (2016) explored students' perceptions of the functions of a LMS aimed at identifying the strengths and weaknesses of the system, to grow and augment the role of the LMS in blended learning. The results indicated that students were fairly satisfied with the LMS; but they reported that there were too many technical glitches and system failures with specific tools in the LMS.

Similarly, Altunoglu (2017) examined first time users' perceptions of an LMS with a view to distinguishing its effective and ineffective features, as well as users' suggestions for improvement relative to engagement with the system, to diminish potential student reluctance to utilize the new system. The researcher discovered that the LMS was very personalized and

oriented to meet students' diverging needs, inclusive of their time management skills, motivation, and learning styles; and it fostered a sense of identity, learner empowerment, confidence, and belonging to a prominent institution. However, participants in the study reported problems relating to the quality and variation of subject matter; and made suggestions for improvement to the quality and quantity of resources like quizzes and e-courses.

Chaw and Tang (2018) explored students' experiences with LMS use with respect to information quality, service quality and system quality, and the extent to which the experiences result in their system use and user satisfaction, which eventually influences their learning effectiveness. The investigators found that system use was significantly associated with service quality and system quality rather than information quality, and that system use was significantly related to learning effectiveness. Of note user satisfaction was not supported in this study. The authors emphasized that the findings of the study heighten understanding of the necessity for exceptional course design, system design and system maintenance, to promote increased system use and ultimately learning effectiveness.

Delving a bit deeper to better understand students' acceptance and continued use of LMS and e-learning technology, Yuen et al. (2019) explored changes in LMS beliefs and students' use of LMS and the effects of the changes on students' levels of satisfaction with the LMS. The results suggested that there were higher satisfaction levels with the system and learning aspects of the LMS among students with higher initial levels of beliefs; faster increases in LMS use resulted in higher satisfaction levels with the LMS; students with higher initial levels of belief demonstrated a higher initial level of LMS use; and faster increases in beliefs occasioned more frequent LMS use. Also, Prifti (2020) examined LMS factors impacting self-efficacy, and how it influenced student satisfaction with their education. He predicted that platform content, platform

accessibility, and critical thinking respectively, would have a positive impact on students perceived self-efficacy; and that the LMS perceived self-efficacy would positively impact course satisfaction. The research findings confirmed his predictions indicating that self-efficacy was positively influenced by platform content, platform accessibility and critical thinking; and that self-efficacy significantly affects course satisfaction.

In contrast, Virtanen et al. (2017) assessed students' satisfaction with a 360^0-technology based learning setting viz à viz a traditional web-based online setting. They wanted to determine the student satisfaction levels in each setting; differences if they existed between students' satisfaction with each setting; and students' perceptions of the 360^0-technology based learning setting. Significant differences between the groups were reported in terms of instruction and feedback, however, students expressed high levels of satisfaction with both learning settings, relative to pedagogy, technology, and content.

On a different note, Alanazi et al. (2020) investigated how students appraised different characteristics of their online experience in fully online graduate level classes and the degree to which their perceived learning could be attributed to those characteristics. More specifically, the researchers applied Task-Technology Fit theory to explore whether students' perceived performance is sufficiently explained by relationship between users, content quality, ease of use, satisfaction with the LMS, and task value. The findings indicated that students' perceived performance is significantly influenced by the task value—the strongest predictor, followed by content quality. Weaker associations with performance were revealed for relationship between users ease of use, and satisfaction with the LMS.

Furthermore, Cheng (2019) coalesced the expectancy-confirmation model and the task-technology fit model to explore the utility of task-technology fit in students' cloud-based e-

learning continuance, and to gauge whether task-technology fit influences students' perceptions of how the cloud-based e-learning system impacts their learning. He theorized that students' confirmation of expectations to the cloud-based e-learning system affects their perceived usefulness, causing their continued system usage intention; students' confirmation and perceived usefulness of the cloud-based e-learning system are precursors to their satisfaction which consequently guide their continued use of the system; task-technology fit will be positively impacted by task characteristics and technology characteristics; task-technology fit positively influences perceived usefulness, confirmation, satisfaction, and continuance intention of the cloud-based e-learning system; and perceived learning impact will be positively affected by continuance intention of and task-technology fit in the cloud-based e-learning system. The postulations were confirmed by the research results which indicated that students' task-technology fit was influenced by both task characteristics and technology characteristics, that significantly shaped their perceived usefulness, confirmation, and satisfaction with the cloud-based e-learning system, leading either directly or indirectly to their intention to continue use of the system and perceived learning impact.

Similarly, Servidio and Cronin (2018) examined undergraduates' acceptance of PerLE, an open-source e-learning Moodle-based platform. They utilized the TAM (Davis et al., 1989) framework to investigate the acceptance factors for PerLE for students in blended learning courses; examine the profiles of individuals in the blended delivery modality; and evaluate how technical support, user interface, and course materials impact user response to PerLE. The researchers discovered that the online course lesson is the most important element directly affecting PerLE Usefulness, which in turn connects online course lesson to PerLE System Usage. The PerLE User Interface significantly impacted PerLE Ease of Use; however, technical support

had no direct bearing on PerLE Ease of Use and PerLE Usefulness. PerLE Ease of Use directly influenced PerLE System Usage.

The content feature of the LMS and instructional content design are critical to successful blended learning pedagogy (Prasetya et al., 2020). Therefore, the researchers proposed and implemented a rich and interactive content model for apposite instructional design in BL, comprising the utilization of EPUB3 documents for content delivery. The model supported a variety of digital content including animation, images, interactive content, sound, text, and video, and was accessible from desktop, laptop, and mobile devices. Subsequently, the researchers sought to evaluate the learning media and content, as well as to examine the user experience with the software. They discovered that the EPUB3 media has the capacity to present feature rich documents and is appropriate for blended learning content delivery. Students conveyed that EPUB3 is fit for use in various learning environments, since it offers rich content and facilitates new learning experiences. The researchers postulated that the instructional design challenges of blended learning could be addressed with EPUB3 rich content.

To improve students' content knowledge and skills, and ultimately their academic performance, Boda and Weiser (2018) combined blended learning pedagogy and the active learning strategy Process-Oriented Guided Inquiry Learning (POGIL) to plan, execute, and examine an innovative remedial undergraduate chemistry course. The course saw fundamental changes to the traditional structure with respect to the curriculum, pedagogy, and assessment, to emphasize the inquiry-based approach that centered on data analysis, learning cycle, argumentation, and inquiries, quizzes, and exams, coupled with the flexibility of the blended learning setting. The authors investigated students' growth in basic chemistry concepts using POGIL in a blended learning setting, and the extent to which their conceptual growth prepared

them to matriculate into the introductory chemistry course. Subsequently, they also compared students who took the remedial course and matriculated into the introductory course, with students who had met the matriculation requirements for the introductory course without the need for remediation. The students who took the remedial course showed substantial and positive improvements in their basic conceptual understanding in chemistry to a degree equivalent to their high-ability peers and were more likely to pass the introductory course than their high-ability counterparts. Yet, there was no statistically significant difference between the pass rates.

On the other hand, Kauppi et al. (2020) sought to develop knowledge and competence for inclusive education, multidisciplinary collaboration, and professional interaction by focusing on the pedagogical design of an e-course. The investigators endeavored to apply design principles to facilitate deep learning in BL settings. Utilizing two research cycles they wanted to determine the type of learning outcomes and experiences that were associated with the first roll-out of the course; the central issues for redesign based on the outcomes of the first roll-out when compared to the established design principles; and the type of learning outcomes and experiences that were related to the second roll-out of the course. In the first research cycle students worked independently, with few instructions and loose deadlines. The findings suggested that at the individual level students acquired the content knowledge, which was aptly supported by the pedagogical design. However, collaboration and interaction proved more challenging.

A comparison of the outcomes of the initial operationalization of the course with the theoretical design principles led to the additional instructions and guidelines particularly with respect to collaboration, co-authoring, negotiation, and reflection prior to the second roll-out of the course. The results of the second iteration of the e-course revealed fewer difficulties with multidisciplinary groupwork, and more positive experiences with collaboration and interaction,

indicative of the success of the pedagogical design in promoting multidisciplinary collaboration, and professional interaction. Nevertheless, the findings unearthed the paradox between the need for the human interaction in the face-to-face setting and the flexibility of the online environment.

Khalil et al. (2018) proposed a validating framework for blended learning design in the anatomical sciences in which they applied instructional design systems theory underpinned by behaviorism, cognitivism, and constructivism. The four-phased approach suggested that BL design should consist of 1) analysis and planning of BL activities, 2) designing and developing BL activities and instructional materials, 3) implementation of BL teaching, and 4) evaluation of the BL process with a view to making improvements for subsequent delivery of anatomical science BL instruction. On a different plane, however, Boelens et al. (2017) conducted a systematic literature review of twenty studies that addressed the design of blended learning settings. They unearthed four major challenges with BL design namely, integrating flexibility, enabling interaction, accommodating for students' learning processes, and nurturing an affective learning atmosphere.

The researchers indicated that flexibility is promoted through appropriate sequencing of the face-to-face and online activities, the relative amount of face-to-face and online instruction, and learner autonomy versus instructor control regarding the acquisition and completion of online activities. They suggested that interaction is accelerated by an introductory face-to-face meeting of students with instructor, together with additional support for synchronous and asynchronous collaboration in the online element of BL; while integrating peer- and self-assessments in the LMS empower learners to better assimilate the content, distribute and manage their workload and receive feedback about their learning. Such assessments also enable instructors to diagnose and attend to learner issues, as well as identify inherent design flaws in

the course design and delivery. The results also showed that affective learning is encouraged more so in the online component of BL environments than in the face-to-face element of BL settings. The researchers emphasized that affective learning strategies should be evident in both instructional components since learners are differently emotionally engaged in each BL element.

What is more, Kintu et al. (2017) researched blended learning effectiveness relative to intrinsic motivation, knowledge construction, performance and student satisfaction and their relationship with student attributes (self-regulation, attitudes, computer competence, age, gender, workload management, social support) and design features (technology quality, interactions, LMS tools and resources, face-to-face support) in a BL setting. More precisely they sought to determine the student attributes and BL design features for an effective BL environment, together with the learner attributes and BL design factors that predict intrinsic motivation, knowledge construction, learning outcomes and student satisfaction. The findings suggested that the learner characteristics self-regulation, attitudes, computer competence, age, workload management, and social support can possibly influence BL effectiveness. The results showed that high intrinsic motivation, knowledge construction and student satisfaction with the eLearning system impacts BL effectiveness but challenges with navigating the system and remaining on tasks were uncovered. Student-teacher interactions, technology quality and face-to-face support, were all found to affect BL effectiveness.

The researchers also revealed that learner satisfaction was predicted by the design features of technology quality, LMS tools and resources, and face-to-face support, as well as by the student attributes of self-regulation and attitudes. The design features of technology quality and interactions, and the self-regulation learner characteristic predicted knowledge construction in BL; while intrinsic motivation was predicted by self-regulation, technology quality, LMS tools

and resources, and interactions. Notably, none of the learner attributes (self-regulation, attitudes, computer competence, age, gender, workload management, social support) or design features (technology quality, interactions, LMS tools and resources, face-to-face support) significantly predicted learning performance in the BL environment.

Contextualizing its function holistically, Green and Chewning (2020) argued that the LMS holds great potential and leverage for promoting learner-centered, critical pedagogy and pedagogic praxis with technology, outside of its current use—static information transfer like student grades. They contended that design practices must be revamped to include an iterative approach that cohesively, and intentionally integrates curricular materials into the learning setting. Moreover, they emphasized the need for collaborative partnerships among practitioners already involved in complementary and transformative pedagogic praxes utilizing digital technologies like Learning Tools Interoperability (LTI) applications, and open access materials. The authors also underscored the need to enhance web content accessibility for all users; and that as educational systems become more dependent on digital technologies in teaching and learning, developing, and sustaining vigorous services and systems that endorse innovative, learner-centered pedagogical praxis is paramount.

Social Environment: Interaction

Interactivity operationalized by student-student, student-instructor and student-content interactions is a fundamental component of any good virtual learning system (Pituch & Lee, 2006); and is associated with student achievement, satisfaction and success, enjoyment, and Internet self-efficacy (Gleason, 2021; Musa Al-Momani & PILLI, 2021; Szeto & Cheng, 2016; Zhang & Lin, 2020).

Kuo and Belland (2016) researched online learners' perceptions of the linkages among the types of interaction, and learning outcomes, internet self-efficacy, student- and course-related variables, respectively; as well as the linkages between student satisfaction and student performance; and student characteristics and course related variables with the types of interactions, Internet self-efficacy and student satisfaction. The findings showed that in the absence of group activities, student-content and student-instructor interactions were major predictors of student satisfaction; and Internet self-efficacy was positively related to all three types of interactions. Positive associations were found for student satisfaction and student performance. Most background variables (gender, age, hours spent online) impacted student-instructor interaction, whereas student-student interaction was affected by course-related variables (course length, type, and number of discussion forums).

Student-student connectedness is positively associated with a range of valuable student learning outcomes and is shown to support learning despite inadequate instructional learning situations (MacLeod et al., 2019). Focusing exclusively on student-to-student interactions, Oyarzun et al. (2018) investigated effective or quality interaction approaches that would improve social presence, satisfaction, and achievement for students in fully online asynchronous courses. They found that high level collaborative interactions and high levels of instructor social presence, positively impacted learner achievement and satisfaction. In addition, Quong et al. (2018) applied the Transactional Distance Theory lens to determine how graduate and undergraduate students perceived a closed social media platform's effect on their learning process. The closed platform was found to contribute to improved student engagement, interaction, and social presence. It also contributed to the reduction in transactional distance in blended and online learning settings.

Considering the COVID-19 pandemic Kumar et al. (2021) explored the relationship between e-learning quality and student-content interaction to ascertain the effect of e-learning quality on students' satisfaction under the moderating effect of perceived harm because of COVID-19. They predicted that e-learning content would significantly affect student satisfaction and quality respectively; e-learning quality significantly impacts e-learning satisfaction; the perceived harm of contracting COVID-19 would significantly moderate the content and e-learning quality relationship; and that e-learning quality would significantly mediate the content student satisfaction relationship. Statistically significant relationships between e-learning content and e-learning quality; and e-learning quality and student satisfaction were unearthed. The moderating effect of perceived harm of contracting COVID-19 was not significant.

Zeroing in on learner interaction and data analytics in blended learning Kokoç and Altun (2021) designed a prescriptive learning dashboard (PLD) and explored the association between learning performance and the real use of the PLD. They sought to examine learner profiles in the PLD interaction data; and the extent to which learner interaction with the PLD predicts their academic performance scores. Cluster analysis revealed four groups of learners: learners in Cluster 1 actively used the PLD and showed higher academic performance scores than learners in the other clusters; Cluster 2 learners who utilized the PLD more often than Cluster 3 and Cluster 4 learners and whose academic performance score approximated to the class average; Cluster 3 learners who engaged with the PLD a maximum of two times weekly, and showed academic performance scores that did not meet the pass requirement for the course; and Cluster 4 learners who accessed the PLD less than once per week and who failed the course. The researchers found a positive association between the incidence of interaction with the PLD and academic performance, indicating that the more successful learners in the course used the PLD

more often. The results also revealed that interaction data effectively forecasted learners' academic performance.

With a view to enrich the student experience and improve graduate employability, Martín-García et al. (2020) analyzed student interactions to determine the effect of visual tools (mind mapping, concept mapping, webbing) on academic performance and student satisfaction in a collaborative learning community context of an employment-focused blended project. The authors found that collaboration and visual tools especially mind and concept mapping positively influenced learning in relation to both student academic achievement and student satisfaction. Analogously, with a focus on preparation for the workplace, Huang and Lin (2017) utilized the flipped classroom model supported by team-based learning to foster understanding of how student learning and engagement occurred in a human resources management course. Positive associations were discovered among participants' perceived team members' valuable contributions, enjoyment, learning outcomes, and motivation. The researchers reported that the flipped classroom team-based model nurtured students' teamwork, understanding of the course material, improved effort during class, and increased interactions and discussion outside of class.

In a similar vein Hewett et al. (2019) researched the effect of human interaction (learner-facilitator, learner-learner, and learner-colleague) on learners' behavioral, cognitive, and emotional engagement in a blended workplace learning (BWL) program. The investigators applied a qualitative case study design to consider the research question "How does interpersonal learner interaction facilitate behavioral, cognitive and emotional learner engagement in BWL?" (p.4). In the online element of the program engagement was accomplished though learner-content interaction only, whereas the face-to-face component occasioned engagement via learner-content, learner-facilitator, and learner-learner interactions.

Interpersonal interaction was found to impact behavioral, cognitive, and emotional engagement in the blended workplace learning program, with learner-content, learner-facilitator, and learner-learner interaction influencing both behavioral and cognitive engagement. In situations involving interactions among facilitators and other learners, participants reported behavioral engagement with an increased variety of active learning behaviors, as well as cognitive engagement that demonstrated more of the higher order thinking skills of Bloom's revised taxonomy. Also, the combined effect of learner-content and interpersonal interactions was positively associated with strong emotional engagement. The researchers surmised that the workplace environment was critical to boosting behavioral, cognitive, and emotional engagement.

On the other hand, Türel (2016) examined the relationship among social ability, which is essential for team collaboration, perceived team/collaborative experience essential for cooperation, and learning output or academic achievement for senior preservice teachers in a Turkish university. More specifically the researcher considered students' views about social interactions as they engaged with technology facilitated learning approaches. As such, the linkages among students' perceived team learning experiences, learning accomplishments, and social skills relative to their confidence and comfort sharing personal information, instructor social presence, peer social presence, social navigation, and written communication skills were explored. The findings indicated positive associations among perceived team learning and peer social presence, written communication skills, instructor social presence and general social ability at the individual level, while moderate associations were discovered for perceived team learning and peer social presence at the group level. Peer social presence was the most accurate predictor of perceived team learning for both individuals and groups.

Alternatively, in a longitudinal study that took a holistic perspective of blended learning contexts, Charbonneau-Gowdy and Chavez (2019) investigated learner engagement at the macro-, meso-, and micro-levels of a higher education institution in Chile. Based on identity and the socio-psychological perspective of learning contexts, they sought to disentangle the multifaceted social psychological characteristics that impact learners' willingness or reluctance to participate in interactions with peers, instructors, and with content in the online element of blended learning. The findings unearthed identities inclusive of meso-level leadership that demonstrates unilateral top-down policy decision making often clashing with quality and innovative teaching and learning principles; macro-level academic leadership that is inadequately prepared for their important role; ostracized teaching faculty without appropriate training in BL, powerless to enhance their good pedagogical practices; and micro-level disempowered and unmotivated students who do not engage the learning process.

The researchers argued that the institutional leaders overlooked the importance of collaborating on decisions about content materials, technologies, and course design; the critical need to facilitate academic leaders and faculty through professional development activities, support, and security of employment; and the disadvantages of forcing an insensitive, highly structured and of dubious usefulness quality assurance and testing environment. They proposed an identity-based model that sees stakeholders at all levels acquiring a profound understanding of how each strategic decision and action relative to the design and delivery of BL programs impact other stakeholder identities, particularly learner identities.

In concert with Charbonneau-Gowdy and Chavez (2019), Serrano et al. (2020) proposed a five-point action plan for the systematic, dynamic design of blended learning. Namely, consultations with staff and students preceding the development of a blended teaching method;

deciphering the most appropriate and feasible blended methodologies and developing a blended learning platform; providing human and financial resources, as well as appointing a BL coordinator; clear policy with respect to copyright, contact hours and OER use; and adequate education and training in BL for staff and students.

Social Environment: Learning Climate

The learning climate relates to the social, emotional, and physical conditions that facilitate knowledge acquisition, traditionally associated with classrooms, tutoring, coaching, and on the job training (Sief et al., 2012). However, the establishment of blended and online learning modalities necessitates that this definition be extended to include e-learning and virtual learning spaces. The Rich Environments for Active Learning, REAL (Grabinger & Dunlap, 1995) are well suited for the blended and online learning settings. Founded on constructivist principles these instructional approaches foster learning within realistic, relevant and information-rich contexts; facilitate the development of student responsibility, initiative and decision-making; promote knowledge construction through student and teacher collaborations; employ generative learning activities to stimulate the development of higher order thinking skills and amalgamate new and prior knowledge; and utilize authentic tasks and performances in the assessment of student progress. On the other hand, Vermeulen et al., (2017) drawing on Van Woerkom (2003) described the learning climate as part of the organizational climate, distinguished by shared reflection, acceptance of diverse opinions, and learning from missteps and other associates and teammates as well as from good practices of other organizations.

Various aspects of learning climate have been explored in the blended and online learning literature. For example, Calderón et al. (2019) applied a mixed method design to investigate the association between a student-centered digital technology method and the

intrinsic motivation, learning climate, and academic achievement of preservice physical education teachers. Participants chose between experiencing the intervention (active group) or the traditional approach (non-active group). The results indicated that the learning climate for the intervention group was more positive than the group that did not experience the intervention. The intervention group's intrinsic motivation and perceived competence improved when they were afforded some choice in every learning activity; and the intervention group demonstrated higher academic achievement than the non-active group. Learning climate was found to predict intrinsic motivation, and together learning climate and intrinsic motivation predicted academic achievement.

In a study that merged blended and team-based learning (BTBL) design to strengthen a management course, Lin et al. (2020) utilized a social lens to investigate the significance of learners' knowledge and sharing behavior on teamwork and learning outcomes. They researched the effect of learners' personal pleasing learning experiences on team effectiveness and learning in a BL environment; hypothesizing that "perceived enjoyment is positively associated with knowledge sharing; perceived enjoyment is positively associated with team effectiveness" (p. 128); "knowledge sharing is positively associated with team effectiveness; knowledge sharing will mediate the relationship between perceived enjoyment and team effectiveness; perceived enjoyment is positively associated with perceived individual learning" (p. 129); "knowledge sharing is positively associated with perceived individual learning; knowledge sharing mediates the relationship between perceived enjoyment and perceived individual learning" (p. 130). The findings showed that all the hypotheses were supported. The authors deduced that since learners' perceived enjoyment seemed critical and valuable to personal learning and team effectiveness, it

is essential that instructors in BTBL settings create pleasant, engaging learning atmospheres that stimulate student learning and participation.

On the other hand, deliberating the online learning climate, Cole et al. (2021) examined linkages between student and course level characteristics to distinguish possible predictors of online student engagement. The researchers hypothesized that "higher student assessment of active learning practices online will significantly, positively, predict student engagement in online courses" (p.867); and that "higher student assessment of the online learning climate will significantly, positively, predict student engagement in online courses" (p. 868). They endeavored to ascertain student and course characteristics that forecast online student engagement; differences in student engagement across college years; and the relationship between students' sense of belonging and engagement in online courses. The results revealed that student engagement in a specific course was positively predicted by higher student perceptions of active learning practices online, and that student rather than instructor impact is associated with student engagement in a specific course. Predictors of student engagement in a specific course were identified as students' age, GPA, doubt about social belonging in college, facing a technology barrier, overall assessment of active learning components, and student influence on the online learning climate.

In addition, Chen (2014) applied Social Cognitive Theory and Uses and Gratification theory to formulate a conceptual model to examine the factors that contribute to college students' proactive stickiness or willingness to repeatedly use and extend the time spent in each stay in a web-based English learning (WBEL) environment. He addressed the research questions "What are the critical determinants of college students' proactive stickiness with WBEL? …. What are the affecting relationships among those critical affecting factors and college students' proactive

stickiness with a WBEL environment?" (p.160). The researcher unearthed that participants' perceptions of the learning climate positively influences their proactive stickiness and learning gratification with the WBEL system. Learning climate was found to be positively impacted by interaction, system characteristics and the digital material features of the WBEL system.

From the teacher perspective Vermeulen et al. (2017) utilized a longitudinal study to ascertain the extent to which school organizational variables inclusive of transformational leadership (vision, individual stimulation, intellectual stimulus), ICT-infrastructure, and organizational learning climate were linked to teachers' attitude, perceived norm, and perceived behavior control in relation to their intention to use digital learning materials in Dutch primary, secondary, and vocational schools. The researchers uncovered clear direct associations among the transformational leadership dimensions and learning climate. They also found that only learning climate together with attitude, perceived norm, and perceived behavior control directly influenced teachers' intention to use digital learning materials; and that the learning climate is affected by the quality of the ICT-infrastructure. Of the transformational leadership dimensions, only intellectual stimulation was positively correlated to learning climate, while learning climate had a small positive influence on attitude.

Additionally, Kolokowski et al. (2020) conducted a meta-analysis with a view to providing general e-learning delivery considerations to higher education institutions, as well as to propose a theory by focusing on the contextual relationship between e-learning and the learning climate in higher education institutions. Explicitly, the authors strived to ascertain how higher education institutions could implement e-learning that develops a positive learning climate in a swiftly changing environment. They proposed a framework built on the interplay of content, pedagogy, technology and learning environment differences operating in a continuous

cycle inside higher education institution. Tailored to the needs of the institution, the learning cycle commences with the instructor's provision of learner baseline content which is relevant to the institutions learning goals. Subsequently the material is delivered or supported by a technological application or tool, usually the LMS. The delivery of the material to the learner is framed within the pedagogical context, centered on the "content-practice-assessment" model (Nikolopoulos et al., 2012, cited in Kolokowski et al., 2020, p. 19).

This model provides instructional stability and facilitates success in a vibrant learning atmosphere. Finally, learner access is maximized as changes occur within the learning setting, on account of the inherent differences in delivery mode—blended, online, or face-to-face, level—undergraduate, graduate, doctoral, and by academic discipline. Such differences portend challenges, but at the same time are essential to developing e-learning delivery considerations. In a similar vein to Charbonneau-Gowdy (2019) and Serrano et al. (2020) the authors surmised that input from multiple stakeholders, is required to address challenges the that may arise. They maintained that a positive learning climate and greater learner success rates are realized with the integration of instructor freedom content creation, e-learning technology, and pedagogy, all working together to precipitate a rounded, stakeholder-centered approach to e-learning delivery.

Summary

"Human adaptation and change are rooted in social systems" (Bandura, 1999, p.24) chief among which is the educational system that is responsible for the transmission of societal values, norms, and mores, from generation to generation. The merger of social cognitive theory and transactional distance theory for application to satisfaction in blended learning environments redound to improved student outcomes including engagement, performance, self-efficacy, intrinsic motivation, and social presence (Warren et al., 2020; Zilka et al., 2019). Learner

satisfaction is fundamental to curriculum design, development, and maintenance (Um et al., 2021). Therefore, attention to the factors that contribute to learner satisfaction in blended and online learning environments is necessitated since they precipitate improved degree and facility quality, and university image; cost effectiveness relative to infrastructural investments (Weerasinghe & Fernando, 2018; Um et al., 2021; Xiao et al., 2020) as well as tremendous gains for learners, instructors, administrators, curriculum and instructional designers, policy planners, educational institutions and by extension the society at the local, regional, and international levels. The advancement of blended learning demonstrates the remarkable progress and transformation in education and training globally (Chen et al., 2011). As the evolution of blended learning continues, there must be synergistic associations among instructional and training models that facilitate student satisfaction of their individual learning needs, promote academic community, and ensure the highest quality benchmarks in rich and adaptable environments (Cuesta Medina, 2018).

CHAPTER THREE: METHODS

Overview

The purpose of this quantitative, predictive, correlational study is to examine the impact of student satisfaction with course, sex, age, and race/ethnicity on student outcomes measured by the end-of-course score among undergraduate students in a blended general education course in University A. Chapter Three begins by introducing the design of the study, including full definitions of all variables. The research question and null hypothesis follow. The participants and setting, instrumentation, procedures, and data analysis strategies are presented.

Design

This quantitative, predictive research was carried out utilizing a predictive correlational design. This design was selected because the study sought to ascertain the extent to which end-of-course scores (criterion variable) can be predicted by a linear combination of variables: satisfaction with course, sex, age, and race/ethnicity (predictor variables). A predictive correlational design utilizes a correlational statistical technique to explain and determine the extent of association or relationship among two or more variables, pinpointing variables that will positively predict an outcome or criterion (Creswell & Guetterman, 2019). Generally, prediction research designs are applied to inform of: a) the degree to which a criterion performance can be forecasted; b) data for formulating a theory about the causes of the criterion performance; and c) confirmation of the predictive validity of the test or tests that were associated with the criterion performance. The criterion variable must be clearly defined to eliminate ambiguities and possible misconceptions among participants and others involved in the research process, ensuring that the criterion variable means the same thing for all participants and eliminating any bias that may arise (Gall et al., 2007).

Several limitations of correlational studies have been identified. For instance, while a correlation statistic may indicate that one variable causes another variable, it cannot be used to establish cause-and-effect relationships (Fraenkel et al., 2019; Lenell & Boissoneau, 1996). Furthermore, while the correlation method may be useful in the exploration or prediction of associations among variables, a correlation between variables could suggest that one determines the other, or another variable causes the variables, or that the association results because of plain chance. Correlational designs can also occasion the erroneous shotgun approach in which large numbers of variables are measured and analyzed with no theoretical foundation or justification for their inclusion (Gall et al., 2007), albeit increasing the time, effort, and financial costs related to the research project. Additionally, the usefulness of a predictive correlational study could be limited by arbitrarily selecting and adding independent variables to regression analysis since it increases the number of possible models (Lenell & Boissoneau, 1996).

Another limitation of correlational research lies in the simplification of complex phenomena to their component parts and the consequential loss of meaning given that the components are not necessarily equal in importance, do not subsume the significant features, or are not the same for all learners (Gall et al., 2007). Lenell and Boissoneau (1996) advise that this limitation could be mitigated with the integration of the study conclusions of the component parts into a unified whole. The array of variables that may influence the complex phenomena outcome as well as the outcomes brought about by a multiplicity of variables are also limiting factors in the correlational method. Criterion contamination where knowledge of the predictor score affects the criterion score can be problematic in correlational studies. However, this may be circumvented if the supplier of the criterion scores is oblivious of the predictor scores (Lenell & Boissoneau, 1996).

For this study age measured in years, is defined as the interval of time between the day, month and year of birth and the day and year of occurrence of the event expressed in the largest completed unit of solar time such as years for adults and children and months, weeks, days, hours, or minutes of life, as appropriate, for infants under one year of age (Gregorian calendar) (OECD, 2021). An end-of-course grade is assigned by a teacher to a student at the culmination of a set period of coursework (Marzano, 2000 cited in Rickets, 2010). End-of-course grades appear on a student transcript. End-of-course numerical scores are used for this study. Race "implies inheritable biological and genotypic traits" (Pan et al., 1999, p. 730). Ethnicity refers to the social group a person belongs to, and either identifies with or is identified with by others, because of a mix of cultural and other factors including language, diet, religion, ancestry, and physical features traditionally associated with race (Bhopal, 2004). Race/Ethnicity used in this study are Asian or Asian Caribbean, Black or Afro-Caribbean, Indian or Indo-Caribbean, Mixed Race, White or Caucasian, and Another Race/Ethnicity.

Sex refers to a set of biological attributes in humans and animals. It is primarily associated with physical and physiological features including chromosomes, gene expression, hormone levels and function, and reproductive/sexual anatomy. Sex is usually categorized as female or male but there is variation in the biological attributes that comprise sex and how those attributes are expressed (Canadian Institutes of Health Research, 2019). Satisfaction has been defined as "the state felt by a person who has experienced a performance (or outcome) that has fulfilled his or her expectations. Satisfaction is thus a function of relative levels of expectation and perceived performance" (Horn, 2002, p. 4); while a course is the basic component of an academic program. This is sometimes referred to as a subject or a topic or a unit of study (Rogers & Smith, 2011). Amalgamating these two definitions for the purpose of this study, satisfaction

with course is defined as the state felt by a person who has experienced a performance (or outcome) that has fulfilled his or her expectations of the course. Satisfaction with course is thus a function of relative levels of expectation and perceived performance in the course (Horn, 2002; Rogers & Smith, 2011).

Research Question

RQ: How accurately can end-of-course scores be predicted from a linear combination of satisfaction with course, age, sex, and race/ethnicity for undergraduate students at University A?

Hypothesis

The null hypothesis for this study is:

$H_0$1: There will be no significant predictive relationship between the end-of-course scores and the linear combination of satisfaction with course, sex, age, and race/ethnicity for undergraduate students at University A.

Participants and Setting

Population

The population for this study comprised undergraduate students in University A. University A has an enrolment of about 7 000 students allocated to seven Faculties—Culture, Creative and Performing Arts; Humanities and Education; Law; Medical Sciences; Science and Technology; Social Sciences and Sport. Undergraduate students account for approximately 80% of the student population of University A.

Participants

For this study, the number of participants sampled was 330 students which, according to Gall et al. (2007, p. 145), exceeds the required minimum of 66 participants for a multiple linear regression when assuming a medium effect size with statistical power of .7 at the .05 alpha level.

The convenience sample included the students enrolled in a blended level one general education history course that is taken by undergraduates, excluding students in the Faculties of Humanities and Education, and Culture, Creative and Performing Arts. Participants took the course during semester 1, the fall semester of the 2022 – 2023 academic year.

The survey response rate was 42% (n = 139), but 55 responses were discarded because most of the survey data was missing. Table 1 shows that the participants comprised 22 males and 62 females ranging in age from 18 years to 30 years and over, with race/ethnicity: 1.2% Asian or Asian-Caribbean, 94.0% Black or Afro-Caribbean, 3.6% Mixed Race, and 1.2% Another Race/Ethnicity.

Table 1

Participants' Profile

Variables	Classification	Total	%
Sex	Male	22	26.2
	Female	62	73.8
Age	18 – 20	37	44.0
	21 – 23	25	29.8
	24 – 26	3	3.6
	27 – 29	3	3.6
	30 and over	17	19.0
Race or Ethnicity	Asian or Asian-Caribbean	1	1.2
	Black or Afro-Caribbean	79	94.0
	Mixed Race	3	3.6
	Another Race/Ethnicity	1	1.2

Setting

University A is a part of a multi-campus regional university comprising five campuses

that serves the English-speaking Caribbean. With a student population of approximately 50 000 students, the regional university offers more than 800 certificate, diploma, undergraduate and postgraduate programs. At this university, a blended course is defined as

> A course which has been designed to intentionally replace some of the face teaching and learning which takes place in a physical space with teaching and learning in the online environment. In order to qualify as a blended course, at least 1 credit hour (12 contact hours of face-to-face teaching or equivalent) must be replaced with teaching and learning in the online environment (University A, Quality Assurance Unit, 2020, p. 1).

The level one history course was selected for the study since it is the only blended general education course that is currently offered at University A. It fosters a general understanding of the Caribbean and the associations among the region's historical and contemporary Caribbean life and living; and employs 67% online delivery and 33% face-to-face teaching comprising synchronous and asynchronous methods including recorded two-hour lectures, video presentations, live discussions, and additional activities. For the face-to-face sessions, students selected one of twelve (12) tutorial groups distributed between two course instructors. These one-hour classes were held Monday to Thursday mainly between 3:00 p.m. and 7:00 p.m.

Instrumentation

The instrument used in this study is the Satisfaction with Blended eLearning Systems (BELS) questionnaire developed by Wu et al. (2010). It measures student satisfaction in blended learning environments and was developed out of a need to comprehend the determinants of student learning satisfaction in blended e-learning environments, as well as to examine how these factors impact student opinions of blended learning spaces and their associations (Wu et al., 2010). Therefore, the purpose of the instrument is to explore the main determinants influencing

student learning satisfaction in blended e-learning system environments and to analyze the connections among those covert variables. Grounded in social cognitive theory, the primary dimensions of student satisfaction with blended e-learning systems are distinguished and explicated as "learners' cognitive beliefs (self-efficacy and performance expectations), technological environment (system functionality and content feature), and social environment (interaction and learning climate)" (Wu et al., 2010, p. 157).

Several researchers (Abdelrady & Akram, 2022; Diep et al., 2017; Gámiz-Sánchez et al., 2019; Yuen et al., 2019; Zhai et al., 2017) have utilized and/or adapted the instrument for their studies. In a Specific Teacher Training course that was delivered in two different BL modes comprising 20% and 50% online components respectively, Diep et al. (2017) proposed a prediction model for student satisfaction with BL programs. They explored the interaction effect of instructors' expertise and the LMS on student satisfaction in the differing BL modes; and examined whether the distinct BL modes impacted students' perceptions of their achievement goals and satisfaction, and their evaluation of their instructors and LMS quality.

The researchers administered a 5-point Likert scale questionnaire that incorporated validated items from several studies inclusive of general self-efficacy (Chen et al., 2001), perceived task value (Pintrich et al., 1991), perceived achievement goals (Ginns et al., 2007), written communication confidence and information sharing comfort (Yang et al., 2006), instructor expertise and support (Jones & Chen, 2008; Lawless & Richardson, 2002; Lim & Morris, 2009; Ozkan &Koseler, 2009), the LMS quality, support service (Hassanzadeh et al., 2012; Ozkan &Koseler, 2009), and satisfaction (Wu et al., 2010). The findings of the study indicated that students' satisfaction is primarily influenced by perceived task value, instructor expertise, perceived achievement goals, LMS quality and instructor support. It was revealed that

when students engage in more online work, the LMS was found to significantly impact student satisfaction. However, instructor expertise did not significantly influence student satisfaction in the differing BL modes.

On the other hand, Gámiz-Sánchez et al. (2019) analyzed e-portfolio use in eight undergraduate courses taught by different professors to determine the effect that professors have on student satisfaction in online settings. They adapted instruments from the literature "(Abou-Naaj et al., 2012; Arteaga-Sánchez & Duarte-Hueros, 2010; Ritzhaupt et al., 2008; Wu et al., 2010)" (p. 653), to create a 32-item 5-point Likert-type questionnaire to solicit student opinions about e-portfolios based on pedagogical issues, professors' work, and usability. Professors' views were also elicited via structured interviews. The results indicated that the professors significantly influenced all aspects of student satisfaction—students' views of instructional action, pedagogical concerns and platform usability.

Moreover, in a longitudinal study that spanned an academic year, Yuen et al. (2019) investigated changes in LMS beliefs and students' use of the LMS together with an assessment of the effects of the changes on students' satisfaction with the LMS. The investigators constructed a 5-point Likert scale instrument in which they adopted and modified five items from Davis (1989) to gauge students' LMS beliefs, as well as eight items from Wang (2003) and Wu et al. (2010) to assess learning satisfaction and system satisfaction. The findings unearthed gradual positive linear growth in students' use of the LMS and their beliefs. At the individual level differences in the initial degree of beliefs, rate of change of beliefs and the initial degree of LMS use were noted. However, there were no individual differences with respect to the rate of change of LMS use. Changes to the use of the LMS and beliefs were observed to be directly and indirectly related to system satisfaction and learning satisfaction, respectively.

In a similar vein Zhai et al. (2017) employed the longitudinal survey method and applied the experiential learning lens to construct a theoretical model that predicts undergraduate satisfaction in a flipped classroom method (FCM) English as a Foreign Language course. The researchers adapted items from several validated instruments that measured Prior Learning Experience (Bourgonjon et al., 2010), Personalized Learning Climate in FCM (Paechter & Maier, 2010), Perceived Value (Fornell et al., 1996), Satisfaction with FCM (Chen et al., 2008; Wu et al., 2010), and Perceived Quality (Paechter & Maier, 2010; Sun et al., 2008; Tsai et al., 2012). The resulting 5-point Likert scale questionnaire comprised 26 items. The results of the study suggested that Personalized Learning Climate and Prior Learning Experience are positively associated with Student Satisfaction, while Personalized Learning Climate is positively linked to Perceived Quality. A significant positive association was discovered between Prior Learning Experience and Perceived Quality and Perceived Value respectively; and Perceived Value and Student Satisfaction were found to be positively related. The findings also demonstrated that Perceived Quality significantly influences Perceived Value. However, Student Satisfaction was not predicted by Perceived Quality, and no association between Personalized Learning Climate and Perceived Value was found.

Also, Abdelrady and Akram (2022) applied a quasi-experimental design using a slightly modified BELS questionnaire (the phrase blended eLearning system restated as eLearning system) to examine how the integration of the ClassPoint tool activities in a EFL course supported eLearning satisfaction of female undergraduate students in Saudi Arabia. They wanted to determine whether ClassPoint activities enriched the students' eLearning satisfaction, as well as what were the most influential elements of eLearning satisfaction for students in both learning modalities—ClassPoint and non-ClassPoint. The authors unveiled that the integration of

ClassPoint activities substantially boosted students' eLearning satisfaction in comparison to the non-ClassPoint traditional teaching, and that the ClassPoint students indicated higher levels of satisfaction because of the technological environment and the least satisfaction on cognitive features. In contrast, the non-ClassPoint group were most satisfied with the cognitive features and least satisfied with the social environment.

This 21-item Satisfaction with Blended eLearning Systems (BELS) questionnaire (Wu et al., 2010) includes a demographic data section and seven (7) constructs relating to perceptions of satisfaction in blended learning, namely—computer self-efficacy, system functionality, content feature, interaction, performance expectations, learning climate, and learning satisfaction. A 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) is used to measure all items. Responses are: 1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Disagree nor Agree, 5 = Somewhat Agree, 6 = Agree, and 7 = Strongly Agree. The possible scores on the questionnaire range from 21 to 147 points. The lowest score possible 21 indicates a very high level of dissatisfaction with the course while a score of 147 the highest possible score indicates a very high level of satisfaction with the course.

Confirmatory Factor Analysis was applied to determine the assessment of item loadings, reliability, convergent validity, and discriminant validity, and the results indicated loadings higher than the baseline value 0.707. In addition, reliability coefficients and average variance extracted (AVE) ranged from 0.821 to 0.957 and 0.605 to 0.849 in turn.

Table 2

Results of Confirmatory Analysis

Construct	Items	Composite reliability	AVE
Computer self-efficacy (CSE)	3	0.821	0.605
System functionality (SF)	3	0.905	0.761
Content feature (CF)	2	0.890	0.802
Interaction (I)	3	0.915	0.782
Performance expectations (PE)	3	0.940	0.838
Learning climate (LC)	3	0.926	0.807
Learning satisfaction (LS)	4	0.957	0.849

Taken from Wu et al. (2010).

Construct definitions (Wu et al., 2010)

Computer self-efficacy (CSE) – learner's assessment of his/her competence to finish a task using a computer.

Performance expectations (PE) – the extent to which a person thinks that utilizing BELS would improve his/her learning performance.

System functionality (SF) – the perceived capacity of a blended e-Learning system (BELS) to furnish open access to instructional and assessment media.

Content feature (CF) – the features and arrangement of information in BELS.

Interaction (I) – the collaborations among students themselves, the collaborations between faculty and students, and the interactions in learning.

Learning climate (LC) – a supportive atmosphere that makes learning comfortable and natural.

Learning satisfaction (LS) – the feelings and attitudes from aggregating all the benefits that a person receives from interaction with BELS (Wu et al., 2010).

The BELS questionnaire was administered online and was estimated to take 10 – 15

minutes. This method of data collection is now commonplace on account of its decreased cost, easiness of administration and timeliness (Rath et al., 2017). Furthermore, Kato et al. (2017) found comparable usability and validity for the print and online versions of a food frequency questionnaire (FFQ). However, they surmised that data analysis for the printed questionnaire would likely be more time consuming because of the need for staff review and follow-up relative to missing information and logical errors, in addition to converting responses to electronic data.

Procedures

Permission to conduct the study was sought from both Liberty University and University A's Institutional Review Boards (IRBs), to ensure that the study conformed to the universities' regulations, professional benchmarks of behavior and practice, and the Code of Federal Regulations for the Protection of Human Subjects (Gall et al., 2007) founded on the ethical principles of respect for persons, beneficence, and justice (Creswell & Guetterman, 2019). An informed consent form was created. The consent form included the title of the study, voluntary participation, the right to withdraw, purpose, procedures, the right to: ask questions, obtain results, anonymity; risks, benefits, and investigator information (Creswell & Guetterman, 2019). A description of the study inclusive of its purpose, data collection methods, the assurances for participants' protection and the consent form were submitted to the IRBs for their review.

Once the IRB approval was granted, permission for data collection was sought from the Campus Registrar of University A. Data were collected using the Satisfaction with BELS questionnaire (predictor variables data) and from participants' records (criterion variable data). The predictor variables data were gathered in advance of criterion variable data. Participants for the study were selected using the convenience sampling approach. Prior to the distribution of the questionnaire, participants were contacted via their course instructors, the researcher in person

and via a video on the Moodle LMS to introduce the researcher, the purpose of the study and to request their cooperation. A recruitment email with a link to the questionnaire was composed and disseminated. It also included an invitation to participate in the study, criteria for participation, the approximate time requirement and the informed consent form with the purpose and significance of the study, the importance of the participants, and guaranteed confidentiality (Gall et al., 2007). Participants consented in advance of taking part in the study. A second email with a link to the questionnaire was sent to non-respondents reminding them to complete the survey, and follow-up emails were sent weekly as necessary. According to Creswell and Guetterman (2019), "contacting participants multiple times, before and after the survey, tend to improve the response rate" (p. 400).

Data Security

At all stages of data collection, all information that could identify the participants was protected. Data was stored securely and only the researcher had access to records. Data was stored on a password protected computer and backed up on a password protected external drive. When not being utilized, the external drive was stored in a locked drawer. The data will be retained for a period of five years after the completion of this research study.

Data Analysis

Multiple linear regression is the statistical analysis technique that was utilized in this study because it verifies which of the influence variables (satisfaction with course, sex, age, race/ethnicity) can be merged to establish the best prediction of the criterion variable (end-of-course score), as well as the individual predictive ability of each predictor variable; it is appropriate for use with interval, ordinal or categorical data; and it calculates both the magnitude and statistical significance of relationships (Gall et al., 2007). In a regression with more than two

predictor variables it is possible to gauge the predictive worth of an individual predictor variable, while statistically controlling for the other variables that are not considered (Warner, 2013). Therefore, multiple linear regression is the appropriate statistic for this study because it explored how the end-of-course score (criterion variable) is predicted by the combined effect of satisfaction with course, sex, age, and race/ethnicity (predictor variables), together with determination of the extent to which each of the predictor variables independently forecasts the end-of-course score.

In addition, in concert with Gall et al. (2007) the criterion variable is continuous, while two predictor variables (sex and race/ethnicity) are nominal. The other predictor variables satisfaction with course, and age are continuous and ordinal, respectively. The criterion variable end-of-course score was obtained from the participants' records, while the predictor variables were gleaned from the BELS questionnaire. Student satisfaction with course was scored according to the directions for scoring the questionnaire mentioned above. Sex was labelled as 0 = female and 1 = male; while race/ethnicity was labelled 1 =Asian or Asian-Caribbean, 2 = Black or Afro-Caribbean, 3 = Mixed Race, and 4 = Another Race/Ethnicity. Labelling for age ranges (in years) was 1 = 18 – 20, 2 = 21 – 23, 3 = 24 – 26, 4 = 27 – 29, and 5 = 30 and over.

The variation in the criterion variable is explained by the variance of each predictor variable, as well as the combined effect of all the predictor variables, labelled R^2 (Kline, 2016 cited in Creswell & Guetterman, 2019). This information assisted in identifying the components if any, that can be changed and/or concerns to be addressed in the course to improve the student experience. Several multiple regression analyses are used by researchers—standard or simultaneous, hierarchical or sequential, and stepwise. Standard, or simultaneous multiple regression was used in the study. According to Warner (2013) this method sees all the predictor

variables entered into the analysis in a single step, and the coefficients calculated for one regression equation that comprises the complete set of predictor variables. The predictive contribution of each predictor variable is described by the effect size sr^2_{unique}, which is adjusted to partial out or control for any linear relationship of a specific predictor variable with all the other predictor variables. Therefore, the effect size sr^2_{unique} represents the variance that is not shared with any of the other predictor variables. On the other hand, in hierarchical regression the predictor variables are entered into the analysis in a specified order, with each predictor assessed on the basis of its contribution to the prediction of the criterion variable after previous variables are controlled for. Stepwise regression sees various approaches where the program selects the variables and their order for entering the analysis, based on statistical criteria (Pallant, 2010).

Initial data screening that checked for errors and inconsistencies in the data was carried out by calculating frequencies for the categorical variables sex, age and race/ethnicity, and calculating means, standard deviations, identifying maximum and minimum values for the continuous variables satisfaction with course and end-of-course score. A scatter plot was used to spot bivariate outliers between the continuous independent variable and the dependent variable. Identified extreme outliers were retained in the data set. Data analysis was performed with descriptive statistics on each of the variables; followed by assumption testing. According to Laerd Statistics (2015) there are eight assumptions for multiple linear regression—continuous dependent variables, at least two independent variables, independence of observations, linearity, homoscedasticity, there is no multicollinearity, there are no significant unusual points—outliers, high leverage points and highly influential points, and normality.

The criterion variable—end-of-course score was continuous, while there were four predictor variables—satisfaction with course, age, sex, and race/ethnicity. Independence of

observations specifies that adjacent observations and more precisely their errors are not correlated. This was assessed using the Durbin-Watson statistic. While the Durbin-Watson falls between 0 and 4, a value of approximately 2 indicates that no correlation exist between residuals (Laerd Statistics, 2015). On the other hand, linearity denotes that a straight-line association exists between the residuals (errors in prediction) and the predicted criterion variable scores. The scatter plot of studentized residuals against the standardized predicted values was used to determine linearity between the criterion variable and the predictor variables collectively, while the partial regression plot between the continuous predictor variable course satisfaction score and the criterion variable end-of-course score was used to confirm their linear relationship.

Homoscedasticity also referred to as homogeneity of variances or equal error variances (Laerd, 2015; Pallant, 2010; Warner, 2013) implies that the variance of the residuals about the predicted criterion variable scores is the same for all predicted scores. Homoscedasticity was assessed by visual inspection of the plot of studentized residuals against the unstandardized predicted values. Multicollinearity describes the relationship among the predictor variables and exist when the predictor variables are highly correlated with correlation coefficient $r = 0.9$ and above (Pallant, 2010). It is detrimental because it makes it difficult to characterize the individual contribution of the predictors and may cause larger standard errors for regression coefficients (Warner 2013). Tolerance Values and Variance Inflation Factor (VIF) values were inspected to establish the absence of multicollinearity.

The unusual points—outliers, high leverage points and highly influential points are observations in the data set that can negatively impact the regression equation that calculates the criterion variable based on the predictor variables (Laerd Statistics, 2015). These points were checked utilizing Casewise Diagnostics, Leverage values and Cook's Distance, respectively. The

final assumption of multiple linear regression, normality is a condition for inferential statistics required to determine statistical significance. It shows that the residuals are normally distributed. Normality was examined by means of a histogram with an overlaid normal curve, and the Normal P-P Plot of Regression Standardized Residual.

The null hypothesis was tested at the 95% confidence level with the alpha level set at $\alpha = .05$. The effect size for the overall regression model—the proportion of variance in the criterion variable (end-of-course grade) that is predictable from a combination of the predictor variables (satisfaction with course, sex, age, and race/ethnicity) was reported using multiple *R*, and multiple R^2. The effect sizes for the individual predictor variables were reported as the squared part correlation sr^2_{unique} which approximates the amount of variance that every predictor variable individually explains. This is the variance that is not split with any of the other predictor variables (Warner, 2013).

CHAPTER FOUR: FINDINGS

Overview

Chapter Four presents the results of the data analysis commencing with descriptive statistics followed by the outcomes of the multiple regression analysis that speak to the research question and the null hypothesis. The descriptive statistics consist of data including the mean and standard deviation of demographic groups on the criterion variable the end-of-course score, in addition to the predictor variables sex, age, race/ethnicity, and satisfaction with course, as well as a comprehensive analysis of course satisfaction data. Assumption tests results are described preceding the detailed statistics and evaluation of the null hypothesis.

Research Question

RQ: How accurately can end-of-course scores be predicted from a linear combination of satisfaction with course, age, sex, and race/ethnicity for undergraduate students at University A?

Null Hypothesis

$H_0 1$: There will be no significant predictive relationship between the end-of-course scores and the linear combination of satisfaction with course, sex, age, and race/ethnicity for undergraduate students at University A.

Descriptive Statistics

Analysis of the data from the survey and student records revealed that the mean for the criterion variable, the end-of-course score was 72.40% for the overall sample. The minimum and maximum scores possible ranged from 0% to 100%. The sample had minimum score 14% and maximum score 95%. On the other hand, the mean for the predictor variable satisfaction with course was found to be 104.35. While this variable had possible minimum and minimum scores of 21 and 147 respectively, the sample showed a minimum score of 21 and a maximum score of

145. Table 3 exhibits the overall means and standard deviations for the continuous criterion and predictor variables.

Table 3

Means and Standard Deviations of Variables Overall

Variable	*n*	*M*	*SD*
Course Satisfaction Score	84	104.35	21.57
End-of-Course Score (%)	84	72.40	15.58

Further analysis of the criterion variable end-of-course score (M = 72.40, SD = 15.58) by predictor variables sex, age, race/ethnicity, and satisfaction with course shown in Table 4 indicated that males (n = 22) with a mean score of 69.73% scored lower than the overall mean in comparison to their female counterparts (n = 62) who recorded a mean score of 73.35% that is higher than the overall mean. Moreover, students ages 18-20 (n = 37), 24-26 (n = 3), and 27-29 (n = 3) recorded higher mean scores than the overall mean (75.54%, 81.68%, 84.00% respectively) while their peers in age ranges of 21-23 (n = 25) and ages 30 and over (n = 16) scored below the overall mean with mean scores of 67.76% and 68.50% in turn. With respect to race/ethnicity, participants represented a homogeneous group, and only the lone participant in the-Another Race/Ethnicity category scored below the overall mean with a mean score of 68.5%. Students who received scores ranging from 21-41 and 63-83 on the satisfaction with course scale scored lower than the overall mean recording mean scores of 59.50% and 36.67% in that order.

Table 4

Means and Standard Deviations for Criterion Variable End-of-Course Score by the Predictor Variables

Variable	Category	*n*	*M*	*SD*
Sex	Male	22	69.73	13.83
	Female	62	73.35	16.16
End-of-Course Score (%)		84	72.40	15.58
Age (years)	18-20	37	75.54	12.85
	21-23	25	67.76	19.13
	24-26	3	81.67	4.04
	27-29	3	84.00	6.08
	30 and over	16	68.50	15.31
End-of-Course Score (%)		84	72.40	15.58
Race/Ethnicity	Asian/Asian Caribbean	1	87.00	
	Black/Afro Caribbean	79	71.99	15.90
	Mixed Race	3	80.00	1.73
	Another Race/Ethnicity	1	68.00	
End-of-Course Score (%)		84	72.40	15.58
Course Satisfaction Score	21-41	2	59.50	26.16
	42-62	2	79.00	2.83
	63-83	3	36.67	36.69
	84-104	34	74.94	10.84
	105-125	34	72.71	14.80
	126-146	9	75.00	11.90
End-of-Course Score (%)		84	72.40	15.58

Analysis of the mean course satisfaction score by age and by sex as shown in Figure 1 disclosed that younger female participants—ages 18-20 and 21-23 scored higher means than male participants in those age ranges. However, the male participants showed higher means on

course satisfaction than did their female colleagues in the 24-26, 27-29, and 30 and over age ranges.

Figure 1

Mean Course Satisfaction Score by Age by Sex

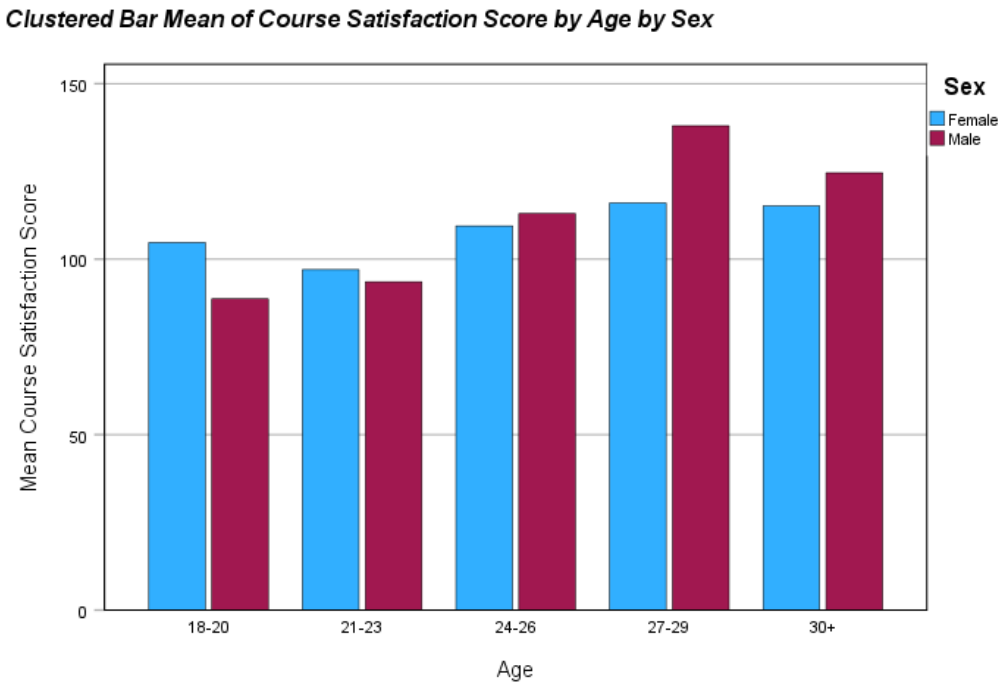


Table 5 shows the means, standard deviations, minimum and maximum scores for the dimensions of course satisfaction—cognitive beliefs (M = 29.60, SD = 7.16), technological environment (M = 28.07, SD = 6.03), and social environment (M = 26.93, SD = 7.30). The possible minimum and maximum scores for the cognitive beliefs and the social environment dimensions ranged from 6 points to 42 points, while those for the technological environment ranged from 5 points to 35 points. The reported sample scores for cognitive beliefs and technological environment were the same as the possible minimum and maximum scores, but in the case of the social environment dimension the maximum score recorded was 40 points, 2 points below the possible maximum score.

Table 5

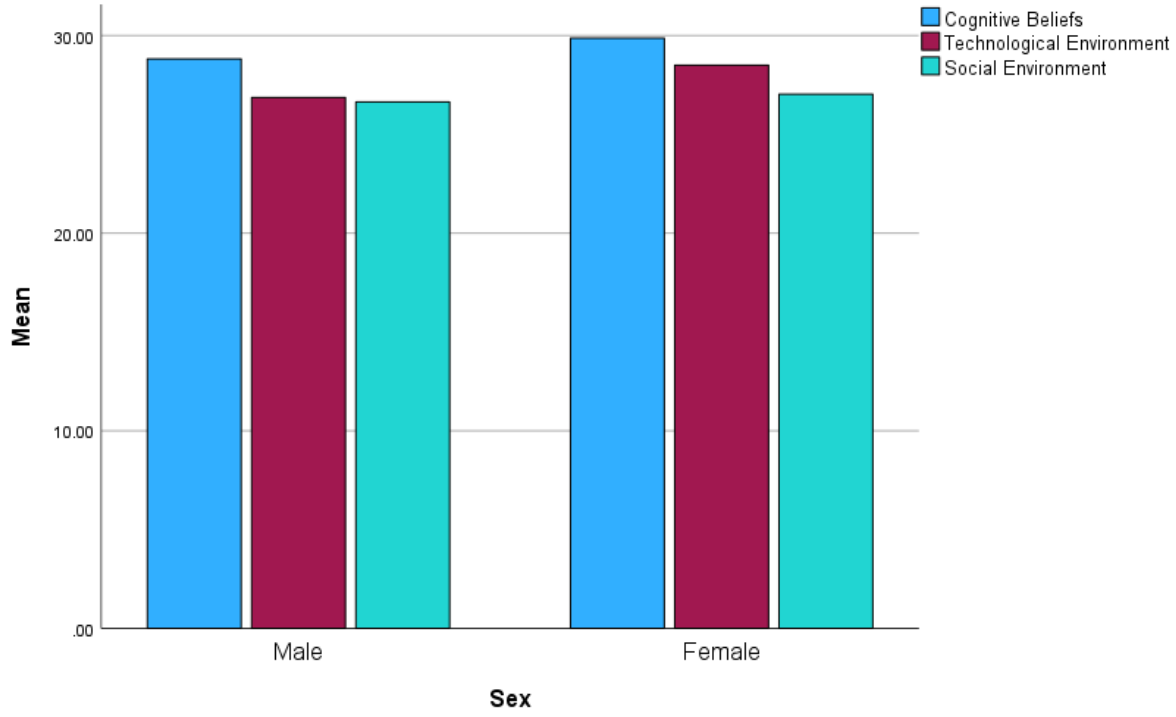
Means and Standard Deviations for Dimensions of Course Satisfaction

Dimension	*n*	*Minimum*	*Maximum*	*M*	*SD*
Cognitive Beliefs	84	6	42	29.60	7.16
Technological Environment	84	5	35	28.07	6.03
Social Environment	84	6	40	26.93	7.30

Figure 2 presents a comparison of the means of the course satisfaction dimensions by sex. It unveiled that female participants recorded higher means than did male participants on all three dimensions.

Figure 2

Means of Dimensions of Course Satisfaction by Sex

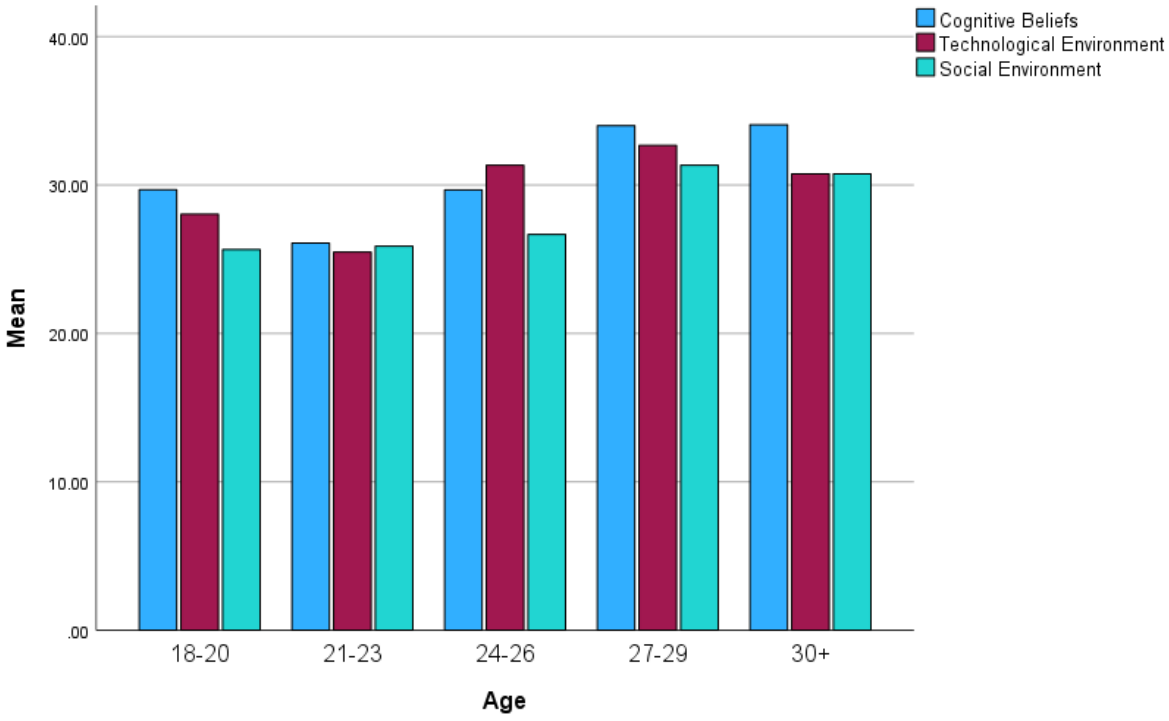


On the other hand, analysis by age shown in Figure 3 indicated that participants ages 27-29 years recorded higher means on all three course satisfaction dimensions than did their

classmates in the other age groups. Generally, there were lower means on the social environment dimension than the cognitive beliefs and technological dimension except for the 21-23 years age group where the mean for the social environment dimension was slightly higher than that for the technological environment dimension.

Figure 3

Means of Dimensions of Course Satisfaction by Age



As it relates to race/ethnicity presented in Figure 4, participants in the-Another Race/Ethnicity category showed the highest mean scores on all three course satisfaction dimensions, whereas Mixed Race participants recorded the lowest mean scores on all three dimensions.

Figure 4

Means of Dimensions of Course Satisfaction by Race/Ethnicity

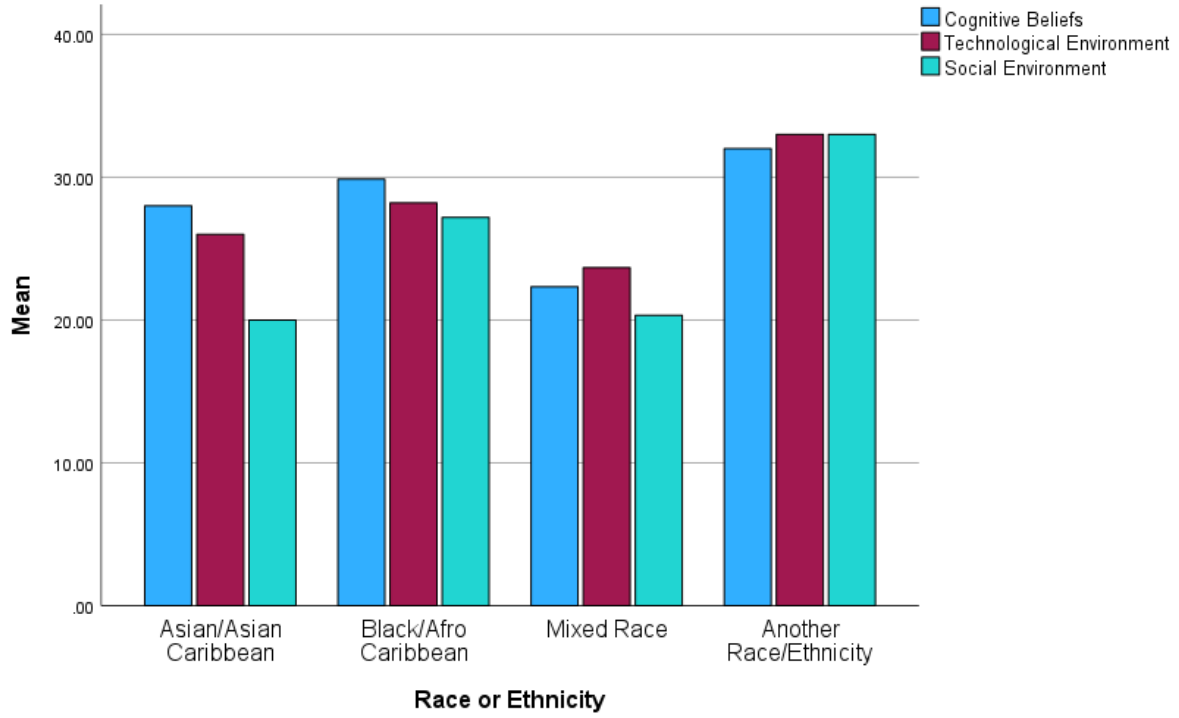


Table 6 shows the means, standard deviations, minimum and maximum scores for the individual course satisfaction constructs—computer self-efficacy (*M* = 14.95, *SD* = 3.93), performance expectations (*M* = 14.64, *SD* = 4.32), system functionality (*M* = 17.38, *SD* = 3.96), content feature (*M* = 10.69, *SD* = 2.43), interaction (*M* = 12.36, *SD* = 4.51), learning climate (*M* = 14.57, *SD* = 3.82) and learning satisfaction (*M* = 19.75, *SD* = 5.20). Notably, the maximum score recorded was the same as the possible maximum score for each construct excluding interaction, unveiling the basis for the result in social environment dimension where the maximum score obtained was lower than the possible maximum score.

Table 6

Means and Standard Deviations for Course Satisfaction Constructs

	n	*Minimum*	*Maximum*	*M*	*SD*
Computer Self-efficacy	84	3	21	14.95	3.93
Performance Expectations	84	3	21	14.64	4.23
System Functionality	84	3	21	17.38	3.96
Content Feature	84	2	14	10.69	2.43
Interaction	84	3	20	12.36	4.51
Learning Climate	84	3	21	14.57	3.82
Learning Satisfaction	84	4	28	19.75	5.20

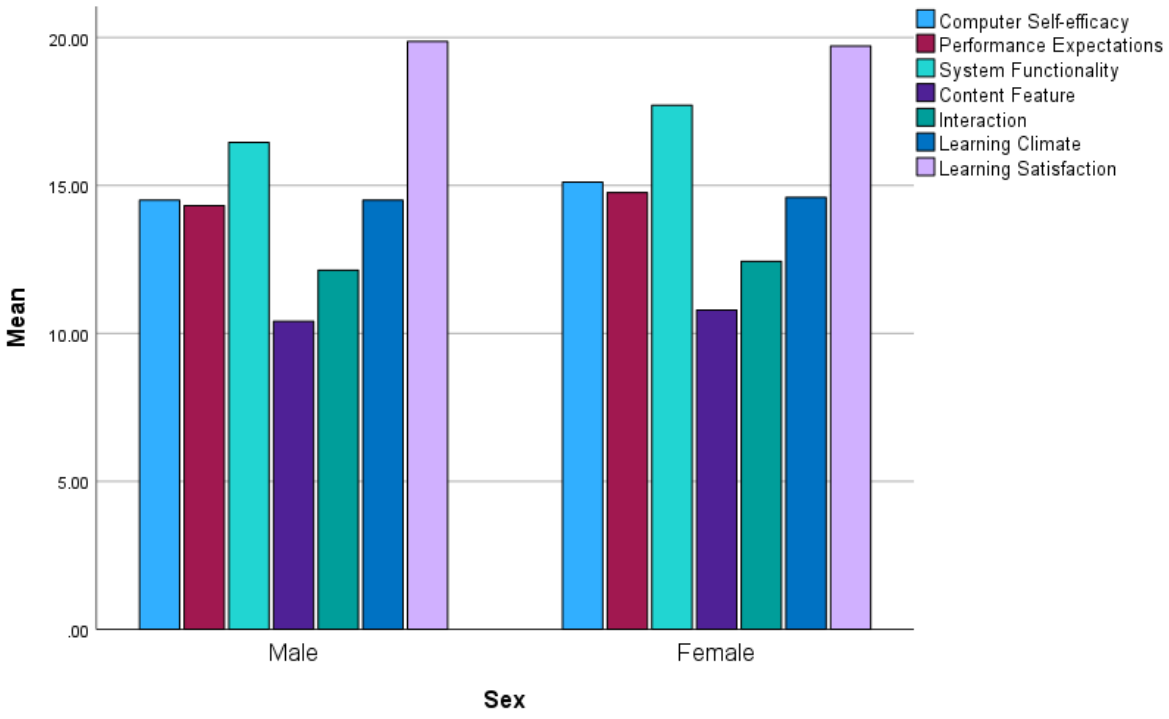
Analysis of the course satisfaction constructs within their respective dimensions revealed that for the cognitive beliefs dimension the mean for computer self-efficacy (M = 14.95) was slightly higher than that for performance expectations (M = 14.64), whereas for the technological environment dimension system functionality (M = 17.38) showed a considerably higher mean score than the content feature (M = 10.69). With respect to the social environment dimension, the mean for learning climate (M = 14.57) was higher than the mean for interaction (M = 12.36). What is more, across the seven constructs of course satisfaction, learning satisfaction (M = 19.75) showed the highest mean score for the sample, while the lowest mean scores were recorded for interaction (M = 12.36) and content feature (M = 10.69) respectively.

Examination of the means of the course satisfaction constructs by sex shown in Figure 5 indicated that male participants recorded higher means on learning satisfaction than did female participants, whereas female participants presented higher means than males on all other course satisfaction constructs—computer self-efficacy, performance expectations, system functionality, content feature, interaction, and learning climate. Nonetheless, the content feature construct had

the lowest mean scores by both male and female participants.

Figure 5

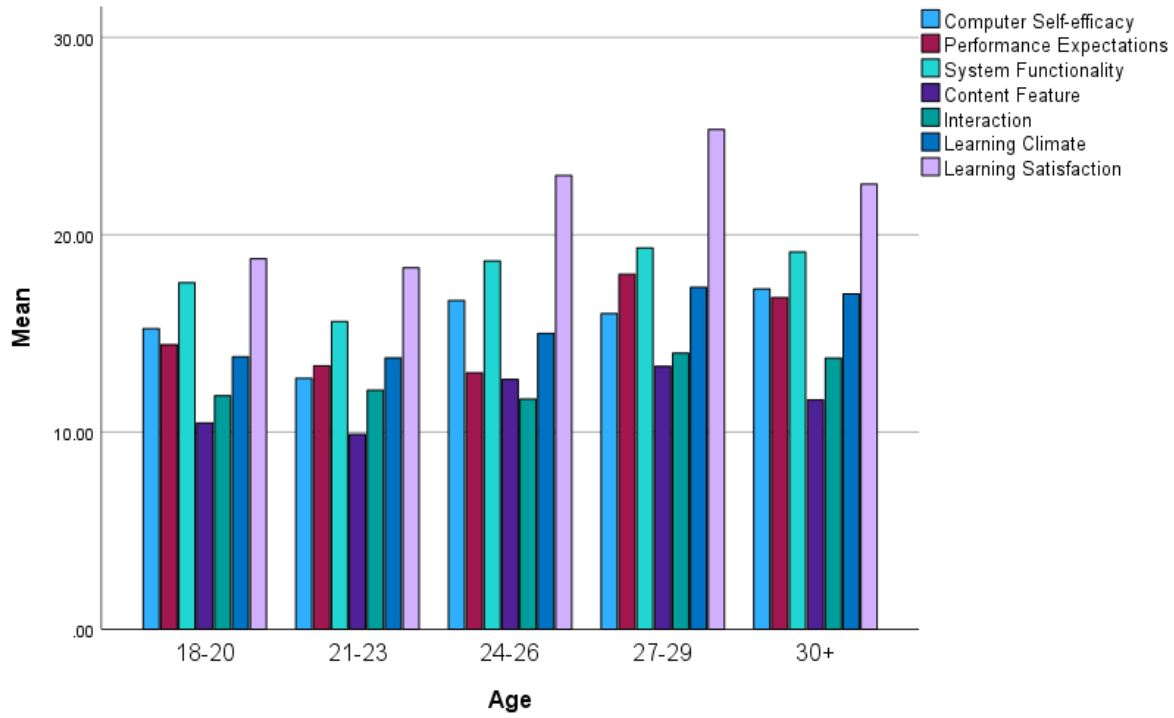
Means of Course Satisfaction Constructs by Sex



In a similar vein, exploration of the course satisfaction constructs by age presented in Figure 6 unearthed learning satisfaction with the highest mean scores across all age categories. Additionally, the lowest mean scores were recorded for the content feature for most age categories, with participants ages 24-26 recording lowest mean scores for interaction.

Figure 6

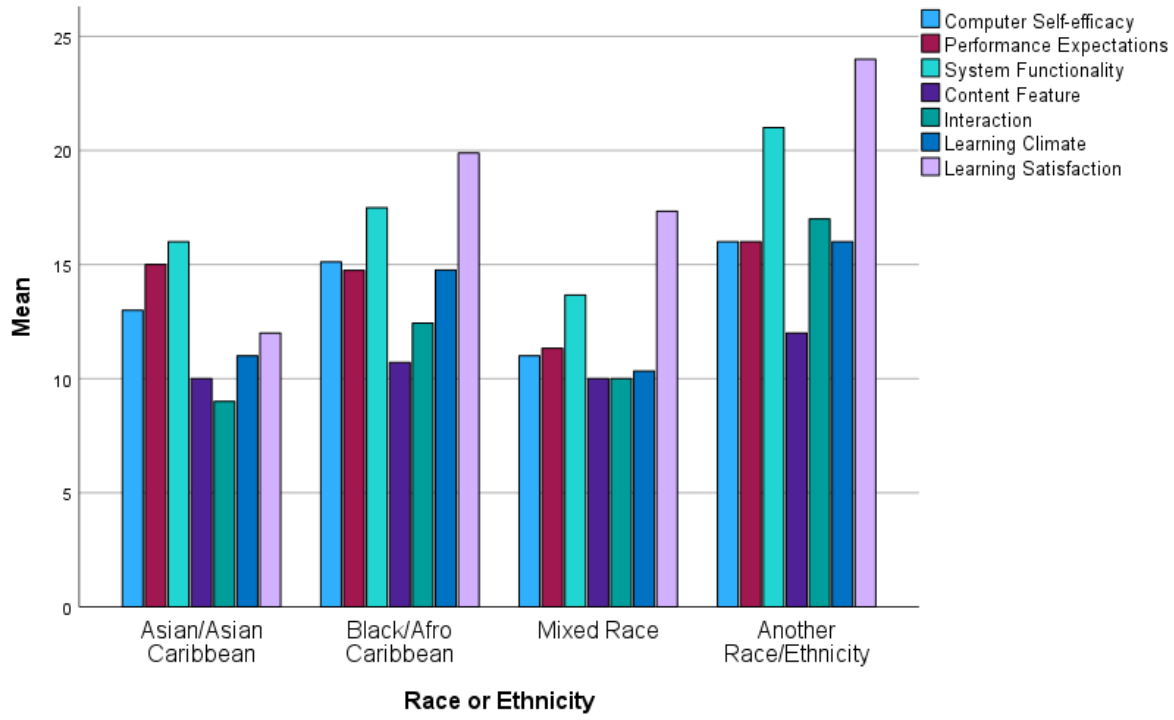
Means of Course Satisfaction Constructs by Age



Also, breakdown of the course satisfaction constructs by race/ethnicity displayed in Figure 7 revealed learning satisfaction as the construct with the highest mean for Black/Afro Caribbean, Mixed Race, and Another Race/Ethnicity participants. Conversely, for the Asian/Asian Caribbean participants system functionality showed the highest mean. For Asian/Asian Caribbean students interaction exhibited the lowest mean scores, while for Black/Afro Caribbean and Another Race/Ethnicity students the content feature showed the lowest mean scores. Mixed Race students reported lowest mean scores equally for content feature and interaction.

Figure 7

Means of Course Satisfaction Constructs by Race/Ethnicity



Results

Hypothesis

H_01: There will be no significant predictive relationship between the end-of-course scores and the linear combination of satisfaction with course, sex, age, and race/ethnicity for undergraduate students at University A.

Standard multiple linear regression was the statistical analytical technique selected to evaluate this null hypothesis.

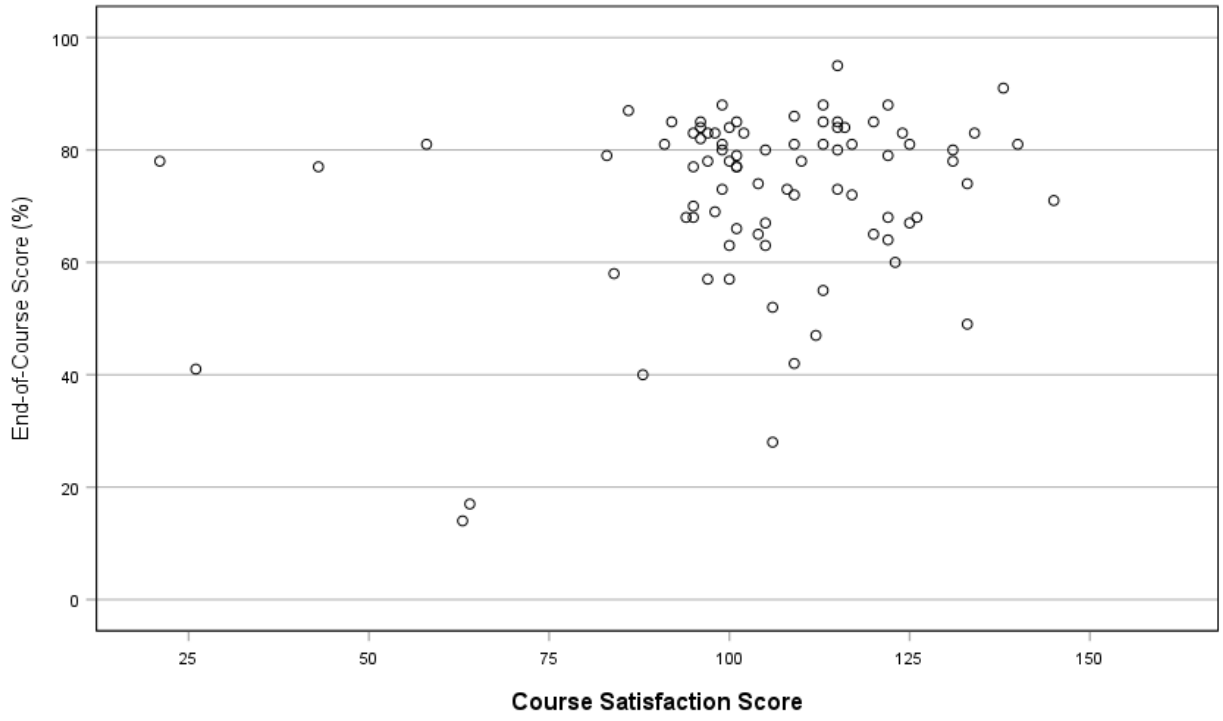
Data Screening

Initial data screening that checked for errors and inconsistencies in the data was carried out by calculating frequencies for the categorical variables sex, age and race/ethnicity, and by

calculating means, standard deviations, and identifying maximum and minimum values for the continuous variables satisfaction with course and end-of-course score. No data errors or inconsistencies were found. A scatter plot was used to spot bivariate outliers between the continuous predictor variable satisfaction with score, and the criterion variable. Since the identified outliers were legitimate responses they were not removed from the dataset. Figure 8 shows the scatter plot.

Figure 8

Scatter Plot of End-of-Course Score by Course Satisfaction Score



Assumption Tests

The assumptions for multiple linear regression are—continuous dependent variables, at least two independent variables, independence of observations, linearity, homoscedasticity, there is no multicollinearity, there are no significant unusual points—outliers, high leverage points and highly influential points, and normality. For this study, the assumption tests were tenable. The

dependent variable end-of-course score was continuous and there were four independent variables—sex, age, race or ethnicity and satisfaction with course. There was independence of residuals as assessed by a Durbin-Watson statistic of 2.02. Visual inspection of the scatter plot of studentized residual by unstandardized predicted value showed a somewhat linear relationship between the criterion variable and the predictor variables collectively, while partial regression plot of the criterion variable and the continuous predictor variable satisfaction with course also suggested linearity as indicated in Figures 9 and 10.

Figure 9

Scatter Plot of Studentized Residual by Unstandardized Predicted Value

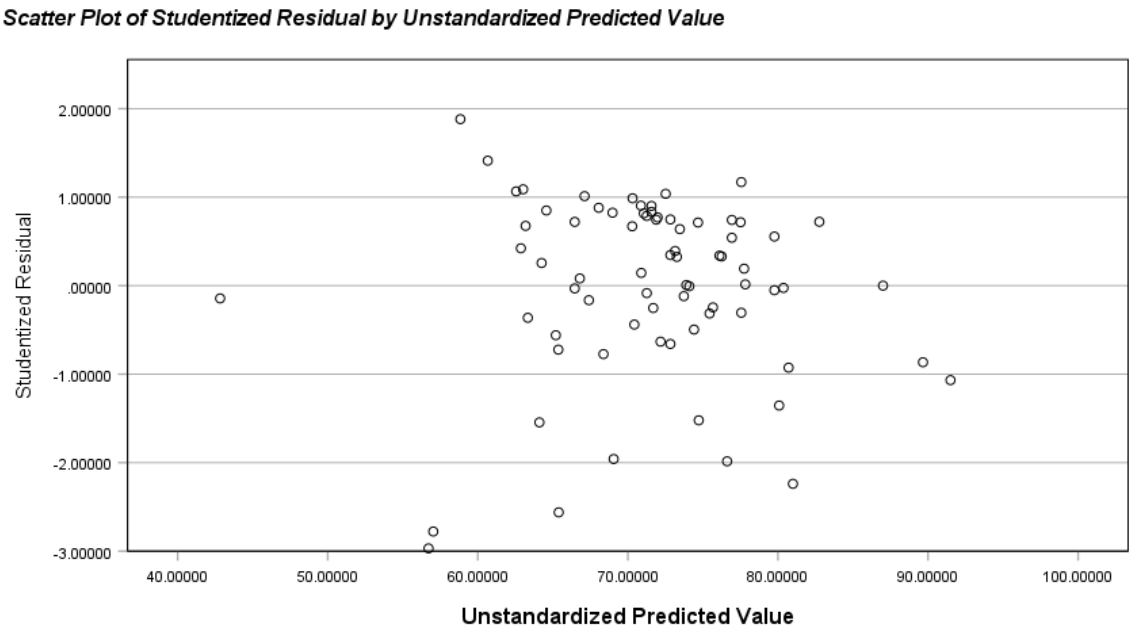


Figure 10

Partial Regression Plot of End-of-Course Score by Course Satisfaction Score

Visual inspection of a plot of studentized residuals against unstandardized predicted values indicated that there was homoscedasticity. Bivariate correlations among the predictor variables were checked and found to be within range with $r < 0.9$, as presented in Table 7.

Table 7

Bivariate Correlations of Predictor and Criterion Variables

Correlations

		End-of-Course Score (%)	Sex	Age	Race/ Ethnicity	Course Satisfaction Score
End-of-Course Score (%)	Pearson Correlation	--				
	N	84				
Sex	Pearson Correlation	-.10	--			
	Sig. (2-tailed)	.351				
	N	84	84			
Age	Pearson Correlation	-.11	.12	--		
	Sig. (2-tailed)	.342	.272			
	N	84	84	84		
Race/Ethnicity	Pearson Correlation	-.00	.26*	.21	--	
	Sig. (2-tailed)	.989	.016	.057		
	N	84	84	84	84	
Course Satisfaction Score	Pearson Correlation	.26*	-.06	.32**	-.02	--
	Sig. (2-tailed)	.016	.587	.003	.890	
	N	84	84	84	84	84

*. Correlation is significant at the 0.05 level (2-tailed).

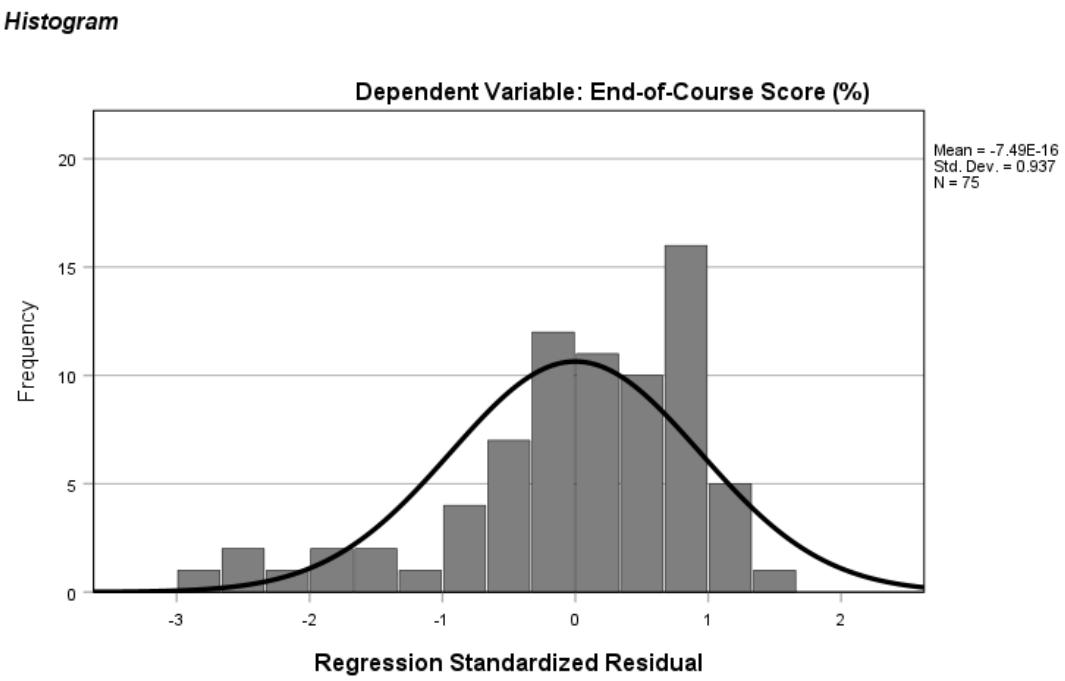
**. Correlation is significant at the 0.01 level (2-tailed).

In addition, the Tolerance Values for the predictor variables sex, age, race/ethnicity, and satisfaction with course ranged from .843 to .920, while their Variance Inflation Factors were all less than 10, with values from 1.087 to 1.187. Hence there was no multicollinearity among the predictor variables. Casewise Diagnostics identified two outliers that were found to represent legitimate responses; hence they were not removed from the data set. Similarly, three Leverage points with values .499, .298, and .201 identified as risky (Huber, 1981 cited in Laerd Statistics,

2015) were retained in the data set. No influential points were detected because there was no Cook's Distance greater than 1. With respect to normality the histogram displayed in Figure 11 indicates that the criterion variable end-of-course score was negatively skewed rather than normally distributed.

Figure 11

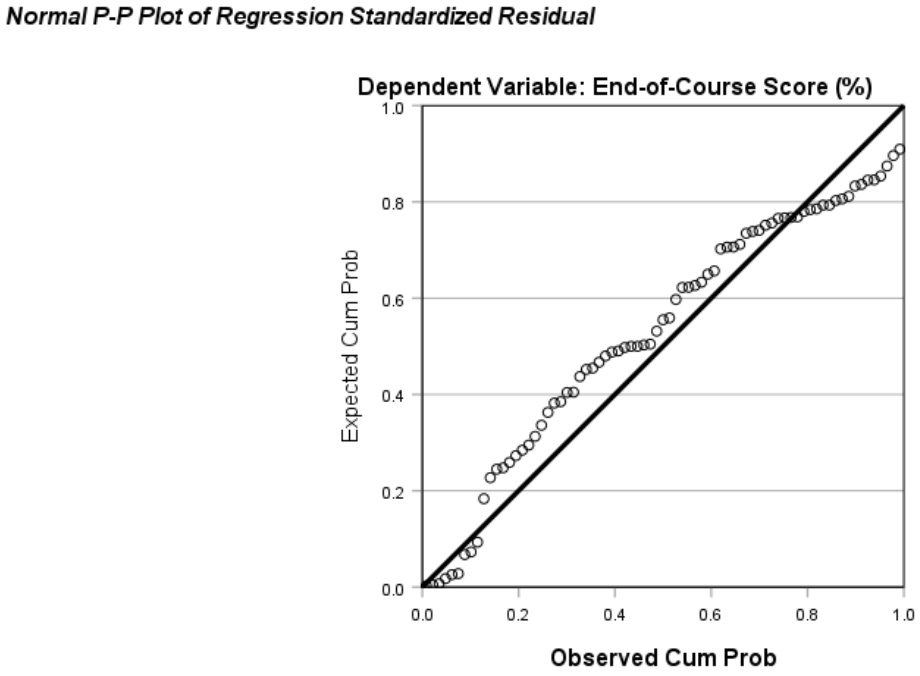
Histogram for End-of-Course Score



This non-normal distribution was corroborated by the P-P Plot shown in Figure 12. However, since multiple linear regression analysis is fairly robust to deviations from normality, there was no need for transformation or otherwise of the criterion variable (Laerd Statistics, 2015).

Figure 12

Normal P-P Plot of Regression Standardized Residual



Results for the Null Hypothesis

$H_0$1: There will be no significant predictive relationship between the end-of-course scores and the linear combination of satisfaction with course, sex, age, and race/ethnicity for undergraduate students at University A.

A standard multiple regression analysis was conducted to determine the relationship between the predictor variables sex, age, race/ethnicity, and satisfaction with course and the criterion variable end-of-course score at a 95% confidence level. The results revealed that there was a statistically significant predictive relationship between sex, age, race/ethnicity, and satisfaction with course and the end-of-course score for students taking a blended general education history course at University A, $F(9, 79) = 2.59$, $p = .043$. A weak linear association

was found between the predictor and criterion variables $R = .34$, while R^2 for the overall model was 12% (.12) with R^2_{adj} of 7% (.07) a medium to large effect size according to Cohen (1998). Hence the researcher rejected the null hypothesis. Satisfaction with course emerged as the only statistically significant predictor of the end-of-course score ($p = .005$). Regression coefficients and standard errors are presented in Table 8 below.

Table 8

Multiple Regression Analysis for End-of-Course Score

End-of-Course Score	*B*	95% CI for *B*		*SE B*	β	R^2	ΔR^2
		LL	*UL*				
Model						.12	.07*
Constant	46.28	18.20	74.37	14.11			
Sex	-2.64	-10.38	5.10	3.89	-.08		
Age	-2.21	-4.57	.14	1.18	-.22		
Race or Ethnicity	3.45	-7.85	14.76	5.68	.07		
Course Satisfaction Score	.24	.08	.40	.08	.33**		

Note. Model = "Enter" method in SPSS Statistics; *B* = unstandardized regression coefficient; CI = confidence interval; *LL* = lower limit; *UL* = upper limit; *SE B* = standard error of coefficient; β = standardized coefficient; R^2 = coefficient of determination; ΔR^2 = adjusted R^2.
*$p < .05$ two-tailed, **$p < .01$ two-tailed.

Table 9 presents indices to show the relative strength of the individual predictor variables along with their corresponding effect sizes. Of the four predictor variables, the partial correlation between course satisfaction and the end-of-course score emerged statistically significant with effect size $sr^2_{unique} = .10$ accounting for 10% of the variance uniquely explained in the end-of-course score—the variance that is not shared with any of the other predictor variables.

Table 9

Bivariate and Partial Correlations of the Predictors with the End-of-Course Score and Effect Sizes

Predictor variables	Correlation between each predictor variable and the end-of-course score	Correlation between each predictor variable and the end-of-course score controlling for all other predictor variables	Effect size for individual predictor variables (sr^2_{unique})
Sex	-.10	-.08	.01
Age	-.11	-.21	.04
Race or Ethnicity	-.00	.07	.00
Course Satisfaction Score	.26**	.31**	.10

**$p < .01$ two-tailed.

The regression equation for predicting participants' end-of-course score is y = 46.28 – 2.64 x (sex) – 2.21 x (age) + 3.45 x (race/ethnicity) + .24 x (course satisfaction score) where for sex, 0 = female, 1 = male.

CHAPTER FIVE: CONCLUSIONS

Overview

Chapter Five begins with a discussion of the findings of this study in relation to the literature. The research question and hypothesis, as well as the interpretation of the results for the data analysis of each variable are examined. The implications of this study for satisfaction in blended learning environments in general, and particularly in blended general education curricula are considered. Limitations of this study are discussed, and recommendations for further research on blended learning curricula and delivery are proposed.

Discussion

The purpose of this quantitative, predictive, correlational study was to determine the relationship between the linear combination of student satisfaction with course, sex, age, and race/ethnicity and the end-of-course score among undergraduate students in a blended general education course in University A. The descriptive statistics revealed that the lowest mean scores were realized for the content feature (M = 10.69) and interaction (M = 12.36) constructs of course satisfaction across most demographics. This could suggest that respondents "somewhat agreed" with the appropriateness and presentation of the content in the blended course. It could imply that this feature of the course may need to be improved, an evaluation and/or revision may be necessary. The content feature or the program structure is one of the fundamental elements of Moore's (1997) theory of transactional distance where the course design and the methods used to organize instruction are paramount, since they are instrumental in closing the communications gap through the utilization of diverse communications media for the delivery of instruction.

For the interaction construct, the mean (M = 12.36) could imply that participants generally "agreed" with the interactions among themselves, with participants and instructors and

the collaborative learning (Wu et al., 2010). Notwithstanding, the foregoing interaction is the only construct that did not record a maximum score from any respondent in the study. Interaction is another fundamental tenet of the theory of transactional distance described as dialogue founded on respect, active listening, and building on the contributions of others (Moore, 1997). Therefore, this finding could intimate that amendments ought to be made to the interaction aspect of the course as the means, though high, show room for improvement.

The learning satisfaction construct recorded the highest mean scores across all demographics in the study. Also noteworthy is that male respondents had higher means on this construct that did female respondents, despite the fact that higher means were reported for females than for males on all other satisfaction constructs—computer self-efficacy, performance expectations, system functionality, content feature, interaction and learning climate. This could imply that males and females may be differently impacted by satisfaction in the blended learning context. As such further investigation by way of the inferential statistics is merited. Learner and learning satisfaction in blended and online environments correlates to the delivery mode itself in comparison to the traditional teaching method (Kazanidis et al., 2019).

Inferential statistics

RQ: How accurately can end-of-course scores be predicted from a linear combination of satisfaction with course, age, sex, and race/ethnicity for undergraduate students at University A?

$H_0$1: There will be no significant predictive relationship between the end-of-course scores and the linear combination of satisfaction with course, sex, age, and race/ethnicity for undergraduate students at University A.

A standard multiple linear regression was used to evaluate the research question. A statistically significant predictive relationship was discovered between the linear combination of

satisfaction with course, age, sex and race/ethnicity and the end-of-course score. Therefore, the null hypothesis was rejected at the 95% confidence level. There was a weak linear association between the predictor variables and the criterion variable, notwithstanding a statistically significant and practically significant predictive relationship. This is a possible consequence of the low response rate. Of the four predictor variables satisfaction with course, age, sex, and race/ethnicity, satisfaction with course was distinguished as the only statistically significant predictor of the end-of-course score.

Age was not a significant predictor of the end-of-course score. This may be due to the fact that age as a variable was for the most part homogeneous. The participant profile by age indicates that the majority of respondents were between 18 and 23 years old (n = 62), with the next significant category being age 30 and over (n = 16). Similarly, sex was not a significant predictor of the end-of-course score. Since the course is a general education course, it is compulsory and must be taken by both male and female students. Unlike other subjects which were traditionally dominated by one sex or the other for example STEM subjects for males and the Arts for females (Plaister, 2021) there is nothing inherent in the course content, delivery or assessment that may predispose male or female students to higher scores in the course. The results of the study support those of Kintu and Zhu (2016) and Kintu et al. (2017) who indicated that neither age nor gender was a significant predictor of learner performance in the BL environment.

Additionally, race/ethnicity did not significantly predict the end-of-course score. The participant profile revealed a homogenous sample with 94% of the respondents being of Black/Afro-Caribbean origin. Perhaps had there been greater stratification of participants by race/ethnicity, there may have been a different result. This was underscored by Joosten et al.

(2021) who found that blended lower-level courses substantiated inclusive learning and success for students in marginalized racial and ethnic groups including Black, African American, Hispanic, Latinx, Latino or Latina, Native or Indigenous American, including American Indian, Alaskan Native, Native Hawaiian, or Pacific Islanders. However, the results of this study are contrary to the findings of Bancroft et al. (2020) who stated that on the basis of race/ethnicity and socio-economic status, traditionally underserved students taught utilizing the flipped classroom method registered greater and more significant improvements in their end-of-course grades than students taught by the traditional teaching model.

Generally, the linkage between student satisfaction and performance is not established in the literature (Chikazhe et al., 2022; Lane et al., 2021; Rajabalee & Santally, 2021). However, this study confirms that satisfaction with course significantly and positively predicts the end-of-course score. The components of course satisfaction—computer self-efficacy, performance expectations, system functionality, content feature, interaction, learning climate and learning satisfaction (Wu et al., 2010) are known to impact academic performance directly or indirectly (Alanazi et al., 2020; Chaw & Tang, 2018; Chen et al., 2016; Fagan, 2019; Lin et al., 2020; MacLeod et al., 2019; Zhang et al., 2016). With respect to computer self-efficacy, it stands to reason that persons who are comfortable with using the computer would report high scores on this construct of course satisfaction. The majority of respondents in this study were from the younger age demographic, born into the technological age with the proliferation of personal computers, tablets and other mobile devices. Therefore, they would have been more likely to demonstrate high levels of computer self-efficacy—a predictor of academic success (Puška et al., 2021).

On the other hand, although performance expectations is concerned with how the learner

deems that his or her learning performance would be improved by using the blended eLearning system, this study was conducted in the context of a general education course which students sometimes regard as irrelevant, unnecessary and needless (Head, 2014; Klauke, 2019; Rutledge & Lampley, 2017) since they do not count towards honors credit. This attitude to the course if present, could have impacted student engagement and performance in the course. Nonetheless performance expectations is associated with satisfaction and indirectly linked to performance (Daneji et al., 2019; Tanis, 2020).

Learning management systems have a pivotal role in blended learning settings. In this study the Moodle LMS was used to deliver course materials, connect students with their peers and with their instructors and for accessing and submitting assignments. Technical issues with the LMS could have portended displeasure and dissatisfaction for learners. Satisfaction with the LMS—system functionality and especially the content feature leads to more frequent engagement and by extension improved performance (Sayfouri, 2016; Virtanen et al., 2017; Yuen, 2019). In concert with this view, Chen et al. (2016) and Alanazi et al. (2020) discovered significant relationships among course design, content arrangement, and content quality and students' final grades and perceived performance. Moreover, instructional content design is essential to learner success and satisfaction in blended learning (Boda & Weiser, 2018; Boelens et al., 2017; Kauppi et al., 2020; Prasetya et al., 2020; Prifti, 2020). Contrastingly, Virtanen et al. (2017) found no differences in student satisfaction levels for students taught in 360^0-technology setting, compared with students taught in a traditional web-based online setting.

Social engagement operationalized by learner-learner and learner-instructor interactions is a hallmark of good and best practices in blended learning pedagogy. These interactions together with learner-content interaction impact student satisfaction and performance. In this

study such interactions were demonstrated in both the online and face-to-face elements of the blended course. High levels of collaborative interaction are associated with students' deep understanding of subject matter, behavioral, cognitive and emotional engagement, academic achievement and satisfaction (Asoodar et al., 2016; Hewett et al., 2019; Kokoç & Altun, 2021; Martín-Garcia, 2020; Oyarzun et al., 2018, Yang et al., 2018; Zainol et al., 2018). However, according to Kintu et al. (2017) interaction did not significantly predict learning performance in a blended learning setting; but the quality of interactions influences the learning climate, while learning climate predicts academic achievement and learning satisfaction (Calderón et al., 2019; Chen, 2014).

A panoramic view of blended learning research unveiled that predictors of learning satisfaction include diverse assessment methods and strategies, cognitive engagement, course flexibility, instructor technological competence, instructor presence and guidance, learner interactions, course content, learner attitudes, technology quality, and institutional support and services (Asoodar et al., 2016; Lakhal et al., 2020; Xiao et al., 2020). Nonetheless, when Chaw and Tang (2018) investigated user satisfaction viz-à-viz the information quality, service quality, and system quality of the LMS, they unearthed that user satisfaction was not established in their study.

Course satisfaction predicts performance in blended learning settings. The findings of this study support the results of Kuo and Belland (2016) who unearthed positive associations for student satisfaction and student performance; as well as the results of several studies situated within the ambit of the Corona Virus pandemic. For example, Dinh and Nguyen (2022) who found that students' academic achievement is directly, significantly, and positively influenced by their satisfaction in the online environment; and Butt et al. (2023) who reported an indirect

association between user satisfaction and achievement, since contentment with their learning environment would encourage students' engagement, completion of tasks, productivity and the resultant improvement in performance.

The results of the study further extend the findings of Muñoz-Carril et al. (2021) who revealed a significant positive relationship between students' satisfaction and the perceived impact on learning; and Rajabalee and Santally (2021) who realized an initial significant positive correlation between perceived satisfaction and performance. However, further analysis confirmed that the satisfaction was not indeed a predictor of student performance. On the other hand, the findings contradict those of Taliaferro and Harger (2022) who found that overall greater satisfaction did not result in better performance, when comparing students in BL and traditional settings. Unlike the current study, Wilczewski et al. (2022) uncovered that academic performance predicts student satisfaction.

Implications

The exigencies and experiences of the COVID-19 pandemic with its trials and triumphs have hastened the advancement of blended learning pedagogy, in the modern education landscape. Blended learning is more than the mere add on of technology to a traditional course, to teach challenging concepts or provide additional material. Rather, it involves the meticulous design, development, scheduling and implementation of instruction within strategically combined physical and virtual spaces (Cuesta Medina, 2018). This study aimed to examine how student satisfaction with the course together with sex, age, and race/ethnicity influence performance in a blended learning setting in the eastern Caribbean. Underpinned by social cognitive theory (Bandura, 1991, 1999) and the theory of transactional distance (Moore, 1997) it contributes to the limited research on blended learning and general education in higher education

in the Caribbean through the exploration of undergraduates' opinions of their satisfaction with a blended general education course.

The findings of the study established that course satisfaction significantly and positively influences performance in blended learning environments. Therefore, there are several implications for stakeholders in education and for educational processes. Since learner satisfaction in blended settings is occasioned by enhanced university image, facility and program quality, and cost effectiveness (Um et al., 2021; Weerssinghe & Fernando, 2018; Xiao et al., 2020), policy makers and administrators in conjunction with other relevant stakeholders, must formulate and/or revise as needed the policies that guide blended learning pedagogy, based on current evidence-based good and best practices in the field.

Furthermore, there must be adequate and appropriate infrastructural and support systems and resources for the end users of BL (faculty and students), from design to implementation, with built in mechanisms for monitoring, evaluation and revision as needed. This can be facilitated through development of learning objects, job aids and/or continuing professional development programs that may be incentivized. A general education course in digital citizenship and technology literacy should be considered for students. Moreover, at the policy level, the purpose of general education in the higher education curriculum must be clearly articulated to students to foster their appreciation for this essential part of their higher education experience.

At the course design and development levels, course developers, curriculum and instructional designers need to be effectively trained and resourced to enable them to guide faculty in BL good and best practices. Thus, they must be well versed in blended course design principles, the educational theories that undergird teaching and learning including but not limited

to social cognitive theory (Bandura, 1991, 1999), the theory of transactional distance (Moore, 1997), task-technology fit for example, and how to apply these theories to course design and development. Throughout the blended course processes, from design to delivery, the dimensions of blended learning satisfaction cognitive beliefs (computer self-efficacy, performance expectations), the technological environment (system functionality, content feature), and the social environment (interaction, learning climate) (Wu et al., 2010) must be carefully considered and supported through the proper curation of content, the activities selected, and the assessment mechanisms of the course.

At the point of delivery of the blended courses there is the need for instructors to demonstrate technological competence and social presence (Lakhal et al., 2020) as well as for teaching assistants to work with instructors to facilitate actual student engagement in the blended course. Instructors must be able to extend the good practices in the course design and development phases of BL through consideration of the course structure and the management of its pace, appropriate sequencing of activities, and by utilizing interactive strategies and tools like audience response systems, polls, games, student-student, student-instructor and student-content interactions, social media platforms, peer- and self-assessments and student choice of activities, topics, resources and assessments (Boelens et al., 2017; Casselman et al., 2020; Heilporn et al., 2021; Holbrey, 2020; Moore, 1997; Northey et al., 2018, Serrano et al., 2019). Scaffolding for students in BL courses is vital. These methods along with a systematic approach to the delivery of BL (Khalil et al., 2018) and the provision of timely feedback to learners would assist in mitigating the challenges associated with BL.

At the student level, in view of the social cognitive theory (Bandura, 1991, 1999) students can contribute to their level of satisfaction with BL by their own attitudes and behaviors.

To obtain maximum benefit and satisfaction in BL settings, students must themselves be engaged in the BL process as it points to the need to promote more self-regulated learning. This necessitates their attendance and participation in both the physical and online components of their courses, completing instructional activities, accessing the asynchronous course components frequently, as well as engaging in meaningful interactions with their instructors and classmates in relation to the course activities (Edwards et al., 2020; Georgakopoulos et al., 2020; Kuo & Belland, 2016; MacLeod et al., 2019).

Limitations

This study is limited because of its correlational design. Whereas the study revealed that course satisfaction predicted the end-of-course score, a cause-and-effect relationship between these variables cannot be confirmed. Rather the implication is that one variable determined the other, or another variable caused the variables, or that the connection between the variables stemmed from pure chance (Fraenkel et al., 2019; Lenell & Boissoneau, 1996).

Threats to validity also present limitations to the study. According to Onwuegbuzie (2000), threats to internal and external validity are commonplace in education research. One such threat in this study is the instrumentation because perfectly reliable and valid scores cannot be given by instruments (Onwuegbuzie, 2000). Furthermore, the instrument used in this study was developed for the Taiwanese environment and culture which is different from the Caribbean culture where the study was located. As such the questions may have different meanings to respondents than what was intended by the developers of the questionnaire. The questions could be modified to ensure respondents' understanding, followed by pilot testing and checking for reliability and validity.

Mortality is another threat to this study's internal validity. Several students who were selected to take part in the study failed to participate resulting in a low response rate. Therefore, the sample and responses are not likely to be representative of the population. This was despite the fact that the researcher used repeated invitations and/or reminders to take the survey. It can be argued that incentives for participation, like offering gift cards, could encourage participation but that could also introduce other threats to validity.

Researcher bias is yet another threat to the internal validity of the study since the researcher spoke to potential participants in person and via a YouTube video. However, the data collection process—from administering the survey, to collecting and anonymizing the data was managed by someone other than the researcher, minimizing this threat to internal validity. Multiple treatment interference was another threat to internal validity because the administration of the survey coincided with the University's usual end of course surveys. There may have been the carry over effect, even in terms of the response rate. The study survey was extended beyond the end of the semester and the time given for the University's end of course survey, maximizing the washout period (Onwuegbuzie, 2000).

Convenience sampling was employed in this study. Therefore, one cannot assert that the sample is representative of the target population and that the findings are generalizable. Thus, population validity is a threat to the external validity of this study. It is suggested that replication studies can minimize this threat of population validity. Also, ecological validity is another threat to external validity because of inherent differences in educational settings, and demographic variables it is difficult to generalize findings across locations, situations, variables, and circumstances (Onwuegbuzie, 2000).

Recommendations for Future Research

1. The study was conducted in a single tertiary level educational institution in the Caribbean region, and with a single blended general education course. Since general education courses are seen by many students as unnecessary, irrelevant and needless (Head, 2014; Klauke, 2019; Rutledge & Lampley, 2017), and since these courses do not count towards honors credit, this study may not have captured the true picture of satisfaction in a blended learning context. Therefore, future research could include a comparison study of satisfaction in blended learning in a general education course and a blended course that counts towards honors credits to see if there are differences in students' satisfaction levels.
2. Future research studies could investigate if there are differences in course satisfaction and student outcomes based on sex, and the causes of the differences if they exist.
3. In addition to examining blended learning in other educational institutions in the Caribbean region, future research studies could examine blended pedagogy across various disciplines, as well as across different types of blended learning delivery methods for example different quantities of online delivery.
4. The combination of delivery modalities, especially where students in remote locations attend classes with students in traditional classrooms in real time could be explored.
5. For future studies, the qualitative research approach could be incorporated into the research through focus group interviews with participants in order to really understand and appreciate how they actually experience blended learning pedagogy.

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APPENDICES

Appendix A

Request to Use Instrument

Dear Professor Tennyson

My name is Andrea Marshall. I am a doctoral candidate in the Ph.D. Education: Instructional Design and Technology program with Liberty University.

My study centers on student satisfaction and student outcomes in blended learning settings. Titled “An Investigation of The Impact of Student Satisfaction on Student Outcomes Among Undergraduate Students in Blended Learning Environments in University A”, it will examine the impact of student satisfaction on student outcomes measured by end of course numerical scores, among undergraduate students in a compulsory blended course. A quantitative predictive correlational design will be employed for this study with predictor variables satisfaction with course, sex, age, and ethnicity, and criterion variable end of course numerical score.

Therefore, I and requesting permission to use your Satisfaction with the Blended e-Learning System (BELS) questionnaire (Wu et al., 2010) for the data collection in the study. As such I am also requesting an electronic copy of the questionnaire. I thank you in advance for facilitating this request.

Regards,

Andrea Marshall

Appendix B

Liberty University IRB Approval

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

June 22, 2022

Andrea Marshall
Kevin Struble

Re: IRB Approval - IRB-FY21-22-899 AN INVESTIGATION OF THE IMPACT OF STUDENT SATISFACTION ON STUDENT OUTCOMES AMONG UNDERGRADUATE STUDENTS IN A BLENDED LEARNING ENVIRONMENT IN UNIVERSITY A

Dear Andrea Marshall, Kevin Struble,

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the following date: June 22, 2022. If you need to make changes to the methodology as it pertains to human subjects, you must submit a modification to the IRB. Modifications can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

Appendix C

University A IRB Approval

Removed.

Appendix D

Participant Recruitment Invitation

Dear [Recipient]:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a Ph.D. degree. The purpose of my research is to examine the impact of student satisfaction on student outcomes among undergraduate students in a blended compulsory foundation course, and I am writing to invite eligible participants to join my study.

Participants must be 18 years of age or older and be enrolled in *FOUN 1101 Caribbean Civilization*. Participants, if willing, will be asked to complete an online survey which will take approximately 15 to 20 minutes. Your participation will be completely anonymous to me. Participants will be asked to place their Student ID numbers on the survey. The Educational Technologist will be the only one who will receive the surveys, link participants' end of course scores with their survey responses, and then remove all identifiers that would link this data with the participants before the researcher receives this anonymized data.

To participate, please click here: https://www.surveymonkey.com/r/2022S1FOUN1101.

Please read the consent document, which contains additional information about my research. It is attached to this email. After you have read the consent form, please click the link to proceed to the survey. Doing so will indicate that you have read the consent information and would like to take part in the survey.

Sincerely,

Andrea M. Marshall
Doctoral Candidate
Liberty University
Tele: [redacted]

Appendix E

Consent Form

Removed