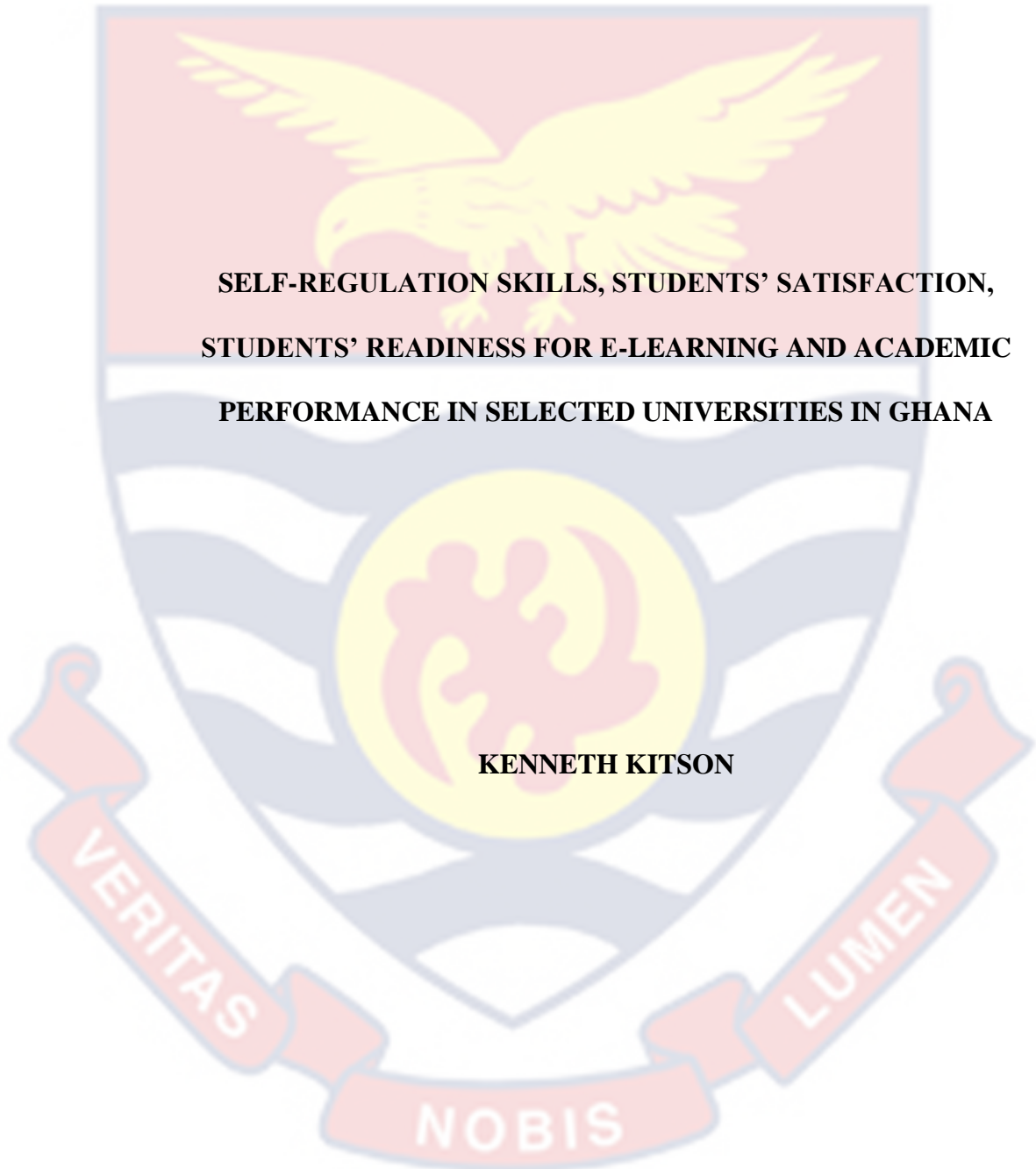


UNIVERSITY OF CAPE COAST



**SELF-REGULATION SKILLS, STUDENTS' SATISFACTION,
STUDENTS' READINESS FOR E-LEARNING AND ACADEMIC
PERFORMANCE IN SELECTED UNIVERSITIES IN GHANA**

KENNETH KITSON

2023

UNIVERSITY OF CAPE COAST



SELF-REGULATION SKILLS, STUDENTS' SATISFACTION, STUDENTS'
READINESS FOR E-LEARNING AND ACADEMIC PERFORMANCE IN
SELECTED UNIVERSITIES IN GHANA

BY

KENNETH KITSON

Dissertation submitted to the Department of Mathematics and Science Education
of the College of Distance Education, University of Cape Coast, in partial
fulfilment of the requirements for the award of Master of Education degree in
Information Technology.

AUGUST, 2023

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature: Date:

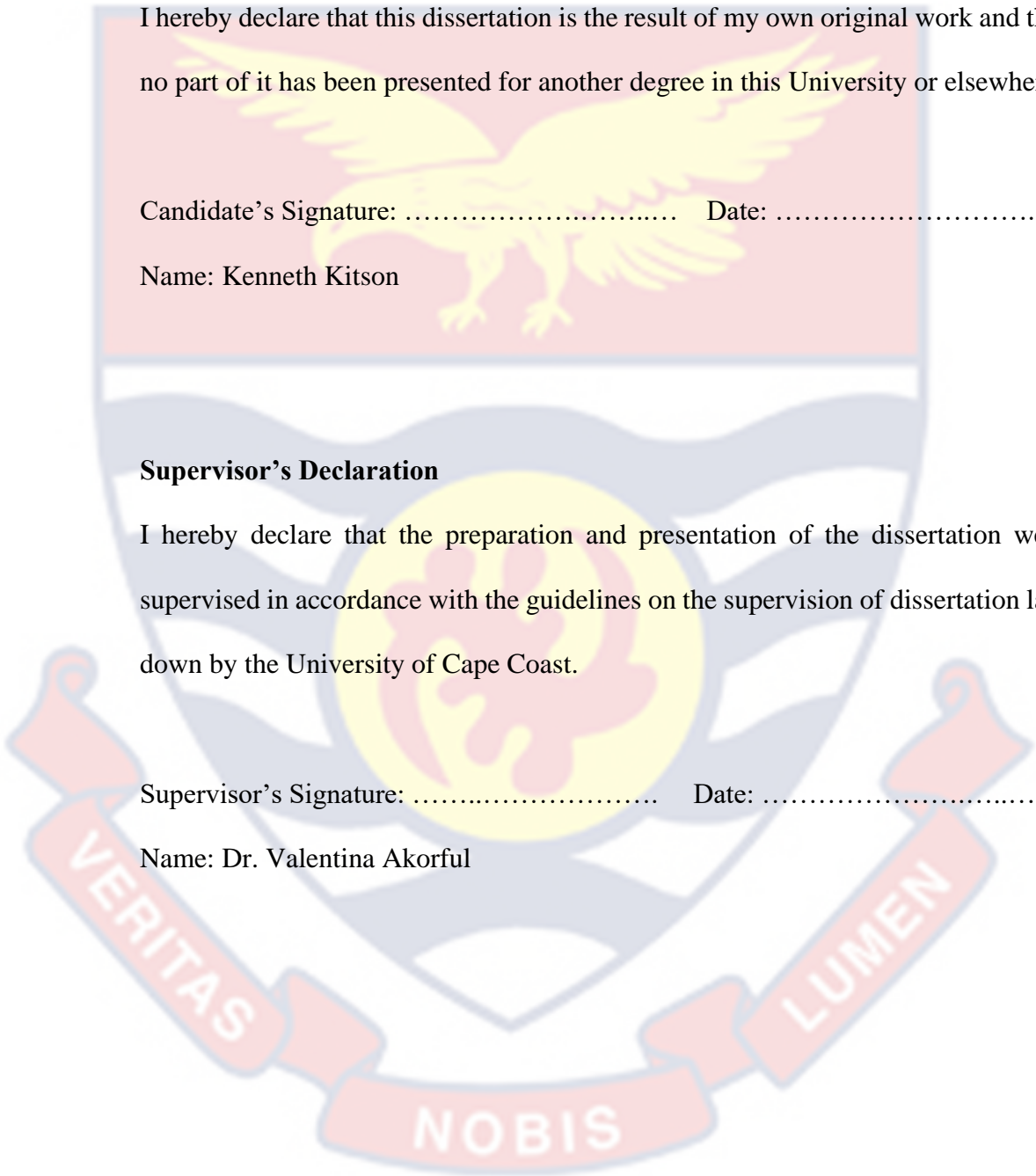
Name: Kenneth Kitson

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on the supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature: Date:

Name: Dr. Valentina Akorful



ABSTRACT

Traditional techniques of teaching and learning are no longer enough to deal with today's learning challenges. The focus of the study was to assess the mediation roles of self-regulation skills and students' satisfaction on the relationship between students' readiness for e-learning and academic performance among some selected universities in Ghana. The social cognitive theory and social presence theory were used to underpin the study. The study area comprised three universities (UCC, UG and KNUST) in Ghana that offer distance education programmes. The data collection instrument employed was questionnaire which was used to gather quantitative data from 400 respondents. The study found that students' readiness for eLearning does not have any significant effect on academic performance but has a significant effect on self-regulation skills. Students' readiness for eLearning has a significant and positive effect on students' satisfaction. Self-regulation skills and students' satisfaction has a significant positive effect on academic performance. Also, self-regulation skills and students' satisfaction significantly mediate between students' readiness for eLearning and academic performance. The study, therefore, recommends that management of tertiary institution organize symposiums, forums and conferences for students to encourage them on student self-regulation skills. Meanwhile, students could also adopt online learning tools in their studies.

KEYWORDS

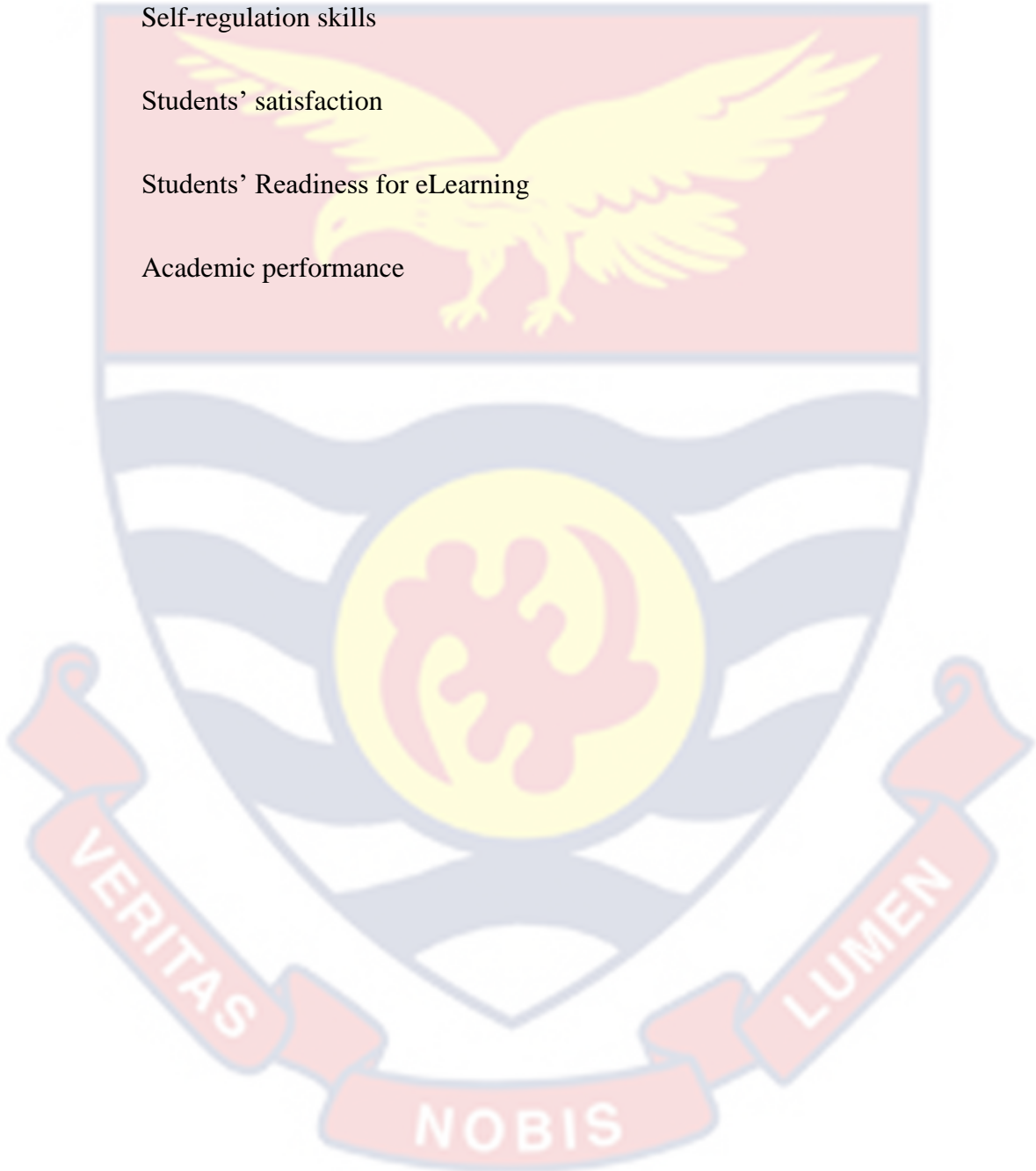
Online learning

Self-regulation skills

Students' satisfaction

Students' Readiness for eLearning

Academic performance



ACKNOWLEDGEMENTS

First and foremost, I am grateful to my supervisor, Dr. Valentina Akorful, for her guidance and support.

To Professor Daniel Agyapong, Professor Gloria Agyapong, Osman Light, Mary Mensah and Mabel Baah Ofori for their support.



DEDICATION

To my family.



TABLE OF CONTENTS

DECLARATION	ii
ABSTRACT	iii
KEYWORDS	iv
ACKNOWLEDGEMENTS	v
DEDICATION	vi
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF ACRONYMS	xiii
CHAPTER ONE: INTRODUCTION	
Background to the Study	1
Statement of the Problem	4
Purpose of the Study	6
Research Objectives	6
Hypotheses of the Study	7
Significance of the Study	7
Delimitations	8
Limitations	9
Organization of the Study	9
CHAPTER TWO: LITERATURE REVIEW	

Introduction	11
Theoretical Review	11
<i>Social cognitive theory</i>	11
<i>Social presence theory</i>	13
Conceptual Review	15
<i>E-learning and Distance Education in Ghana</i>	15
<i>Self-Regulation Skills</i>	16
<i>Students Satisfaction</i>	17
<i>Students' Readiness for E-Learning</i>	18
<i>Academic Performance</i>	19
Empirical Review	20
<i>Students' Readiness For E-Learning and Academic Performance</i>	20
<i>Students' Readiness For E-Learning and Self-Regulation Skills</i>	21
<i>Students' Readiness For E-Learning and Students Satisfaction</i>	22
<i>Self-Regulation Skills and Academic Performance</i>	23
<i>Students Satisfaction and Academic Performance</i>	24
<i>Students' Readiness For E-Learning through Self-Regulation Skills and Students' Satisfaction to Academic Performance</i>	25
Conceptual Framework of the Study	26
Chapter Summary	28

CHAPTER THREE: RESEARCH METHODS

Introduction	29
Research Paradigm	29
Research Approach	31
Research Design	32
Study Area	33
Population	34
Sample Procedure	35
Data Collection Instruments	37
Data Processing and Analysis	40
Ethical Considerations	46
Chapter Summary	46
CHAPTER FOUR: RESULTS AND DISCUSSION	
Introduction	48
Data processing and analysis	48
Socio-Demographic Characteristics of Respondents	49
Assessing PLS-SEM Results	59
Evaluation of LOC Measurement Model	59
Multicollinearity and Common Method Bias Test	70
Evaluation of HOC Measurement Model	71

Test of Model Fit Using Overall Fit and Other Relative Measures for the structural model 74

Presentation of Findings (Direct effect) 78

Assessment of Mediation (Indirect) Effects 83

Summary of Hypothesis 84

Discussion of Results 85

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction 92

Summary 92

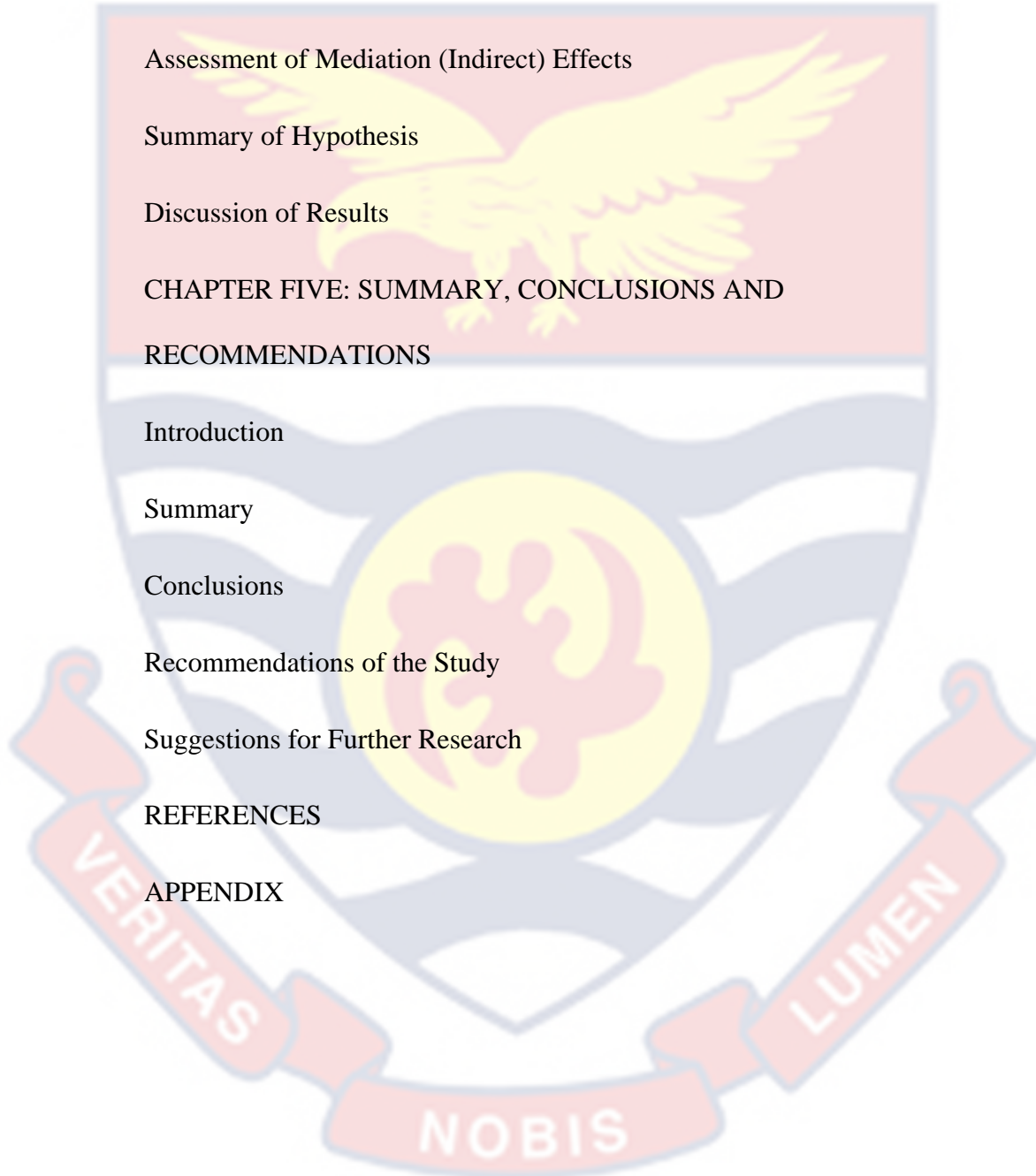
Conclusions 95

Recommendations of the Study 97

Suggestions for Further Research 99

REFERENCES 101

APPENDIX 127

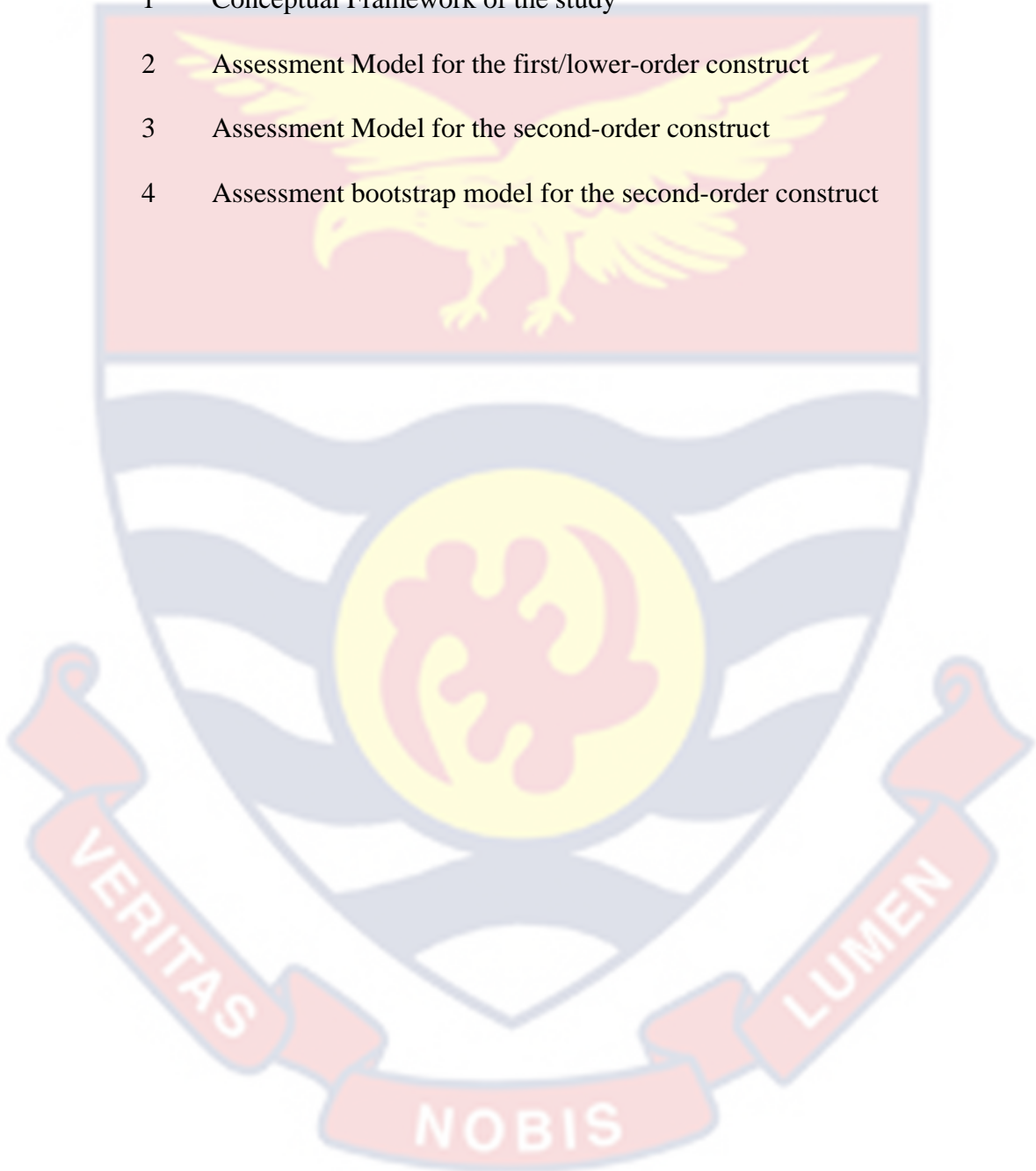


LIST OF TABLES

Table	Page
1: Sample size among the Universities	36
2: Measurement and Hierarchical component of study	39
3: Normality measure	45
4: Demographic Characteristics of Respondents	49
5: Students' Readiness For E-Learning	52
6: Student Satisfaction	55
7: Self-Regulation Skills	56
8: Academic Performance	57
9: Descriptive Statistics of the main construct	58
10: Outer model results for first-order constructs	60
11: Discriminant validity - Cross loadings (first-order model)	65
12: Discriminant validity – Fornell-Larcker criterion (first-order model)	68
13: Discriminant validity - Heterotrait-monotrait ratio (HTMT) (first-order model)	69
14: Collinearity statistics (VIF) - inner model (first-order model)	70
15: Outer model results for second-order constructs	72
16: Goodness-of-Fit Indices for the Proposed Model for the Study	76
17: Direct effects for the hypothesized paths	80
18: Indirect effects for the hypothesized paths	81
19: Summary of Direct and Indirect effects for the hypothesized paths	84
20: Summary of the key findings (Research objectives and Major findings)	94

LIST OF FIGURES

Figure		Page
1	Conceptual Framework of the study	27
2	Assessment Model for the first/lower-order construct	64
3	Assessment Model for the second-order construct	73
4	Assessment bootstrap model for the second-order construct	82



LIST OF ACRONYMS

AP Academic Performance

SRS Self-Regulation Skills

SREL Students Readiness for eLearning

SS Student Satisfaction

HOC Higher-Order Constructs

LOC Lower Order Constructs

VIF Variance Inflation Factor

HTMT Heterotrait-Monotrait Ratio

SEM Structural Equation Models

PLS-SEM Partial Least Square Structural Equation Modelling

CB-SEM Covariance-based Structural Equation Modelling

AVE Average Variance Extracted

CMV Common Method Variance

SD/STDEV Standard Deviation

CHAPTER ONE

INTRODUCTION

Background to the Study

Many factors contribute to progress of education, but the most important is commitment to continuous learning on a grand scale. Online education, also known as eLearning, has become the standard method of learning today. It involves instructors and students being physically separated but staying connected through various technologies for teaching and communication (Greenhow, Graham & Koehler, 2022). This learning method has grown in popularity and could improve education, especially for students who struggle in traditional schools (Bettinger & Loeb, 2017). Online learning is particularly beneficial for individuals who can't attend in-person classes, such as full-time workers, military personnel, and those in remote areas (Weigle, 2022; Sutiah et al., 2020; Selivanov & Savchenko, 2019). Online education has become the norm, connecting instructors and students and providing flexibility and accessibility to a wide spectrum of learners.

The educational experience in Ghana is very different from that of developed countries. Ghana is a developing country that is still putting finishing touches on many parts of its technology infrastructure in order to catch up to the more advanced nations. As a corollary of this fact, online distance education in Ghana is still in its infancy (Forson & Vuopala, 2019) and undergoing continuous improvement as compared to online distance education in the developed countries. Distance education is being used to expand the usage of online learning in Ghana.

Nevertheless, little attention has been paid to the issue of student preparation for online learning in the remote education mode (Forson & Vuopala, 2019). For the most part, online courses are challenging to less prepared students.

Maximising the efficacy and impact of educational programmes requires a deeper understanding of, and focus on, student satisfaction. Student satisfaction refers to students' judgments of a course's importance and their experiences in the learning program (Kuo et al., 2014). Numerous studies (Pei & Wu, 2019; Lockman & Schirmer, 2020; González-Gómez et al., 2016) have looked at the question of whether or not online or hybrid learning is more effective than traditional classroom settings. According to the findings of these studies, traditional classrooms do not provide nearly the same levels of success for students as online learning environments. A number of studies in online learning emphasise a significant distinction in favour of online learning environments, demonstrating that traditional classroom arrangements fall short of providing comparable levels of academic achievement and student success.

Satisfaction is a crucial contributor to student results in online courses and has been proven to be interwoven with several other aspects and thus it requires research. Self-regulation in online learning provides motivation, metacognitive (plan, establish objectives, organise, evaluate, and self-monitor), and behavioural (self-assessment, self-evaluation, and help-seeking) processes to help students succeed and have a positive learning experience, making it important for e-learning and academic performance research. E-learning has established itself as a viable educational option, and current trends indicate that it will only continue to expand

in prominence (Mishra et al., 2020). In essence, the critical relationship between satisfaction, self-regulation, and academic achievement highlights the need for e-learning research, as its role in fostering positive online learning experiences and academic success grows in digital education.

An integral determinant influencing the effectiveness of online learning is the preparedness of students for this mode of education. Student readiness for online learning pertains to their degree of preparation, inclination, and capability to engage in digital courses (Chung, Subramaniam & Dass, 2020). This encompasses factors like self-directed learning abilities, computer proficiency, internet accessibility, preferred learning methods, and attitudes towards online education (Hung, Chou, Chen & Own, 2010). Students who exhibit readiness for online learning are more likely to achieve favorable educational outcomes and satisfaction. Therefore, educators should evaluate students' readiness for online learning before creating and conducting digital courses. Similarly, students should be cognizant of their own strengths and weaknesses in online learning, and seek suitable assistance and guidance as necessary.

Students dedicate themselves to rigorous studying and attentive participation, driven by the anticipation of assessments. Academic performance is how well students, educators, or institutions meet educational goals (Steinmayr, Meie, Weideinger & Wirthweinger, 2014). It is usually measured by examinations, assessments, grades, or diplomas. However, some researchers have suggested that subjective measures of academic performance can also provide valuable insights into students' achievements and satisfaction (Stadler, Kemper & Greiff, 2021;

Gatzka, 2021). Subjective academic performance measurements include students' self-evaluations and emotions, personal objectives, aspirations, and values, and these provide holistic grasp of academic achievement (Kaya & Erdem, 2021).

Academic success is affected by intelligence, personality, motivation, emotional intelligence, life's meaning, and environment. Understanding these interactions improves student learning and happiness.

Statement of the Problem

The outbreak of the COVID-19 pandemic caused significant disruptions within Ghana's education sector, prompting numerous institutions to adopt online learning approaches. However, this transition brought forth challenges impacting the academic performance of participating students (Limniou, Varga-Atkins, Hands & Elshamaa, 2021; Mahdy, 2020; Udeogalanya, 2022). These challenges encompassed limited access to internet connectivity, devices, and essential learning resources, alongside concerns regarding the quality of instructional delivery and assessment methods, as well as issues concerning students' motivation and engagement. Consequently, this study bears crucial relevance for both educational administrators and students. The study aims to contribute to the understanding of how students' readiness, self-regulation, and satisfaction play a role in mitigating the negative impact of such challenges on academic performance.

The majority of studies on online learning or eLearning were done to assess the level of students' satisfaction with e-learning (Inan et al., 2017; Landrum, 2020; Hamdan et al., 2021; Topal, 2016; Pham et al., 2019; Yilmaz, 2017; Bismala & Manurung, 2021; Jegathesan et al., 2018; Dhaqane & Afrah, 2016; Asad et al.,

2021) with a few of being conducted in Ghana (Kosiba et al., 2022; Bossman & Agyei, 2022). Kosiba et al. (2022) used an enhanced UTAUT2 technique to analyze students' satisfaction with online learning during the Covid-19 epidemic. Bossman and Agyei (2022) investigated the connections between technology and teacher aspects, e-learning satisfaction, and academic achievement of Ghanaian distance students. It is evident that research on student's satisfaction with e-learning is widespread however, there is little research on how students' readiness for e-learning affects their academic performance, particularly in the Ghanaian environment.

Studies exploring students' self-regulation skills and student satisfaction as mediators of the relationship between students' readiness for e-learning and academic performance are scarce, despite substantial evidence supporting the direct effects of students' self-regulation on academic performance. Again, almost all these studies had R square values below 0.7 implying that there are other factors that explain the variations in these relationships. Therefore, this study aims to assess the mediation roles of self-regulation skills and students' satisfaction on the relationship between students' readiness for e-learning and academic performance. There is a need for a study of this nature as digital readiness will most likely increase student's satisfaction with e-learning and couple with self-regulation skills, lead to improved academic performance.

Purpose of the Study

The purpose of the study was to assess the mediation roles of self-regulation skills and students' satisfaction on the relationship between students' readiness for e-learning and academic performance of students in selected universities in Ghana.

Research Objectives

The specific objectives of the study are to:

1. assess the influence of students' readiness for e-learning on academic performance of students in selected universities in Ghana.
2. evaluate the influence of students' readiness for e-learning on self-regulation skills of students in selected universities in Ghana.
3. analyze the influence of students' readiness for e-learning on students' satisfaction of students in selected universities in Ghana.
4. determine the influence of self-regulation skills on academic performance of students in selected universities in Ghana.
5. assess the influence of students' satisfaction on academic performance of students in selected universities in Ghana.
6. estimate the mediating roles self-regulation skills and students' satisfaction on students' readiness for e-learning and academic performance of students in selected universities in Ghana.

Hypotheses of the Study

The following research hypotheses guide the study and seek to help meet the objectives of the study:

H1₀: there is an insignificant effect of students' readiness for e-learning on academic performance.

H2₀: there is an insignificant effect of students' readiness for e-learning on self-regulation skills.

H3₀: there is an insignificant effect of students' readiness for e-learning on students' satisfaction.

H4₀: there is an insignificant effect of self-regulation skills on academic performance.

H5₀: there is an insignificant effect of students' satisfaction on academic performance.

H6₀: self-regulation skills does not significantly mediate between students' readiness for e-learning and academic performance.

H7₀: students' satisfaction does not significantly mediate between students' readiness for e-learning and academic performance.

Significance of the Study

The swift advancement of technology has established e-learning as the prevailing norm in modern education. As highlighted by Bervell and Umar (2020), over the past decade, e-learning has gained extensive traction within university-level education. The significance of this study lies in its pursuit to comprehensively

examine the intricate dynamics that influence the academic performance of students in selected universities in Ghana within the context of e-learning readiness. By delving into the mediation roles of both self-regulation skills and students' satisfaction, the study sheds light on previously unexplored aspects of the relationship between students' preparedness for e-learning and their academic achievements.

This research contributes not only to the academic literature but also holds practical implications for educational institutions and policymakers. Educational institutions can utilize the outcomes to fine-tune their e-learning strategies by recognizing the pivotal role of students' readiness for e-learning in shaping academic performance. The insights into the mediating influences of self-regulation skills and students' satisfaction offer a roadmap for designing targeted interventions that foster effective self-directed learning behaviours and enhance overall learning experiences. Policymakers can leverage these findings to craft informed policies that promote and support e-learning readiness initiatives, thereby contributing to improved educational outcomes and student satisfaction on a broader scale.

Delimitations

The scope of this study encompassed the assessment of the mediation effects of self-regulation skills and students' satisfaction within the context of the relationship between students' readiness for e-learning and their academic performance. The study was conducted across three prominent universities in Ghana, namely the University of Cape Coast, University of Ghana, and Kwame Nkrumah University of Science and Technology. These universities were selected

as they offer distance education programs, specifically employing a blended approach – hybrid learning environment. By focusing on this specific cohort and assessing the role of self-regulation skills and satisfaction as mediators, the study provided insights into the precise factors shaping the academic performances of students engaged in e-learning within the Ghanaian context.

Limitations

The study did not use all distance education students in the various tertiary institutions in Ghana due to time and financial constraints. As only distance students were considered, the research's narrow study area of research, together with the sampling procedure used, may have an influence on generalizing the research's conclusions to everyone enrolled at a university or college in Ghana. As a consequence, the research's findings are best generalized to the study population. Consequently, extrapolating the study's results to other populations with similar characteristics should be done cautiously. Also, as the study utilized a quantitative research approach, the results may be biased if the study's population was underrepresented and therefore misrepresenting the target demographic may impact the findings.

Organization of the Study

This research report is presented under five chapters. The first chapter introduced and discussed the background to the study, the problem statement and the purpose of the study. The chapter one also presents the research objectives, the research hypotheses guiding the study and the significance, delimitations and

limitations of the study. Chapter two comprises the theoretical framework on which the study was based, conceptual review, empirical review and conceptual framework. The third chapter describes the methods and how the data for the study were gathered. The analysis of the data collected is presented and discussed in the fourth chapter. The final chapter, presents a summary of the findings, conclusions, recommendations and suggestions for further research.



CHAPTER TWO

LITERATURE REVIEW

Introduction

The first part of this chapter presents the theoretical review which explained the various theories underpinning this research. The next section is the empirical review which will review various literature on the subject to provide deeper insight into the relationships that exist among the variables under study and also how the various hypotheses were developed. The chapter then goes on to discuss the various concepts that will be used in the study. This makes it easier to understand the various concepts that was used in the study. The last part provides a conceptual framework, the use of which will guide the research.

Theoretical Review

Social cognitive theory

Social cognitive theory is a psychological theory that explains how individuals learn and act in social settings. Albert Bandura, who is also known for his work on observational learning, self-efficacy, and reciprocal determinism, developed the theory (Bandura, 1986). Individuals learn through observation, imitation, and interaction with their surroundings, according to this theory (Rumjaun & Narod, 2020). This theory emphasises the interaction between cognitive processes, behaviour, and external factors such as social interactions and environmental factors (Bandura, 1986). It introduces the concept of self-efficacy,

which refers to an individual's confidence in their ability to execute a task or attain a goal successfully.

The theory has been extensively applied to explain a wide range of human behaviours, including academic achievement and health behaviours. In relation to the study, SCT provides insight into how self-regulation skills and satisfaction are influenced by an individual's interactions with their environment and how these factors, in turn, impact academic performance. Individuals with higher self-efficacy are more likely to engage in tasks, set ambitious objectives, and persevere through obstacles, according to the theory (Agholor, 2019). In the study, students' self-efficacy in e-learning could influence their self-regulation skills, including their ability to plan, self-monitor, and modify their learning strategies. A greater sense of self-efficacy may result in enhanced self-regulation, positively impacting students' preparedness for e-learning and, in turn, their academic performance.

According to Social Cognitive Theory, people learn by observing the actions of others and their results. According to Umar and Ko (2022), students' satisfaction with e-learning experiences can be influenced by observing their peers' or instructors' experiences and outcomes. When these observations yield positive outcomes and constructive feedback, students' contentment tends to rise, thereby enhancing their sense of satisfaction (El-Sayad, Md Saad & Thurasamy, 2021). Conversely, unfavorable outcomes can evoke dissatisfaction, leading to a reduced sense of engagement and motivation. This satisfaction then influences the students' engagement, motivation, and overall approach to learning, which can impact their academic performance.

In summary, SCT provides a framework for understanding how students' interactions with their environment, such as their own self-efficacy beliefs, observational learning, and feedback, contribute to the development of self-regulation skills and impact their satisfaction with e-learning experiences. These variables, in turn, mediate the relationship between e-learning readiness and academic performance. By examining the social cognitive processes involved, the study obtains insight into how individual and environmental factors interact to influence the learning outcomes of students at the selected Ghanaian universities.

Social presence theory

Social presence theory (SPT) is a psychological theory that explains how individuals experience a sense of presence during online interactions. The Social Presence Theory, developed by John Short, Ederyn Williams, and Bruce Christie in 1976, asserts that communication technologies vary in their capacity to convey a sense of social presence — the feeling of being connected, real, and involved in interactions with others. The theory suggests that different media have different levels of social presence, depending on how well they can convey physical and emotional cues, such as voice, facial expressions, gestures, and body language (Farhadi, 2019; Wut & Xu, 2021; Lim et al., 2021). The higher the social presence of a medium, the more realistic and engaging the interaction will be.

In relation to the study, the SPT provides insight into how the perception of social presence can affect students' self-regulation skills, satisfaction, and ultimately their academic performance. Social Presence Theory posits that communication technologies that convey higher levels of social presence can

facilitate improved participant interaction (Emans & Murdoch-Kitt, 2023). Self-regulation skills can be affected by students' interactions with instructors, colleagues, and learning materials in the context of e-learning. As students engage more actively and collaboratively in the learning process, increased levels of interaction, facilitated by a sense of social presence, can contribute to effective self-regulation strategies.

The theory emphasises the significance of social cues in nurturing engagement and a sense of belonging. Studies have shown that social presence in e-learning increases student engagement and satisfaction (Lee & Kim, 2023; Mykota, 2022). The perception of social connection can have a positive effect on students' overall satisfaction with their learning experiences, thereby increasing their motivation to participate actively and perform well academically (Goeman et al., 2020). SPT also recognises the importance of social indicators, such as feedback and interaction, to learning outcomes (Miao, Chang & Ma, 2022). According to Liu, Luo and Yin (2023), students with a greater perception of social presence are more likely to receive timely feedback, participate in class discussions, and request clarifications. This active participation, which is facilitated by social presence, can enhance students' comprehension and academic performance.

The theory provides a lens for understanding how the perception of social presence in e-learning environments influences students' self-regulation skills, engagement, satisfaction, and academic performance. The theory emphasises the significance of communication dynamics and social indicators in determining the experiences and learning outcomes of students (Miao, Chang & Ma, 2022;

Richardson, Maeda, Lv & Caskurlu, 2017). By examining the elements of social presence, the study gains insight into how the quality of interactions and communication within the e-learning context mediates the relationship between students' readiness for e-learning and their academic achievements at the selected Ghanaian universities.

Conceptual Review

E-learning and Distance Education in Ghana

In Ghana, distance education and learning has been around for a long time (Adjabeng, 2017). Distance learning was originally called correspondence learning because students received course materials by mail and returned them by mail. In light of the alarmingly low admissions rate to Ghana's colleges and universities as a result of a lack of housing resources and the rapid growth of mobile and internet technologies in Ghana, it was imperative that these institutions find new ways to grant access to qualified students. Distance education emerged as a viable solution to accommodate a larger number of students (Ali, 2020). According to Biney (2021), many institutions sought to develop and execute some kind of distant or online distance education with the support of the Ghanaian government and the President's Education Initiative.

Universities in Ghana offer a variety of courses through distance education (Amponsah, Torto & Badu-Nyarko, 2018). In 1996, the University of Education Winneba admitted its inaugural cohort of distance learners. During the academic year of 2001/2002, the University of Ghana and University of Cape Coast introduced diploma programmes in youth development and basic education through

distance learning (Hope & Guiton, 2006). In 2013, a total of 45,000 students were engaged in pursuing higher education by means of distance learning (Gay & Betts, 2020). The enrollment in distance education experienced a significant growth of 39.4 percent throughout the period from 2014 to 2016. Nevertheless, as of 2016, over 50% of students were enrolled in distance learning programmes. Each year, an estimated 8,000 students are enrolled in distance learning programmes.

The limited quality of online distance education provided by higher education institutions is a direct outcome of the nation's insufficient advancements in internet technology. As enrollment in distance-learning programmes increases and technology improves, it is reasonable to presume that the best is yet to come.

Self-Regulation Skills

Previous research has raised questions regarding whether or not students can regulate their own learning (Adams et al., 2021). Students' skill in using the eLearning platform and their capability to study courses online are crucial, but they must also adopt effective learning practices. Self-regulation is a complex, high-level talent having metacognitive, cognitive, emotional, and social behavioral components, according to the theoretical and empirical explanations of the notion (Teng & Zhang, 2016). Self-regulation is a person's view of his or her capacity to arrange time, establish objectives, and handle problems (Khusainova & Ivutina, 2016). The ability to engage in self-managing behaviors and apply learning processes is another definition of self-regulation offered by Landrum (2020), which, when combined with motivation, enables students to act independently on their own self-confidence beliefs.

Students' ability to self-regulate may be seen through interactions with the subject matter, with other students, and with the teacher (Cho & Cho, 2017). Alt and Naamati-Schneider (2021) argue that taking charge of one's education is crucial to maintaining self-regulation. This work is performed in a variety of ways, including via behavior, metacognition, and the individual's own motivation. In addition, Su, Li, Liang and Tsai (2019) and Broadbent and Poon (2015) found a positive correlation between self-regulation skills and academic success, a favorable perspective on online education, and the actual participation in group projects.

Students Satisfaction

Satisfaction is a crucial component that influences students' achievement in online courses, and it is shown to be interwoven with several other aspects. Satisfaction is defined as individuals' assessment of how thoroughly their wants, objectives, and ambitions have been satisfied. In relation to student satisfaction, it is possible to define it as the fulfillment of students' expectations and wants (Alqurashi, 2019). Again, Syahrivar (2019) describes student satisfaction as a subjective appraisal of educational achievements and experience by the student. Also, Elliott and Healy (2001, p.2) defined student satisfaction as a “short-term attitude resulting from an evaluation of a student's educational experience” and claimed that student satisfaction was achieved when their actual experiences or performances met or exceeded their initial expectations.

Student satisfaction may also be seen as a transient emotion borne out of an individual's assessment of their experience with the school's resources and services.

Along with learning effectiveness, faculty satisfaction, scalability, and access, this is one of the Online Learning Consortium's five criteria for evaluating the quality of online learning (Yavuzalp & Bahcivan, 2021). Therefore, it may be concluded that students' happiness throughout the study period was a result of the relative intensity of experiences and the perceived effectiveness of educational services.

Students' Readiness for E-Learning

The concept of online education is not new. When applied to higher education, this exceptional method of instruction fundamentally transforms both the learner's and the faculty's views of the learning process (Mishra et al., 2020). The fact is that e-learning is a system of education that expands and enhances people's opportunities to pursue higher education. It also offers an inordinate deal of leeway on the basis of pedagogical approaches, content management, instructor-student communication (both real-time and asynchronous), course structure, student projects, and assessment. With the advent of e-learning, the focus has shifted from the instructor to the learner.

Students' level of preparedness may make or break the success of e-learning programs (Rasouli et al., 2016). Many students prefer traditional methods of education since they were familiar with them for a longer length of time throughout their time in elementary and secondary school (Adams et al., 2021). Some students, especially those from rural or distant places, would still be unfamiliar with the online domain in which lecturers and instructors previously conducted classroom-based activities. Therefore, to guarantee the effective adoption of any e-learning model of teaching, it is important to evaluate student readiness (Adams et al., 2018).

Academic Performance

In anticipation of assessments, students dedicate themselves to rigorous studying and attentive participation. Academic performance is the extent to which students, educators, and institutions achieve their educational goals (Steinmayr, Meie, Weideinger, & Wirthweinger, 2014). Typically, examinations, assessments, grades, or diplomas are used to measure it. Nonetheless, some researchers have suggested that subjective measures of academic performance can also provide valuable insights into students' accomplishments and satisfaction (Stadler, Kemper, and Greiff, 2021; Gatzka, 2021; Leung & Xu, 2013). Subjective academic performance measures incorporate students' self-assessments, emotions, and evaluations of their educational accomplishments, casting light on dimensions not captured by objective metrics.

These measures can encompass personal aspirations, expectations, benchmarks, and values, thereby enhancing the comprehensive understanding of academic achievement (Kaya & Erdem, 2021). Academic performance is influenced by multiple factors, including intelligence, personality traits, motivation, emotional intelligence, the significance of life, and environmental conditions. Understanding these dynamics helps students improve their learning outcomes and levels of satisfaction. This study assessed academic performance using subjective scale.

Empirical Review

Students' Readiness For E-Learning and Academic Performance

The section presents an empirical review on students' readiness for e-learning and academic performance. First and foremost, Bazargan (2021) investigated students' preparedness for online education during Covid-19, their satisfaction with their eLearning experiences, and the link between student satisfaction and students' performance. They found that academic performance was connected with students' level of preparedness for e-learning and students' satisfaction with their eLearning experiences was positively correlated with their academic performance.

Also, Joosten and Cusatis (2020) analyzed students' success in online courses. They combined information from student information systems at several institutions with data gathered from student surveys. Multiple regression models' findings corroborated that students' level of readiness for online learning significantly influenced their performance. Additionally, Torun (2020) looked at how students' e-learning preparedness affected their grades in a challenging online college course. They used the E-Learning Readiness Scale as the survey instrument for this research. The study found that interest in e-learning was also shown to have the ability to forecast academic performance, although self-directed learning was revealed to be the most important factor.

A study by Khatib Zanjani et al. (2017) explored the association between self-directed learning preparation, acceptance of eLearning, and academic

achievement among learners pursuing a Master of Science degree in nursing or midwifery. They found that there is a significant connection between readiness for self-directed learning and both academic achievement and readiness for electronic learning. They also found that students' aptitude for self-directed learning is an effective predictor of both their acceptance of e-learning and their academic achievement. Therefore, the current study hypothesises that:

H1₀: There is an insignificant effect of students' readiness for e-learning on academic performance.

Students' Readiness For E-Learning and Self-Regulation Skills

The section presents an empirical review on students' readiness for e-learning and self-regulation skills. The extent to which students benefit from online instruction may depend on factors including their familiarity with and skill at using online resources, as well as their capacity for self-regulation and time management. Landrum (2020) investigated how students' self-regulation and self-efficacy in using online learning technologies affect their perceptions of the value of online courses and their overall satisfaction with them. The results suggest that students who are more self-regulated and self-efficacious in using online learning technologies are more likely to have positive perspectives on online courses.

Also, Ergun and Adibatmaz (2020) investigated students' self-regulation and e-learning styles, as well as their level of preparedness for online learning. The results suggest that students who have personal learning goals, good time management skills, and a preference for working with visual components are more likely to be successful in online learning. Additionally, Ngampornchai and Adams

(2016) investigated students' readiness for online education in Northeastern Thailand using the UTAUT model. The results suggest that students who are more self-regulated and have experience with social media and mobile technology are more likely to be ready for online education. This current study, therefore, hypothesise that:

H₂₀: There is an insignificant effect of students' readiness for e-learning on self-regulation skills.

Students' Readiness For E-Learning and Students Satisfaction

The section presents an empirical review on students' readiness for e-learning and self-regulation skills. Firstly, Topal (2016) surveyed students to understand their level of preparation for online learning, their level of satisfaction with e-learning, and the relationship between these variables and e-learning resources. The results showed that there is a positive and statistically significant relationship between students' level of preparation and their level of satisfaction with e-learning. Students who were more prepared for online learning were more likely to be satisfied with their experience. Again, Pham et al. (2019) analyzed the relationship between e-learning service quality attributes, overall e-learning service quality, student satisfaction, and loyalty in Vietnam. The results showed that student satisfaction is directly linked to the quality of the e-learning services offered, which in turn has an effect on student loyalty.

A study by Bismala and Manurung (2021) used importance performance analysis (IPA) to study students' perceptions of e-learning as a form of distance education during the COVID-19 pandemic. The results showed that the most

important factors for students are flexibility, adequate assessment, the importance of e-learning, and students' ability to manage their time effectively. Additionally, Yilmaz (2017) conducted a study to understand how students' level of preparation for e-learning affects their level of satisfaction and motivation in the FC model of instruction. The results showed that there is a significant relationship between students' level of preparation and their level of satisfaction and motivation in the FC model of instruction. The study therefore hypothesizes that:

H3₀: There is an insignificant effect of students' readiness for e-learning on students' satisfaction.

Self-Regulation Skills and Academic Performance

This section provides an empirical review of the studies available on students' self-regulation skills and academic performance. First and foremost, Zimmerman and Kitsantas (2014) investigated the predictive validity of several measures of students' self-discipline and self-regulation. They conducted a mixed-methods study with 507 high school students and their teachers. They found that students' grades and performance on a statewide performance exam were better predictors of their self-regulation composite than their self-discipline composite. Additionally, Morrison et al. (2010) examined the role of self-regulation in children's long-term academic achievement as part of their study of school readiness. They emphasized the importance of behavioral self-regulation and argued that an individual's ability to self-regulate is influenced by their unique combination of traits, experiences, and relationships.

Also, Motlagh et al. (2011) conducted a study with high school students to investigate the relationship between self-efficacy and academic success. They used cumulative grade point average (GPA) as a proxy for academic performance.

Correlational analyses showed that academic performance is correlated with students' capacity for self-evaluation, self-direction, and self-regulation. Regression analysis also showed that self-evaluation and self-regulation are significant predictors of academic achievement. The study therefore hypothesizes that:

H4₀: There is an insignificant effect of self-regulation skills on academic performance.

Students Satisfaction and Academic Performance

This section provides an empirical review of the studies available on students' satisfaction and academic performance. First and foremost, Jegathesan et al. (2018) investigated the attitudes and experiences of ODL students in Malaysia. They found that there was a strong relationship between students' levels of achievement and their satisfaction with the course materials, assessments, academic support, services, and responsiveness of the institutions. Also, Dhaqane and Afrah (2016) examined the relationship between student satisfaction and academic achievement. They found that academic performance was significantly correlated with student satisfaction. The study also found that students who were satisfied were more likely to succeed academically and stay in school.

Moreover, Khan and Iqbal (2016) investigated the relationship between student satisfaction and student performance in distance learning. They found that the majority of students were satisfied with the learner-learner contact, learner-material interaction, learner-technology engagement, and learner-instructor interaction. However, they found no significant correlation between student satisfaction and academic achievement. Also, Afzal and Afzal (2015) conducted a study in Islamabad to investigate the relationship between student satisfaction and academic achievement. They found that student satisfaction had a significant effect on academic performance. The study based on studies reviewed hypothesises that:

H5₀: There is an insignificant effect of students' satisfaction on academic performance.

Students' Readiness For E-Learning through Self-Regulation Skills and Students' Satisfaction to Academic Performance

The section presents an empirical review on the mediation roles of self-regulation skills and students' satisfaction between students' readiness for e-learning and academic performance. The current study found few studies that assessed relationship among self-regulation skills, students' satisfaction, students' readiness for e-learning and academic performance. Landrum (2020) investigated the factors that contribute to students' satisfaction and success in online learning. The study found that students' self-regulation, time management, and prior experience with online learning are all important factors.

Also, Inan et al. (2017) examined the relationship between self-regulation and students' performance and satisfaction in online courses. They found that students' ability to manage their time effectively was a key component of their self-regulation, which in turn predicted their success and satisfaction in online learning. Additionally, Hamdan et al. (2021) studied the impact of online learning on students' social interactions, sense of control over their learning, and overall satisfaction during the COVID-19 pandemic. They found that students' internet self-efficacy, self-regulated learning, and learner-learner interaction were all positively correlated with their satisfaction with online learning.

Moreover, Yavuzalp and Bahcivan (2021) investigated the relationship between e-learning preparedness, self-regulation, satisfaction, and academic performance among college students taking on-campus courses online. They found that students' e-learning preparedness positively affected their self-regulation, satisfaction, and academic performance. In line with the literature reviewed above, the study hypothesise that:

H6₀: Self-regulation skills does not significantly mediate between students' readiness for e-learning and academic performance.

H7₀: Students' satisfaction does not significantly mediate between students' readiness for e-learning and academic performance.

Conceptual Framework of the Study

Based on the concepts and empirical literature reviewed, this section presents a conceptual framework that depicts the research constructs: self-

regulation skills, students' satisfaction, students' readiness for e-learning and academic achievement to describe the relationship that exist among them. All of the study's different hypotheses are represented by the framework.

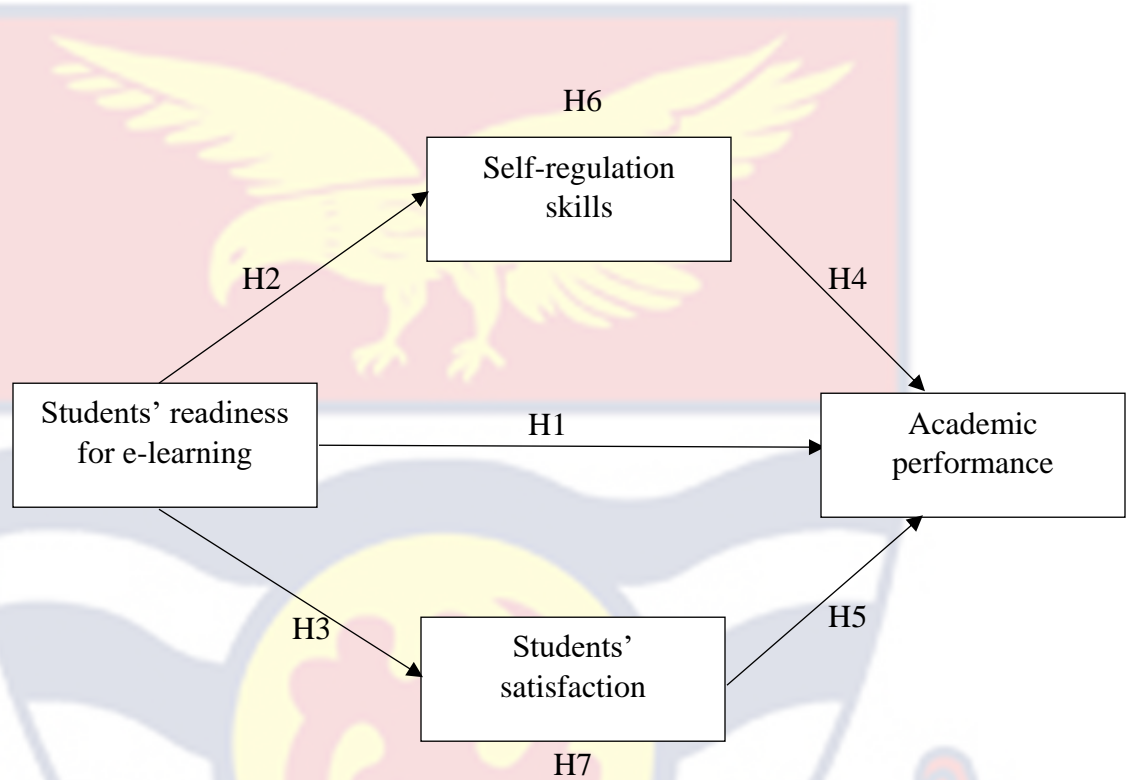
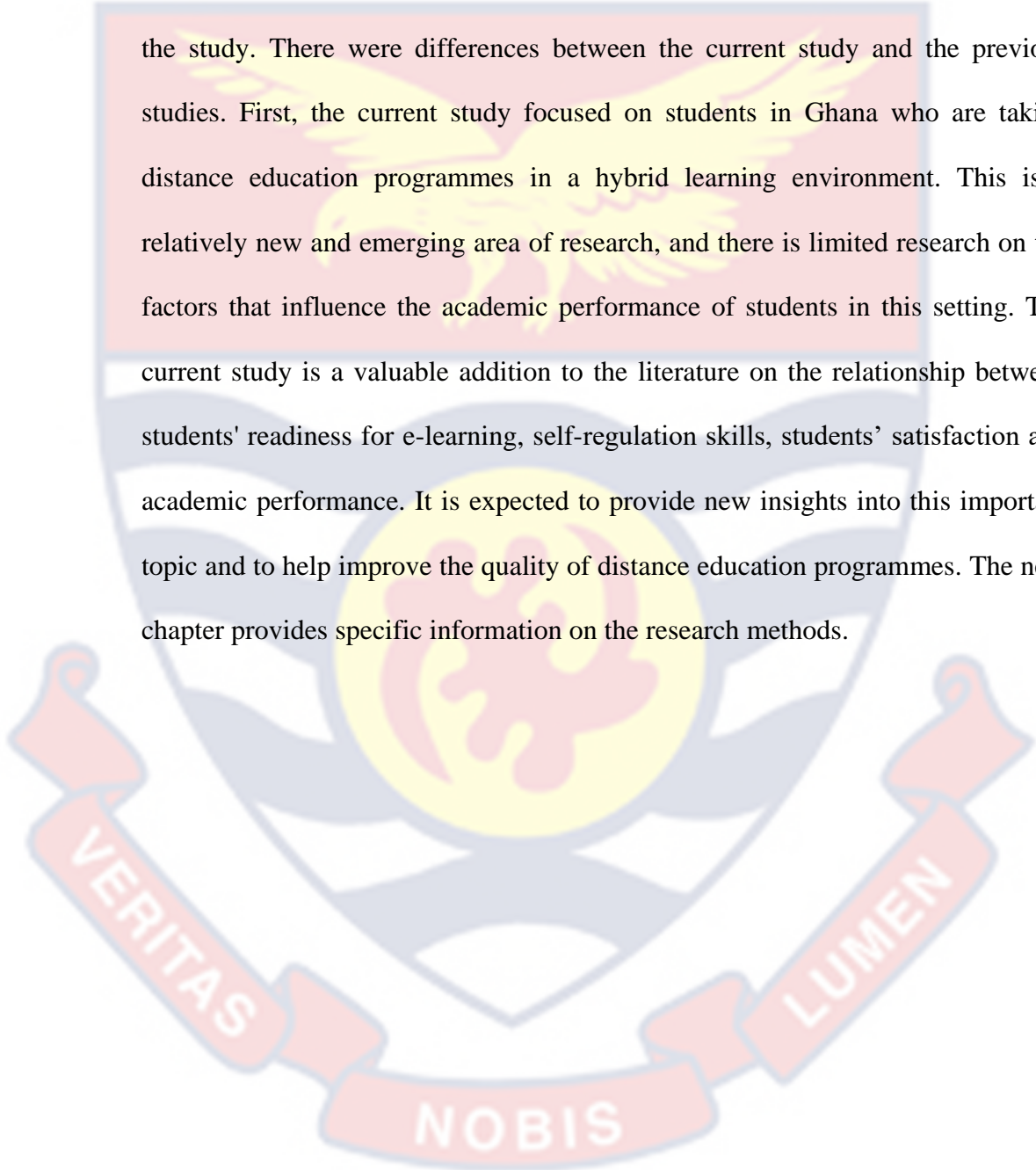


Figure 1: Conceptual Framework of the study

From Figure 1, the independent variable is students' readiness for e-learning. Academic performance is the dependent variable, while self-regulation skills and students' satisfaction are the mediating variables. A variable that participates in a causal chain that links an independent variable to a dependent variable is referred to as a mediating variable. In such a chain, the independent variable is what first causes the mediating variable, which in turn is what initially causes the dependent variable (Mackinnon, 2015). The role of the mediating variable will allow for a more in-depth investigation of the connection between the independent and dependent variables.

Chapter Summary

The chapter reviewed the theories underlying the study and reviewed extant literature relevant to the study. In addition, this chapter established a framework for the study. There were differences between the current study and the previous studies. First, the current study focused on students in Ghana who are taking distance education programmes in a hybrid learning environment. This is a relatively new and emerging area of research, and there is limited research on the factors that influence the academic performance of students in this setting. The current study is a valuable addition to the literature on the relationship between students' readiness for e-learning, self-regulation skills, students' satisfaction and academic performance. It is expected to provide new insights into this important topic and to help improve the quality of distance education programmes. The next chapter provides specific information on the research methods.



CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter provides an overview of the procedures that were carried out in order to obtain answers to the research questions posed by this investigation. According to Atmowardoyo (2018), the definition of a research technique is a methodical strategy that a researcher employs in order to handle research difficulties. It focuses on three primary aspects: the study design, the technique for data collection, and the analysis of the results. The research philosophy or paradigm, method, design, demographic, study area, sampling technique, data collecting tool, measurement of the parameters, and data analysis are all discussed in this chapter.

Research Paradigm

American philosopher Thomas Kuhn (1962) originally used the phrase paradigm in the realm of research to imply a philosophical method of thinking. In the context of academic study, paradigms serve as conceptual and methodological "tools" (Kaushik & Walsh, 2019). The study examined three paradigms of research. They are the positivist, interpretivism and pragmatism paradigms.

The positivist research paradigm proposes that the social world may be comprehended in an objective fashion. The major goal of positivist research is to identify the underlying causes of a phenomenon so that it may be predicted and

managed in the future. As a result of its reliance on objectivity, positivism ignores the subjective feelings and values of study participants as well as researchers themselves (Park et al., 2020). Replicability and generalizability are two additional advantages of the positivism paradigm (Shah et al., 2018). Interpretivism emerged as a response to positivism's criticism from a subjective point of view. According to interpretivists, people and their meanings are distinct from physical occurrences and cannot be analyzed in the same way. Individual meanings and contributions are more important to interpretivism than they are to positivism's research philosophy. It is also less probable that the data collected and analyzed under the interpretivist paradigm will be generalized since the data are mostly reliant on context, perspective, and values (Alharahsheh & Pius, 2020). It is possible, according to the pragmatist theory, for academic research to neglect abstract disputes about the nature of truth and reality in favor of "practical understandings" of actual, day-to-day facts (Kelly & Cordeiro, 2020). Some theorists have argued that common interpretations of pragmatism that focus only on "what works" are disconnected from the philosophical foundations of pragmatism. As a result, some theorists have concluded that pragmatism is not valid (Hesse-Biber, 2015). There are many who say emphasizing practical, real-world issues might lead researchers to adopt a "soft" approach, ignoring the importance of epistemological differences like quantitative vs qualitative research (Kelly & Cordeiro, 2020).

The positivism research paradigm was used in the study because it is deemed to be more appropriate for the investigation based on the objectives of the study. The interpretivism paradigm was not suitable for this study because it is more

subjective than objective in nature and therefore the results obtained are not independent of the researcher and cannot be generalized to the population of the study. The pragmatism paradigm supports a mixed research approach and therefore will also not be applicable to this study. The positivism paradigm was used for this study as it sought to examine the relationships and causation effects among the variables under study. The positivist paradigm was also used because it was better suited to the quantitative nature of the study unlike the interpretivism and pragmatism paradigms.

Research Approach

The research approach refers to the technique used to gather relevant data for scientific analysis and interpretation (Malhotra et al., 2017). According to Naoum (2007), there are three different methodologies for doing research, including the quantitative, the qualitative, and the mixed methodologies. Given the research's objectives and aims, a quantitative approach was deemed appropriate and subsequently employed. The term quantitative refers to the amount of data that was gathered throughout the course of a research and is expressed numerically. Research employing quantitative approaches, such as statistics, aims to answer questions such as "who, what, when, where, how much, how many, and how," by gathering and analyzing large amounts of numerical unchanging data. It is concerned with the quantification and analysis of variables in order to obtain results.

Quantitative research relies on statistical, mathematical, or computational methods to provide precise findings. It is a method of problem solving that is

scientific, objective, rigorous, and experimental in nature (Mohajan, 2020). Aligned with the positivist research paradigm, a quantitative methodology was imperative to scrutinize the interconnections among variables for the validation or rejection of hypotheses (Mohajan, 2020). The inherent traits of this quantitative research approach rendered it the most fitting choice for fulfilling the research objectives. Following this approach, the systematic collection of data was executed to unveil associations between independent (predictor) variables and dependent (outcome) variables across the entire study population.

Research Design

A research design is intended to give a clear structure for the study (Sileyew, 2019). A research design lays out a framework which ensures that the findings of a quantitative study are reliable, undistorted, and as generalizable as possible. Research design's duty is to provide substantial solutions to research issues while reducing overhead to a minimal (Asenahabi, 2019). A poor research design may invalidate any findings of the researcher no matter how sophisticated the statistical analysis is (Dannels, 2018). Descriptive, experimental, explanatory quasi-experimental, correlational, and case study research designs are examples of research designs (Baker, 2020; Wisenthige, 2023). In this study, an explanatory research design was used.

An explanatory research design seeks to identify the causal relationships between variables and provides an in-depth understanding of the research problem. By using an explanatory research design, researchers can gather data on various

variables and analyze them to determine the causal mechanisms and pathways involved (Wisenthige, 2023). This design allowed for the examination of multiple factors and their relationships, providing a comprehensive understanding of the complex interactions between readiness for e-learning, self-regulation skills, students' satisfaction, and academic performance.

The explanatory research design is a suitable choice because it allows for the exploration of the mediation roles of self-regulation skills and students' satisfaction in the relationship between readiness for e-learning and academic performance. According to Wisenthige (2023) explanatory design provides an opportunity to collect and analyze quantitative data through surveys. Additionally, this design allows for the establishment of cause-and-effect relationships (Baker, 2020). The findings from this research design can contribute to the development of effective strategies and interventions to enhance students' readiness for e-learning, self-regulation skills, and overall academic performance in universities in Ghana.

Study Area

The study area is an important part of a research project, as it defines the geographical and contextual scope of the study. The study was conducted within the educational context of universities in Ghana that provide distance education programmes. Specifically, the study area encompassed three prominent institutions: the University of Cape Coast, the University of Ghana, and Kwame Nkrumah University of Science and Technology. These universities were chosen as the focal points of the study due to their offering of distance education programmes. The

study chose these universities because they have a wide and diversified group of distance education students who can provide rich and relevant data. The study considered student availability, accessibility, ethical, and logistical challenges.

Population

Research populations are discrete groups of individuals or entities with established commonalities. A population is a sizable group of individuals for whom it is necessary to collect data (Banerjee & Chaudhury, 2010). According to Saunders et al. (2012), the population is made up of all of the occurrences from which a sample is taken. Choosing a study population is dictated by the study's research questions or goals. When selecting the study's population, factors like location, age, gender, and employment restrictions are considered, as emphasized by Banerjee and Chaudhury (2010), to accurately define who should be included or excluded from the research. From the above, the study's population was made of students enrolled on distance education programmes in selected universities in Ghana. According to Ghana Tertiary Education Commission (GTEC), there are 147 universities in Ghana.

The selected universities in Ghana are: University of Cape Coast (UCC), University of Ghana (UG), and Kwame Nkrumah University of Science and Technology (KNUST). The University of Cape Coast was established in 1962 and has a total student population of about 78,485, of which about 29,804 are distance learners (UCC - Enrolment Facts, 2022). Also, UG was founded in 1948 and has a total student population of about 53,643, of which about 15,000 are distance

learners (UG - Enrolment and Graduation Statistics, 2020). Additionally, KNUST was established in 1952 and has a total student population of about 76,702, of which about 10,000 are distance learners (KNUST - Facts & Figures, 2021).

Sample Procedure

The right sample size can be determined statistically by applying certain statistical approaches (Lund, 2023). Sample size can be determined through data that addresses the reduction, acceptance, or anticipation of sample errors, with statisticians and social scientists employing diverse and sometimes intricate methods to calculate it. Due to the difficulty in determining the population size accurately, the study's population met the criterion of being both unknown and substantial according to Smith (2013). The study sampled 400 distance education students from 3 universities in Ghana using convenience sampling technique (see Table 1 for the breakdown). This sample size was guided by Cochran's (1977) minimum sample size recommendation of 385 for populations that are both large and unknown. This guideline has been recently emphasised by Adam (2020), which is as follows:

$$n = \frac{Z^2 * p * q}{e^2}$$

n represents the required sample size.

Z is the Z-score corresponding to the desired level of confidence. A 95 % confidence level gives us Z values of 1.96

p is the estimated proportion or probability of success. p = 0.5

q is the complement of p, where $q = 1 - p$. $q = 1 - 0.5 = 0.5$

e is the desired margin of error or level of precision. $e = 0.05$

$$n = \frac{1.96^2 * 0.5 * 0.5}{0.05^2} = 384.16$$

Sample size, n is approximately 385

Table 1: Sample size among the Universities

Tertiary Institution	No. of students
University of Cape Coast	211
University of Ghana	124
Kwame Nkrumah University of Science and Technology	65
Total	400

Source: Field survey (2022)

In population research, sampling procedures are classified into two types. Statistical sampling may be either probability-based or non-probability-based. The first technique is called probability sampling, and it's the one in which every person of the population being studied has chance of getting chosen to take part in the research. Probability sampling enables researchers to draw conclusions and assumptions about a study's target population (Stratton, 2021). Common probability sampling methods include random sampling methods such as simple, stratified, systematic and cluster randomization. Non-probability sampling methods are less impartial than studies that rely on random sampling, and they include the researcher selecting, referring, or having participants self-select to take part in a study rather than randomly selecting people from a target population.

Quota, convenience, snowball, and purposive sampling are all examples of non-probability sampling methods (Berndt, 2020).

For this study, a convenience non-probability sampling method was used to select participants. The utilization of this method in this study was justified by its practicality and suitability for accessing the targeted population of distance education students from specific universities in Ghana. Given the challenges posed by factors such as geographical dispersion and time constraints, the convenience sampling method enabled the study to efficiently gather data from readily available participants (Bhardwaj, 2019; Stratton, 2021). While acknowledging the potential limitations in terms of representativeness and generalizability, the method was chosen as it allowed for the collection of relevant insights and information without imposing excessive logistical demands, aligning with the study's objectives and constraints.

Data Collection Instruments

A data collecting instrument is used by researchers to gather data from study subjects. A questionnaire was utilised to gather data for the study. The questionnaire was employed in this research because of its low cost, high response rate, and high reliability in gathering information from large samples of respondents (Hendra & Hill, 2019; Story & Tait, 2019; Li, Higgins & Deeks, 2019). According to Theunissen, de Wolff and Reijneveld (2019), a questionnaire is an instrument for collecting information from respondents via a structured set of questions and other indicators. This data collection instrument includes numerous questions, which may be either closed-ended or open-ended, asking respondents to provide a brief

description of the current population behavior, circumstances or attributes over a certain time period.

The questionnaire was chosen because it employs a quantitative approach to its analysis which makes it the most suitable data collection instrument as it is in line with the study approach. In addition, the questionnaire administration guarantees that the various replies of participants are assessed in a consistent manner (Hair et al., 2010; Saunders et al., 2012). The researcher used closed-ended questions because they are simple to ask and answer, do not require a lengthy response from the respondent, and their results are straightforward to decipher and analyze. The questionnaire design employs a Likert scale with options ranging from "Strongly Disagree" to "Strongly Agree," represented by values 1 to 5.

The questionnaire has five sections in all: A, B, C, D and E (see Appendix A). Section A comprises questions on the demographic information of the study's participants. Section B comprises questions on students' readiness for e-learning which serves as the independent variable within this study. Students' readiness for e-learning used 17 indicators adapted from the work of Hong and Kim (2018). Section C has questions on student satisfaction, mediating variable in the study. 5 indicators were adapted from Kirmizi (2015)

For the section D, self-regulation skills assessed through 11 indicators adapted from the work of Kirmizi (2015). The last section, section E comprised questions on academic performance, the dependent variable. This variable was measured using subjective scale. Four indicators adapted from the works of Hsieh and Cho (2011) and Damnjanovic et al. (2015). All the questions were adapted from

previous studies and modified to suit the objectives of this study. The Table 2 presents the study's variables with number of indicators used to measure them.

Table 2: Measurement and Hierarchical component of study

Higher-Order Constructs (HOC)	Lower Order Constructs (LOC)	Number of Indicators	Source(s)
Students' readiness for e-learning	Digital application usage, Digital media awareness, Digital tool application, Information seeking skills, and Information sharing behaviour	17	Hong and Kim (2018)
Self-regulation skills	Computer self-efficacy, Learner control, and Self-direction learning	11	Kirmizi (2015)
Students' satisfaction	-	5	Kirmizi (2015)
Academic performance	-	4	Hsieh and Cho (2011); Damnjanovic et al. (2015)

Source: Author's own construct (2022)

Data Processing and Analysis

Data analysis is the act of analyzing, categorizing, and tabulating evidence so that data may be transformed into results for interpretation. The process of translating a vast quantity of data into information that can be used and reporting on that information is known as data processing and analysis (Opoku et al., 2016). The study used online questionnaire with Google form to gather the data from the participants. The study used two months for the distribution, collection and cleaning of data from participants. During this period, four hundred valid responses were received from distance education students in the selected universities in Ghana. Partial least squares structural equation modeling (PLS-SEM) was employed to ensure the model's accuracy since it can be used to examine both reflective and formative components at once (Ali et al., 2018). The measurement model was, first, establish, then evaluated the structural model, where the hypotheses were tested. The study's variables have reflective and formative connections.

The adoption of the reflective model for some indicators and the formative model for others was necessary due to the nature of this study's confirmation of the causal relationship between the latent variable and its indicators. In reflective models, the causal relationship is from the latent variable to the indicators, whereas in formative models, it's the opposite (Hair et al., 2019; Wetzels et al., 2009; Chin, 2010). Item reliability, construct reliability, convergent validity, and discriminant validity were utilized to evaluate reflective models. Multicollinearity was used to evaluate formative models. Before deciding on the nature of the model, the study

made sure there was a solid foundation for the relationships between indicators and their respective constructs.

Validity and reliability of the test were determined before proceeding with the model's structural analysis. Multiple measures, such as coefficients of determination (R^2), effect sizes (f^2), and predictive validity (Q^2), were used to evaluate the model's structural validity. Using PLS-composite SEM's analysis, the study aggregated higher-order constructs by calculating scores on latent variables as the precise linear combination of the indicators (Sarstedt et al., 2019; Hair et al., 2017; Richter et al., 2016). These measures were done to ensure that the structural model was of good fit and ready for further analysis.

Partial least squares structural equation modeling is suitable for models with both Lower Order Construct (LOC) and Higher Order Construct (HOC), and to estimate mediation and moderation effects. The current study's variables called for hierarchical component model to be used. For instance, students' readiness for e-learning which was adapted from the work of Hong and Kim (2018) were expressed in terms of several levels of scale (Table 2). They were information-seeking skills, information-sharing behaviours, digital media awareness, and digital application usage. These areas in students' readiness for e-learning formed one level. And each area had several indicators/items specifically measuring them. This is where the hierarchical component model, as outlined in the literature, comes into play. In this context, HOC pertains to students' readiness for e-learning variable, while LOC encompass the specific areas of students' readiness for e-learning. A similar situation was observed in the case of self-regulation skills (Table 2).

Another issue that is worth discussing is the approach to the hierarchical component model. The repeated indicators approach, the total effects analysis of a collect-type HCM (the extended repeated indicators approach; Becker et al., 2012), and embedded and disjoint, the two-stage approaches (Sartstedt et al., 2019), allow modeling and estimating HCMs in PLS-SEM. Each of these HCM types depicts the specific relationship between the HOC and the LOCs as well as the measurement model used to operationalize the constructs on the lower-order level: reflective-reflective, reflective-formative, formative-reflective, and formative-formative (Sarstedt et al., 2019). The study opted for the disjoint two-step method with reflective-formative relationship because it improves route parameter recovery.

At first, the disjoint method relied only on testing out a model for measuring the subcomponents. These were linked to all possibly associated HOC constructs. Thus, the study examined reflective construct reliability (item and construct), validity (convergent and discriminant), and multicollinearity, while formative construct outer weight and multicollinearity were examined (Hair et al., 2019). These tests excluded items that did not meet the requirements, resulting in lower-order structure scores. Then, only the values of the lower-order constructs were stored. In this study, the scores of the LOCs computer self-efficacy, learner control, and self-direction learning, which together form the HOC Self-regulation skills; and the LOCs digital application usage, digital media awareness, digital tool application, information seeking skills, and information sharing behavior, which together form the HOC students' readiness for e-learning.

In the second phase, these scores served as quantitative indicators of the related higher-order construct. To this end, the study used the PLS-SEM method once again in this second stage, this time using the lower-order dimensions of higher-order constructs as the indicators. The PLS-SEM method was refined in this second phase for use in assessing the measurement and structural models (Sarstedt et al., 2019). Also, the path coefficients, coefficient of determination, effect sizes, and predictive relevance were used to validate the structural model (Sarstedt et al., 2019). Higher-order components, which depict a complex context, improve the suggested model's ability to account for observed variation.

In addition, the cut down on the path model's relationship count, resulted in a more compact model (Figure 3 in chapter 4). It should be noted that normality and multicollinearity tests were first conducted on the data to satisfy the assumptions of normality and no linear connection between the explanatory variables respectively (Creswell, 2014; Rahi, 2017). IBM SPSS version 26 were used to summarize, describe, and analyze the data using descriptive (mean and standard deviation) while SmartPLS 4.0 (Ringle, Wende & Becker, 2022) was used for the inferential statistics (PLS-SEM analysis for the path model).

Validity and Reliability of Instrument

Validity is a measure of how effectively something captures ideas and how accurate it is, whereas reliability is a measure of how consistent an item is. For internal consistency testing, Cronbach alpha, a measure of reliability and dependability, were utilized while confirmatory factor analysis were used for validity. According to Henseler et al. (2015), any Cronbach's alpha higher than 0.7

is considered an acceptable index and outstanding reliability. Researchers may determine the validity of a study by asking a series of probing questions to the participants in the study (Harriss & Atkinson, 2015). The validity of the instrument was verified by its ability to accurately evaluate the objective of the study. The model's performance in predicting the observed data will also be validated using goodness-of-fit criteria.

Normality Test

The researchers conducted a normality test to confirm that the data was normally distributed. The lack of substantial outliers and collinearity must be assured for PLS-SEM analysis, despite the fact that normally distributed data are not required (Hair et al., 2019). It is rare for PLS-SEM to presume randomness. They emphasize that when bootstrapping non-normal data, peaked and skewed distributions could be generated. Before using inferential statistics, the distribution of the data was examined. Graphic and numerical techniques are employed to assess the data's statistical normality (including statistical tests). However, statistical tests are insensitive with small samples and oversensitive with large ones when attempting to objectively assess whether or not something is normal.

A skewness or kurtosis of ± 1.5 is considered acceptable by Tabachnick and Fidell (2013). SEM's skewness ranges from -3 to +3, whereas Kurtosis ranges from -10 to +10 (Brown, 2015). Due to SEM's robustness, minor deviations may not be indicative of more significant assumptions being violated. Table 3 showed a normal distribution with excess kurtosis between -1.572 and -0.912 and skewness between -0.390 and 0.356 This is within the permissible range, according to Brown (2015).

Table 3: Normality measure

Variable	Excess kurtosis	Skewness
Academic Performance	-1.226	0.143
Computer/Internet Self efficacy	-1.177	-0.390
Digital Application Usage	-1.491	-0.310
Digital Media Awareness	-1.431	0.029
Digital Tool Application	-1.572	0.070
Information Seeking Skills	-1.155	0.356
Information Sharing Behaviour	-1.368	-0.016
Learner Control	-1.316	-0.159
Self-Direction Learning	-0.912	-0.328
Student Satisfaction	-1.257	0.012

Source: Field survey (2022)

Multicollinearity

The term "multicollinearity" refers to the phenomenon that occurs when the multiple linear regression analysis includes a number of factors that are not only closely associated with the dependent variable, but also with each other (Shrestha, 2020). Because of multicollinearity, some of the main factors in the research turned out to be statistically insignificant. The variance inflation factor (VIF) was used in order to quantitatively analyze multicollinearity. The variance inflation factor is a metric that determines how much the variance of the predicted regression coefficient is inflated as a result of correlation between the variables that are considered independent.

An independent variable has no correlation with the dependent one when VIF is equal to 1. VIF values greater than 1 but less than 5 indicate substantial

correlation between the variables. VIF values ranging from 5 to 10, indicate strongly linked variables. For weaker models, VIF values over 2.5 may be a cause for concern, while for more robust models, VIF values above 10 are often seen as suggesting multicollinearity (Senaviratna & Cooray, 2019; Shrestha, 2020).

Ethical Considerations

The study's participants were specifically informed of the researcher, his intent and data requirements. Everyone who participated in the study was guaranteed that their responses would remain private and confidential. Those who volunteer for research projects need to be given assurances that their identities would be concealed and kept secret (Hoft, 2021). The questionnaire did not include a column for respondents to provide their names or any self-identifying statements for that matter to maintain confidentiality and anonymity of respondents. Participants were assured that their information would be kept private and used only for research in a statement included in the study materials.

Chapter Summary

The chapter looks at the research methodologies employed in this study. It examines the research paradigm, methodology, design, study area, study population, sampling technique, sample size, the instrument used for the collecting of data from respondents, measurement of study variables, data processing and analysis, and the ethical issues. The chapter provides a convincing defense for each and every research approach that was used. In this chapter, descriptive and inferential statistical methods, such as means, standard deviations, correlation, and

regression, were used to analyze the data processed using IBM SPSS (v.26) and SmartPLS (v.4.0) in order to answer the study's research hypotheses and, as a result, achieve its objectives. These methods were used to determine whether or not there was a correlation between two variables.



CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The results obtained after the analysis of data collected from respondents are presented in this chapter. The first part of the chapter details how the data collected was analysed and the demographic characteristics of respondents. The chapter then goes on to present the descriptive statistics for the various constructs of the study. Next, the study's model is evaluated, followed by various checks to ensure the data was fit for analysis. The final part of the chapter presents the main results from the various paths assessed and also the mediation effects.

At the end of data collection, the study had 400 responses from google form (online questionnaires) that targeted distance education students in selected universities in Ghana. The responses received were cleaned and prepared with IBM SPSS statistical software and it was subsequently used for data analysis and generalization (Sheard, 2018; Samuels, 2020).

Data processing and analysis

Data processing and analysis is the transformation of massive amounts of data into actionable information for better decision-making and policy formulation (Denis, 2018). In order to reduce the quantity of data gathered, descriptive and inferential statistics were employed. Descriptive statistics make it simpler to describe and summarize data dependent on the characteristics of the respondents. It is possible to draw generalizations about a population using inferential statistics

based on sample estimations. IBM SPSS version 26 was used for processing the data and descriptive statistics, while SmartPLS v 4.0 (Ringle, Wende & Becker, 2022) was used for inferential statistics.

Socio-Demographic Characteristics of Respondents

In this section, the study presented on the respondents' demographic information. Questions on participants' sex, age, degree of education, academic field, marital status, familiarity with online learning tools, and familiarity with the online learning Platform are among the most important pieces of demographic information being collected for this research (s). Dissected and summarized results for respondent demographics are shown in Table 4.

Table 4: Demographic Characteristics of Respondents

Variables	Frequency	Percent
Sample Size	400	100.0
Sex		
Male	237	59.0
Female	163	41.0
Age (in years)		
21-30	249	62.3
31-40	129	32.3
41-50	12	3.0
over 50	10	2.5
Educational Level		
Diploma	106	26.5
Undergraduate	189	47.3
Research Postgraduate	28	7.0
Taught Postgraduate	59	14.8

Variables	Frequency	Percent
Others	18	4.5
Academic Field		
Arts and Social Science	13	3.3
Business	154	38.5
Education	112	28.0
Mathematics and Science	56	14.0
Others	65	16.3
Marital Status		
Single	264	66.0
Married	122	30.5
Widow(er)	14	3.5
Skill in the use of online learning tools		
Novice	70	17.5
Intermediate	206	51.5
Expert	124	31.0
Skill in the use of online learning platforms		
Beginner	97	24.3
Intermediate	194	48.5
Advanced	109	27.3

Source: Field survey (2022)

From Table 4, majority of the respondents were males (237) and this represents (59.3%) of the 400 respondents. Thus, (163) respondents are females representing (40.8%). With respect to marital status, majority of the respondents were single (264) and this represent (66.0%), 122 of the respondents representing (30.5%) were married. Finally, 14 of the respondents representing (3.5%) were widow(er). In terms of age, majority (249) of the respondents representing (62.3%) were within the ages of 21-30 years. The Table 4 also reveals that 129 of the

respondents representing (32.3%) were within the ages of 31-40 years. Again, 12 respondents representing (3.0%) were within the ages of 41-50 and finally, 10 respondents representing (2.5%) were within the ages of over 50 years.

In terms of educational level, majority (189) representing 47.3% of the respondents were diploma holders. 106 of the respondents representing 26.5% were undergraduate students. 59 of the respondents representing 14.8% were taught postgraduate students. 28 of the respondents representing 7.0% were research postgraduate students, and finally 18 of the respondents representing 4.5% were having other qualifications. Also, in terms of academic field of the respondents, majority (154) representing 38.5% pursue business program. 112 of the respondents representing 28.0% pursue education. Again, 65 of the respondents representing 16.3% pursue other program. 56 of the respondents representing 14.0% pursue mathematics and science, and finally, 13 of the respondents representing 3.3% pursue arts and social science.

In terms of skill in use of online learning, majority (206) representing 51.5% of the respondents were intermediate. 124 of the respondents representing 31.0% were expert in the use of online learning. Finally, 70 of the respondents representing 17.5% were novice in the use of online learning. Again, in terms of skill in use of online learning platforms, majority (194) representing 48.5% of the respondents had intermediate knowledge in the use of online learning platforms. 109 of the respondents representing 27.3% had advance knowledge in the use of online learning platforms. Finally, 97 of the respondents representing 24.3% are novice in the use of online learning platforms.

Descriptive Statistics for Students' Readiness For E-Learning, students' satisfaction, self-regulation skills and academic performance.

Descriptive statistics are statistical techniques used to describe and summarise information about the sample. The mean, median, mode, and standard deviation are examples of descriptive statistics. The variables assessing students' readiness for E-learning, students' satisfaction, self-regulation skills and academic performance are quantitatively described in this section. To statistically characterise the data, the researchers utilised mean and standard deviation. For each factor's components, separate tables were created.

Students' Readiness For E-Learning

The study sought to find out from students their opinions on student readiness for E-learning. The results are presented in the Table 5.

Table 5: Students' Readiness For E-Learning

Indicator	Mean	Std. Deviation
I know how to remove a computer virus or malware from my laptop or desktop computer.	2.68	1.68
I have the ability to upload and download material such as online images, files, video files, and sound files.	3.49	1.46
I have the ability to control software or applications from a computer or mobile device.	3.16	1.51
In a web browser, I may configure and modify security settings.	2.87	1.45

Indicator	Mean	Std. Deviation
I am able to use the basic features of a presentation application (e.g., Microsoft PowerPoint) to create class presentations.	3.51	1.71
I can utilize basic word-processing capabilities to produce and update documents for class assignments.	3.38	1.55
I can manage and analyze data in spreadsheet applications (such as Microsoft Excel) for class assignments.	3.24	1.53
In digital media material, I can spot bias or rumors.	2.78	1.53
I am capable of critically interpreting digital media information.	3.02	1.45
When I utilize digital media material, I know how to preserve intellectual property rights.	2.81	1.47
I may look for information that my colleagues are unaware of using a number of accessible methods.	2.65	1.47
I can educate my colleagues on several methods for doing good information searches.	2.92	1.42
I may create keywords to look for content for academic purposes.	2.78	1.40
I can communicate with students utilizing real-time communication options such as video conferencing or messengers.	2.99	1.57
Blogs, social networking sites, and web pages, for example, allow me to air my views on the internet.	3.03	1.49
Using internet software, I can share my files with my students.	3.25	1.49
Using online tools, I can collaborate with peers.	3.38	1.38

Source: Field survey (2022)

The Table 5 represents the descriptive statistics of the components of the factor, “Students’ Readiness For E-Learning”. From the table, it is shown that the component with the highest mean is “I am able to use the basic features of a presentation application (e.g., Microsoft PowerPoint) to create class presentations”. It has a mean of 3.51 and a SD of 1.71. The component with the second highest mean is “I have the ability to upload and download material such as online images, files, video files, and sound files”. It has a mean of 3.49 and a SD of 1.46. The component with the third highest means is “I can utilize basic word-processing capabilities to produce and update documents for class assignments” and “using online tools, I can collaborate with peers”. They have the same mean of 3.38 and a SD of 1.38 and 1.55. The component with the lowest mean is “I may look for information that my colleagues are unaware of using a number of accessible methods”. It has a mean of 2.65 and a SD of 1.47. The component with another lowest mean is “I know how to remove a computer virus or malware from my laptop or desktop computer”. It has a mean of 2.68 and a SD of 1.68.

Student Satisfaction

The study sought to find out from students their opinions on student satisfaction. The results are presented in the Table 6.

Table 6: Student Satisfaction

Indicator	Mean	Std. Deviation
Overall, I'm satisfied with online learning lessons.	3.09	1.426
My academic growth was aided as a result of taking online learning.	2.88	1.432
This training helped me advance professionally.	3.02	1.316
I am pleased with the degree of engagement that occurred throughout the course.	2.98	1.365
I would be prepared to take a totally online course again in the future.	3.00	1.491

Source: Field survey (2022)

The Table 6 shows the descriptive statistics of the components of the factor, “Student Satisfaction”. From the Table 6, it is shown that the component with the highest mean is “overall, I'm satisfied with online learning lessons”. It has a mean of 3.09 and a SD of 1.426. The component with the second highest mean is “this training helped me advance professionally”. It has a mean of 3.02 and a SD of 1.316. The component with the third highest mean is “I would be prepared to take a totally online course again in the future”. It has a mean of 3.00 and a SD of 1.491. The component with the fourth highest mean is “I am pleased with the degree of engagement that occurred throughout the course”. It has a mean of 2.98 and a SD of 1.365. The component with the lowest mean is “my academic growth was aided as a result of taking online learning”. It has a mean of 2.88 and a SD of 1.432.

Self-Regulation Skills

The study sought to find out from students their opinions on self-regulation skills. The results are presented in the Table 7.

Table 7: Self-Regulation Skills

Indicator	Mean	Std. Deviation
I am comfortable with the fundamental capabilities of Microsoft Office products (Word, MS Excel, PowerPoint)	3.42	1.541
I am confident in my understanding and abilities to handle software for online learning.	3.09	1.498
I am confident in my ability to use the Internet to search or acquire information for online learning.	3.56	1.436
I stick to my own study schedule.	3.17	1.370
When I am having difficulty learning, I seek help.	3.48	1.375
I'm good at managing my time.	3.05	1.298
I established my learning objectives.	3.09	1.228
My learning expectations are greater.	3.36	1.482
I have the ability to guide my own learning development.	3.10	1.515
When I am studying online, I am not sidetracked by other internet activities (Facebook, Twitter, etc.)	2.75	1.306
I repeat the educational materials based on my need.	3.13	1.482

Source: Field survey (2022)

The Table 7 represents the descriptive statistics of the components of the factor, Self-Regulation Skills. From the Table 7, it is shown that the component with the highest mean is “I am confident in my ability to use the Internet to search or acquire information for online learning”. It has a mean of 3.56 and a SD of 1.436. The component with the second highest mean is “when I am having difficulty learning, I seek help”. It has a mean of 3.48 and a SD of 1.375. The component with the third highest means is “I am comfortable with the fundamental capabilities

of Microsoft Office products (Word, MS Excel, PowerPoint)”. It has a mean of 3.42 and a SD of 1.541. The component with the lowest mean is “I’m good at managing my time”. It has a mean of 3.05 and a SD of 1.298. The component with another lowest mean is “when I am studying online, I am not sidetracked by other internet activities (Facebook, Twitter, etc.)”. It has a mean of 2.75 and a SD of 1.306.

Academic Performance

The study sought to find out from students their opinions on their academic performance. The results are presented in the Table 8.

Table 8: Academic Performance

Indicator	Mean	Std. Deviation
The content on eLearning system improves my grade.	2.85	1.345
The e-learning tool improves my grade for the subject	2.74	1.292
Use of the e-learning tool has improved my overall learning performance	2.72	1.432
Applying e-learning encourages me to continue learning on the Internet by myself	2.95	1.470

Source: Field survey (2022)

The Table 8 shows the descriptive statistics of the components of the factor, Academic Performance. From the Table 8, it is shown that the component with the highest mean is “applying e-learning encourages me to continue learning on the Internet by myself”. It has a mean of 2.95 and a SD of 1.470. The component with the second highest mean is “the content on eLearning system improves my grade”.

It has a mean of 2.85 and a SD of 1.345. The component with the third highest mean is “The e-learning tool improves my grade for the subject”. It has a mean of 2.74 and a SD of 1.292. The component with the lowest mean is “use of the e-learning tool has improved my overall learning performance”. It has a mean of 2.72 and a SD of 1.432.

Main Constructs

Table 9: Descriptive Statistics of the main construct

Indicator	Mean	Std. Deviation
Students’ Readiness For E-Learning	3.06	1.20
Student Satisfaction	2.99	1.31
Self-Regulation Skills	3.20	1.05
Academic Performance	2.82	1.34

Source: Field survey (2022)

The Table 9 shows the descriptive statistics of the main constructs, Academic Performance, Students’ Readiness For E-Learning, Student Satisfaction and Self-Regulation Skills. From the Table, it is shown that the variable with the highest mean is Self-Regulation Skills. It has a mean of 3.20 and a SD of 1.05. The variable with the second highest mean is Students’ Readiness For E-Learning. It has a mean of 3.06 and a SD of 1.20. The variable with the third highest mean is Student Satisfaction. It has a mean of 2.99 and a SD of 1.31. The component with the lowest mean is Academic Performance. It has a mean of 2.83 and a SD of 1.34.

Assessing PLS-SEM Results

This part of the study describes the outcomes of using the disjoint two-step technique on the higher-order component (HOC) model. The research model hypothesis was put through its paces using proper PLS-SEM procedure. Because they provide a summary of the constructs, higher-order constructs help researchers create a simpler model. In order to take advantage of this, the study used applicable recommendations (Hair et al., 2018) and recent study (Nguyen, 2020) on hierarchical component models to conduct independent assessments of students' eLearning preparedness and self-regulation abilities as formative higher order components.

Parameter bias in the structural model was reduced as much as possible by using a disjoint two-stage approach (Sarstedt et al., 2019). At the outset, the model consisted solely of first-order components, the lowest possible order. Higher-order (second-order) relationships that need to be formed were included into the model's predictions. Construct scores from the first stage were used to make predictions about the second stage's higher-order constructs (Sarstedt et al., 2019). The first thing that was done was to do analysis on the outer model based on the prediction findings that were obtained in the first step. Reflective measurement was used for all of the measurements in this procedure; hence the analyses were performed within the framework of reflective measurement (Table 10).

Evaluation of LOC Measurement Model

The reliability and validity of the lower-order composites measurement model was assessed according to the following four criteria: reliability of individual

items, construct reliability, convergent validity, and discriminant validity. Convergent validity was evaluated using factor loadings, Cronbach's Alpha (CA), rho A, Composite Reliability (CR), and Average Variance Extracted (AVE) (Hair Jr et al. 2017). Each item loading in Table 3 was higher than the threshold of 0.7. The Cronbach Alpha, rho A, and Composite Reliability values of the constructs were all over 0.7, and the AVE values were all above the cutoff value of 0.5. (Hair Jr et al. 2017). Therefore, convergent validity was established for these latent variables (Table 10).

Table 10: Outer model results for first-order constructs

Constructs/Associated Indicators	Factor Loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Academic Performance		0.976	0.978	0.982	0.933
AP1	0.960				
AP2	0.966				
AP3	0.964				
AP4	0.974				
Digital Tool Application		0.943	0.948	0.959	0.853
SREL1	0.912				
SREL2	0.899				
SREL3	0.955				
SREL4	0.927				
Information Sharing Behaviour		0.945	0.948	0.96	0.858
SREL14	0.925				

Constructs/Associated Indicators	Factor Loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
SREL15	0.923				
SREL16	0.946				
SREL17	0.910				
Digital Media Awareness		0.931	0.933	0.956	0.878
SREL8	0.924				
SREL9	0.944				
SREL10	0.943				
Information Seeking Skills		0.927	0.929	0.954	0.873
SREL11	0.948				
SREL12	0.942				
SREL13	0.914				
Digital Application Usage		0.956	0.957	0.972	0.92
SREL5	0.932				
SREL6	0.976				
SREL7	0.968				
Computer/Internet Self efficacy		0.95	0.959	0.968	0.908
SRS1	0.959				
SRS2	0.943				
SRS3	0.957				
Learner Control		0.916	0.923	0.947	0.855
SRS9	0.925				
SRS10	0.909				
SRS11	0.940				
Self-Direction Learning		0.94	0.943	0.954	0.806

Constructs/Associated Indicators	Factor Loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
SRS4	0.867				
SRS5	0.908				
SRS6	0.886				
SRS7	0.882				
SRS8	0.943				
Student Satisfaction		0.962	0.962	0.97	0.867
SS1	0.950				
SS2	0.910				
SS3	0.941				
SS4	0.932				
SS5	0.924				

Source: Field survey (2022)

Discriminant validity shows the degree to which one construct varies from another (Ronkko & Cho, 2022). While discriminant validity assesses how effectively two scales can measure distinct components within a structural model, convergent validity evaluates indicators' potential to measure or capture a single component (Henseler, Ringle & Sarstedt, 2015). Three criteria, including the HTMT, the Fornier-Lacker criterion, and cross-loadings, were suggested by Hair et al. (2017) for evaluating discriminant validity. Because this is how cross-loadings are generally assessed, an item's outer loading on its target construct should be higher than its cross-loadings on other constructs. Because the target construct is loaded. This is because the target construct matters most. According to Table 11, the outer loading of each component was larger on the corresponding construction

than any of the cross-loadings that any of the components experienced. This was the situation with each and every one of the things.

The second approach that was used in the examination of the discriminant validity was the Fornell-Larcker criteria. According to these requirements, the square root of the average variance extracted from each component's data has to be higher than the component's correlation with the other factors. The findings of this alternative technique are summarized in Table 12, which shows that the square root of the AVE for each construct was found to be greater than any relationship that any of the constructs had with any other constructs. The information is shown in Table 12.

The heterotrait-monotrait-ratio (HTMT) has been recommended for assessing discriminant validity by Henseler et al. (2015). The genuine correlation between two constructs may be estimated using this new method. The cutoff for HTMT is suggested to be 0.90. (Henseler et al., 2015). A cutoff of more than 0.90 suggests that the test lacks discriminant validity. Finally, HTMT's confidence interval should not include 1. The PLS model used in this investigation met the HTMT criteria, as shown in Table 13.

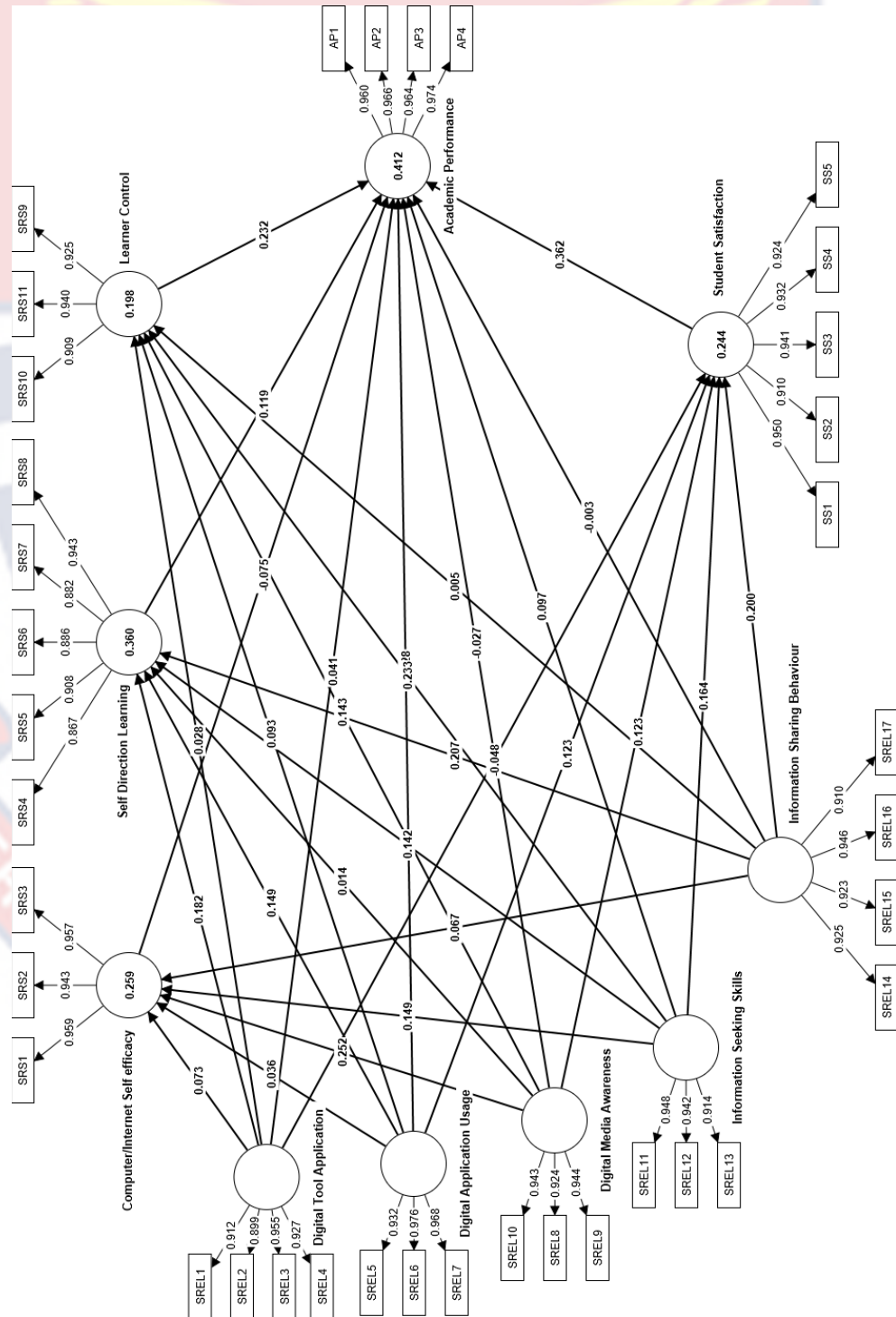


Figure 2: Assessment Model for the first/lower-order construct

Table 11: Discriminant validity - Cross loadings (first-order model)

Variable	Academic Performance	Computer/Internet Self efficacy	Digital Application Usage	Digital Media Awareness	Digital Tool Application	Information Seeking Skills	Information Sharing Behaviour	Learning Control	Self-Directed Learning	Student Satisfaction
AP1	0.960	0.238	0.335	0.320	0.331	0.374	0.335	0.468	0.426	0.523
AP2	0.966	0.286	0.351	0.340	0.327	0.398	0.342	0.472	0.442	0.534
AP3	0.964	0.267	0.324	0.321	0.319	0.392	0.346	0.512	0.453	0.559
AP4	0.974	0.296	0.380	0.360	0.359	0.411	0.376	0.519	0.464	0.578
SREL1	0.374	0.425	0.612	0.633	0.912	0.613	0.627	0.383	0.530	0.363
SREL10	0.357	0.462	0.553	0.943	0.606	0.681	0.657	0.379	0.470	0.421
SREL11	0.377	0.462	0.634	0.718	0.683	0.948	0.680	0.392	0.512	0.424
SREL12	0.387	0.395	0.604	0.654	0.604	0.942	0.666	0.390	0.490	0.402
SREL13	0.380	0.405	0.637	0.636	0.601	0.914	0.637	0.396	0.458	0.416
SREL14	0.379	0.418	0.625	0.664	0.653	0.739	0.925	0.342	0.513	0.465
SREL15	0.306	0.350	0.504	0.571	0.585	0.580	0.923	0.293	0.494	0.374
SREL16	0.331	0.366	0.576	0.621	0.620	0.647	0.946	0.301	0.467	0.410

Variable	Academic Performance	Computer/Internet Self efficacy	Digital Application Usage	Digital Media Awareness	Digital Tool Application	Information Seeking Skills	Information Sharing Behaviour	Learning Control	Self-Directed Learning	Student Satisfaction
SREL17	0.321	0.384	0.558	0.611	0.574	0.641	0.910	0.322	0.481	0.378
SREL2	0.278	0.378	0.630	0.623	0.899	0.616	0.595	0.303	0.478	0.312
SREL3	0.301	0.383	0.608	0.619	0.955	0.611	0.596	0.292	0.478	0.323
SREL4	0.316	0.331	0.596	0.644	0.927	0.655	0.611	0.293	0.434	0.322
SREL5	0.322	0.361	0.932	0.572	0.611	0.587	0.545	0.349	0.506	0.355
SREL6	0.335	0.365	0.976	0.606	0.633	0.656	0.606	0.333	0.462	0.384
SREL7	0.378	0.375	0.968	0.614	0.662	0.680	0.614	0.352	0.474	0.410
SREL8	0.332	0.444	0.633	0.924	0.680	0.671	0.590	0.358	0.425	0.382
SREL9	0.285	0.431	0.567	0.944	0.634	0.662	0.628	0.358	0.428	0.367
SRS1	0.269	0.959	0.346	0.419	0.376	0.398	0.372	0.422	0.444	0.390
SRS10	0.425	0.351	0.300	0.338	0.280	0.346	0.259	0.909	0.453	0.472
SRS11	0.455	0.402	0.325	0.383	0.332	0.409	0.345	0.940	0.520	0.486
SRS2	0.276	0.943	0.405	0.505	0.431	0.494	0.435	0.376	0.367	0.393
SRS3	0.259	0.957	0.335	0.428	0.369	0.385	0.359	0.412	0.422	0.404

Variable	Academic Performance	Computer/Internet Self efficacy	Digital Application Usage	Digital Media Awareness	Digital Tool Application	Information Seeking Skills	Information Sharing Behaviour	Learning Control	Self-Directed Learning	Student Satisfaction
SRS4	0.435	0.352	0.438	0.349	0.369	0.421	0.424	0.523	0.867	0.468
SRS5	0.393	0.418	0.403	0.423	0.467	0.460	0.462	0.494	0.908	0.403
SRS6	0.406	0.312	0.431	0.419	0.451	0.450	0.459	0.424	0.886	0.438
SRS7	0.402	0.411	0.477	0.467	0.520	0.499	0.508	0.472	0.882	0.435
SRS8	0.441	0.423	0.493	0.448	0.525	0.501	0.510	0.527	0.943	0.461
SRS9	0.529	0.412	0.367	0.359	0.346	0.404	0.333	0.925	0.528	0.510
SS1	0.556	0.416	0.383	0.387	0.334	0.419	0.423	0.531	0.499	0.950
SS2	0.560	0.382	0.365	0.392	0.306	0.430	0.403	0.519	0.434	0.910
SS3	0.534	0.383	0.373	0.402	0.365	0.421	0.413	0.483	0.451	0.941
SS4	0.511	0.358	0.358	0.371	0.311	0.392	0.398	0.459	0.446	0.932
SS5	0.485	0.392	0.382	0.390	0.356	0.400	0.418	0.473	0.455	0.924

Source: Field survey (2022)

Table 12: Discriminant validity – Fornell-Larcker criterion (first-order model)

Construct	1	2	3	4	5	6	7	8	9	10
1 Academic Performance	0.966									
2 Computer /Internet Self efficacy	0.282	0.953								
3 Digital Application Usage	0.360	0.383	0.959							
4 Digital Media Awareness	0.348	0.476	0.623	0.937						
5 Digital Tool Application	0.346	0.414	0.663	0.682	0.924					
6 Information Seeking Skills	0.408	0.451	0.669	0.717	0.675	0.935				
7 Information Sharing Behaviour	0.363	0.411	0.614	0.668	0.659	0.707	0.926			
8 Learner Control	0.511	0.422	0.359	0.390	0.347	0.420	0.341	0.925		
9 Self-Direction Learning	0.462	0.429	0.501	0.472	0.523	0.521	0.529	0.543	0.898	
10 Student Satisfaction	0.569	0.415	0.400	0.417	0.359	0.443	0.441	0.530	0.491	0.931

Note: The square roots of the AVE values were highlighted for emphasis.

Source: Field survey (2022)

Table 13: Discriminant validity - Heterotrait-monotrait ratio (HTMT) (first-order model)

Construct	1	2	3	4	5	6	7	8	9	10
1 Academic Performance										
2 Computer /Internet Self efficacy	0.291									
3 Digital Application Usage	0.372	0.398								
4 Digital Media Awareness	0.363	0.502	0.661							
5 Digital Tool Application	0.358	0.431	0.697	0.729						
6 Information Seeking Skills	0.428	0.475	0.710	0.770	0.721					
7 Information Sharing Behaviour	0.375	0.429	0.643	0.709	0.695	0.752				
8 Learner Control	0.536	0.451	0.382	0.421	0.368	0.454	0.362			
9 Self-Direction Learning	0.483	0.455	0.527	0.501	0.549	0.556	0.558	0.584		
10 Student Satisfaction	0.586	0.434	0.416	0.440	0.375	0.469	0.461	0.563	0.517	

Source: Field survey (2022)

Multicollinearity and Common Method Bias Test

The extent of multicollinearity was investigated in the research. According to Kock (2016) and Hair et al. (2017), a thorough collinearity test based on Variance Inflation Factor (VIF) values is the most effective way to discover multicollinearity (both lateral and vertical) in PLS-SEM. The variance inflated factors (VIF) values are calculated from the latent variable scores of endogenous variables. The utilization of a homogenous sample (higher education students) raises the possibility of a severe case of Common Method Variance (CMV).

Many recent studies have tried to deal with the issue of common method bias that arises while collecting data from the same sample of people (Rahman et al., 2015; Tehseen et al., 2017; Fuller et al., 2016; Malhotra et al., 2017; Palmatier, 2016). Having a VIF larger than 3.3 is recommended as an indicator of pathological collinearity and, by extension, that a model may be tainted by common method bias. If all VIFs in the inner model from a thorough collinearity test are 3.3 or lower, then the model is free of common method bias (Kock, 2015). Neither common method bias nor multicollinearity are present in the model, as shown in Table 14.

Table 14: Collinearity statistics (VIF) - inner model (first-order model)

Construct	1	2	8	9	10
Academic Performance					
1 Academic Performance	1.489				
2 Computer /Internet Self efficacy	2.252	2.209	2.209	2.209	2.209
3 Digital Application Usage	2.683	2.580	2.580	2.580	2.580
4 Digital Media Awareness	2.574	2.500	2.500	2.500	2.500
5 Digital Tool Application	2.974	2.885	2.885	2.885	2.885

Construct	1	2	8	9	10
6 Information Seeking Skills	2.555	2.433	2.433	2.433	2.433
7 Information Sharing Behaviour	1.713				
8 Learner Control	1.934				
9 Self-Direction Learning	1.653				
10 Student Satisfaction					

Source: Field survey (2022)

Evaluation of HOC Measurement Model

It is possible for variables to have no correlation at all, negative correlation, or positive correlation between the formative factors. As a result, measures such as consistency reliability, the reliability of internal indicators, and discriminant validity would be of little help for assessing formative conceptions (Wong, 2013). This was due to the fact that for any latent variable including uncorrelated measurements, outer loadings, CR, and AVE would lose all significance (Wong, 2013). The importance and relevance of indicator weights, as well as collinearity, were also employed extensively to examine the formative measurement model (Hair et al., 2011). The formative measurement model can be evaluated in three ways, as proposed by Ramayah et al. (2018), Cheah et al. (2018), and Hair et al. (2017): (i) by analyzing the convergent validity; (ii) by analyzing the collinearity issues; and (iii) by analyzing the significance and relevance of formative items. Therefore, the following technique would be used to evaluate the study's objectives in light of the recommendations made by Hair et al. (2017).

The disjoint two-stage technique was employed within the framework of the structural model to reduce the possible consequences of the parameter bias

(Sarstedt et al., 2019). At the outset, the model consisted solely of first-order components, the lowest possible order. Higher-order (second-order) linkages that need to be formed were included into the model's predictions. Construct scores from the first stage were used to make predictions about the second stage's higher-order constructs (Sarstedt et al., 2019).

First, the prediction findings from the first stage were used to inform the outer model analyses. All of the measurements taken here were reflective, thus all of the analyses were performed in that light (Table 10).

Table 15: Outer model results for second-order constructs

Second-order constructs	Associated first-order constructs	Weights	p-value	VIF
Students Readiness for eLearning	Digital Application Usage	0.230	0.015	2.209
	Digital Media Awareness	0.187*	0.100 ^a	2.580
	Digital Tool Application	0.100*	0.382 ^b	2.500
	Information Seeking Skills	0.368	0.002	2.885
	Information Sharing Behaviour	0.272	0.011	2.433
Self-Regulation Skills	Learner Control	0.363	0.000	1.513
	Self-Direction Learning	0.588	0.000	1.524
	Computer/Internet Self efficacy	0.269	0.000	1.306

^a Digital Media Awareness outer loading = 0.844, p = 0.000.

^b Digital Tool Application outer loading = 0.807, p = 0.000.

Source: Field survey (2022)

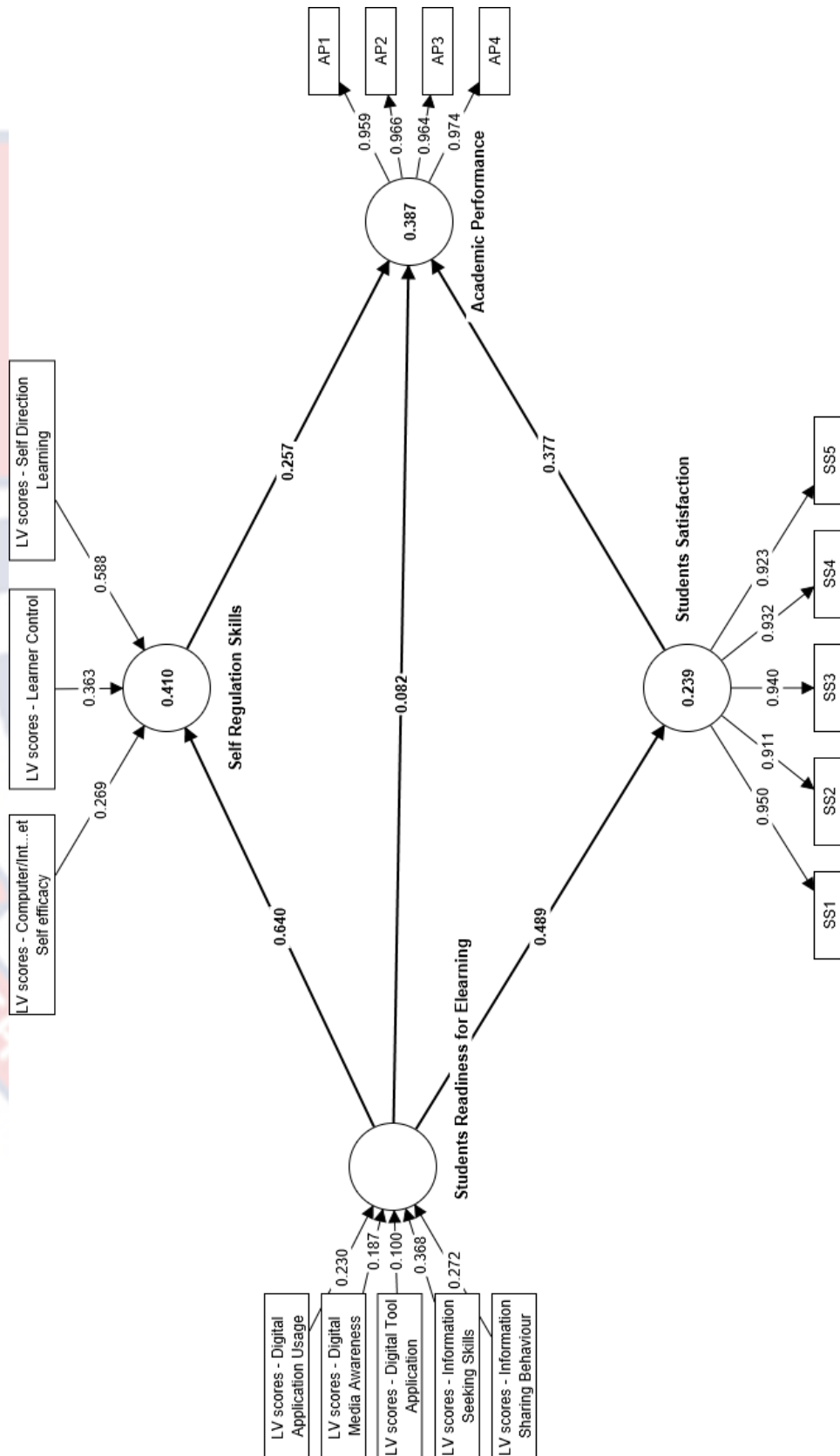


Figure 3: Assessment Model for the second-order construct

Second, outer model findings with higher-order components (HOC) were evaluated. Since the constructs (i.e., students' eLearning readiness and self-regulation abilities) were measured as formative HOC, they were examined using outer model evaluation criteria. Except for Digital Media Awareness and Digital Tool Application, all of the outer weights that are shown in Table 15 were determined to be significant ($p < 0.05$) when using a bootstrap analysis with 5000 subsamples. This was the case for all of the outer weights. Non-significant outer weights in formative constructs are not eliminated. Keeping or removing a non-significant outer weight depends on its outer loading. If the outer loading of a nonsignificant outer weight is more than 0.50, it should be interpreted as certainly important but not as comparably important and maintained (Hair et al., 2018). Because its outer loading is greater than the cutoff value of 0.50 (Digital Media Awareness_{outer loading} = 0.844, $p = 0.000$ and Digital Tool Application_{outer loading} = 0.807, $p = 0.000$), and because it continues to be theoretically important, Digital Media Awareness and Digital Tool Application are both kept in the model.

The variance inflation factor (VIF) was then adjusted for multicollinearity, and no item exceeded 5.0 points. No multicollinearity issues on the table 15. Weights were analyzed item-by-item to determine relative contribution. Thus, required circumstances for formative measures were satisfied (Hair Jr et al., 2017).

Test of Model Fit Using Overall Fit and Other Relative Measures for the structural model

This section evaluated the model's overall fit using a variety of related metrics. Coefficient of determination (R^2), effect size (f^2), the cross-validated

redundancy measure (Q^2) and standardized root mean square residual (SRMR) were all employed in this investigation to evaluate the study's structural model. Table 16 shows the structural model's R^2 , f^2 and Q^2 to illustrate how well the structural model fit. Using these measurement units, the study may demonstrate the equation's overall fit. Although the acceptable values of R^2 vary on the study environment (Hair Jr et al., 2020), the following criteria might be considered: 0.75 (substantial), 0.50 (moderate), and 0.25 (weak) (Henseler et al., 2009).

In addition to the value of R^2 , the value of Q^2 that was acquired while blindfolded should be larger than zero for there to be predictive significance. To understand the predictive relevance (Q^2), Hair et al. (2019) recommends the following thresholds: 0 for a small, 0.25 for a medium, and 0.50 for a big (large). When doing an analysis of the effect sizes, the 2 values that fall within the range of 0.02 to 0.15 are regarded as being weak, those that fall within the range of 0.15 to 0.35 are seen as being moderate, and those that have values that are larger than 0.35 are regarded as being strong (Cohen, 1992; Hair Jr et al., 2020). Table 16 contains the findings obtained from the inner model. Table 16 displays the results of model fit testing.

The coefficient of determination (R^2) measures the amount of variance in the endogenous variable that is explained by a set of exogenous variables in a model. This effect has a 0–1 scale, with 1 denoting perfect foresight. Although R^2 is a useful tool for measuring the quality of a PLS model, over reliance on R^2 might be dangerous. In particular, relying just on R^2 may lead researchers to pick a less efficient model when comparing models with varying specifications of the same

endogenous components (Hair et al., 2014). In Table 16, the total variance explained by the predictors of academic performance (R^2) was 0.387. This implies that 38.7 per cent of the variation in academic performance is explained by the variables: self-regulation skills, students' readiness for eLearning and students' satisfaction and it suggests moderate predictive accuracy.

Also, the total variance explained by the predictors of self-regulation skills (R^2) was 0.410. This implies that 41.0 per cent of the variation in self-regulation skills is explained by the student's readiness for eLearning and it suggests moderate predictive accuracy. Finally, the total variance explained by the predictors of student's satisfaction (R^2) was 0.239. This implies that 23.9 per cent of the variation in students' satisfaction is predicted by the variable student's readiness for eLearning and it suggests weak predictive accuracy.

Table 16: Goodness-of-Fit Indices for the Proposed Model for the Study

	Academic Performance	Self- Regulation Skills	Students Satisfaction
Effect Size (f^2)			
Academic Performance			
Self-Regulation Skills	0.053		
Students Readiness for Elearning	0.006	0.694	0.314
Students Satisfaction	0.145		
Stone-Geisser's Q^2 (=1- SSE/SSO)	0.172	0.389	0.223

	Academic Performance	Self- Regulation Skills	Students Satisfaction
R Square	0.387	0.410	0.239
R Square Adjusted	0.382	0.408	0.237
Model Fit index			
Standardized Root Mean Square Residual (SRMR)	0.083		

Source: Field survey (2022)

The effect size (f^2) of each exogenous construct to the endogenous constructs is shown in table 16. Cohen (1988) proposes a guide to the interpretation of effect sizes. From Table 16, effect of self-regulation skills on academic performance had a f^2 value of 0.053 representing small effect size. Again, effect of student's readiness for eLearning on academic performance had a f^2 value of 0.006 representing small effect size. Also, effect of students' satisfaction on academic performance had a f^2 value of 0.145 representing small effect size. The effect of student's readiness for eLearning on self-regulation skills had a f^2 value of 0.694 representing strong effect size. Finally, effect of student's readiness for eLearning on students' satisfaction had a f^2 values of 0.314 representing moderate effect size.

Predictive relevance (Q^2) values, as proposed by Geisser (1974) and Stone (1974), are said to be indicative of the PLS model's ability to accurately predict. In order to get this metric, a PLSpredict algorithm (Shmueli et al., 2016) is used. Q^2 values are predictively significant since they are all greater than zero (Hair et al.,

2018). Q^2 values of 0.172, 0.389, and 0.223 were obtained for these variables' academic performance, self-regulation skills and students' satisfaction, respectively, using 10 number of folds and repetition, indicating that the model has predictive relevance for this model (Table 16).

Finally, the research evaluated the SRMR model fit index in its final analysis. SRMR is defined as the difference between observed and predicted correlation matrices. Thus, the average difference in correlations observed and anticipated may be used as an absolute measure of the model fit. A value of less than or equal to 0.10 or 0.08 is considered a good match (in a more cautious version; according to Hu and Bentler, (1999). Model misspecification may be avoided by using Henseler et al. (2014)'s new goodness of fit measure for PLS-SEM, the SRMR. In Table 16, it is found that the SRMR value is 0.083, which is within the acceptable range of less than 0.08.

Presentation of Findings (Direct effect)

An examination of the path coefficients in Table 17 shows that the direct effects among all the constructs. Results of the bootstrapping with 5000 subsamples were used to see whether the path coefficients are significant. The effects were tested at significant value, p-value of less than 0.05. The effect of Students Readiness for eLearning on Academic Performance (H_1) ($\beta = 0.082$, $STDEV = 0.054$, $T\ Statistics = 1.524$) is positive but insignificant at p value of 0.128, $p < 0.05$. The forecast is further supported with a 95% confidence level at lower and higher bounds of -0.004 and 0.174. The fact that the confidence interval values were multidimensional showed that the forecast was accurate and not just a guess.

Again, the effect of Students Readiness for eLearning on Self-Regulation Skills (H₂) ($\beta = 0.640$, STDEV = 0.037, T Statistics = 17.277) is positive and significant at p value of 0.000. The forecast is further supported with a 95% confidence level at lower and higher bounds of 0.580 and 0.702 respectively. The fact that the confidence interval values were uni-dimensionality showed that the forecast was accurate and not just a guess.

Students Readiness for eLearning (H₃) ($\beta = 0.489$, STDEV = 0.042, T Statistics = 11.692) have a positive and significant effect on Students Satisfaction at p value of 0.000. The forecast is further supported with a 95% confidence level at lower and higher bounds of 0.425 and 0.561 respectively. The fact that the confidence interval values were uni-dimensionality showed that the forecast was accurate and not just a guess.

Furthermore, Self-Regulation Skills (H₄) ($\beta = 0.257$, STDEV = 0.061, T Statistics = 4.213) has a positively significant effect on Academic Performance at p value of 0.000, $p < 0.05$. The forecast is further supported with a 95% confidence level at lower and higher bounds of 0.158 and 0.359 respectively. The fact that the confidence interval values were uni-dimensionality showed that the forecast was accurate and not just a guess. Finally, Students Satisfaction (H₅) ($\beta = 0.377$, STDEV = 0.057, T Statistics = 6.617) has a positive and significant effect on Academic Performance at p values of 0.000. The forecast is further supported with a 95% confidence level at lower and higher bounds of 0.282 and 0.468 respectively. The fact that the confidence interval values were uni-dimensionality showed that the forecast was accurate and not just a guess.

Table 17: Direct effects for the hypothesized paths

Effect (Direct)	Original sample (O)	Standard deviation (STDEV)	T statistics (O /STDEV)	P values	Lower Boundary	Upper Boundary
Students Readiness for Elearning -> Academic Performance (H1₀)	0.082	0.054	1.524	0.128	-0.004	0.174
Students Readiness for Elearning -> Self-Regulation Skills (H2₀)	0.640	0.037	17.277	0.000*	0.580	0.702
Students Readiness for Elearning -> Students Satisfaction (H3₀)	0.489	0.042	11.692	0.000*	0.425	0.561
Self-Regulation Skills -> Academic Performance (H4₀)	0.257	0.061	4.213	0.000*	0.158	0.359
Students Satisfaction -> Academic Performance (H5₀)	0.377	0.057	6.617	0.000*	0.282	0.468

*Significant at 5%

Source: Field survey (2022)

Table 18: Indirect effects for the hypothesized paths

Effect (Indirect)	Original sample (O)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Lower Bound	Upper Bound
Students Readiness for eLearning -> Self-Regulation Skills -> Academic Performance (H6₀)	0.165	0.04	4.124	0.000*	0.101	0.233
Students Readiness for eLearning -> Students Satisfaction -> Academic Performance (H7₀)	0.184	0.035	5.331	0.000*	0.131	0.245

*Significant at 5%

Source: Field survey (2022)

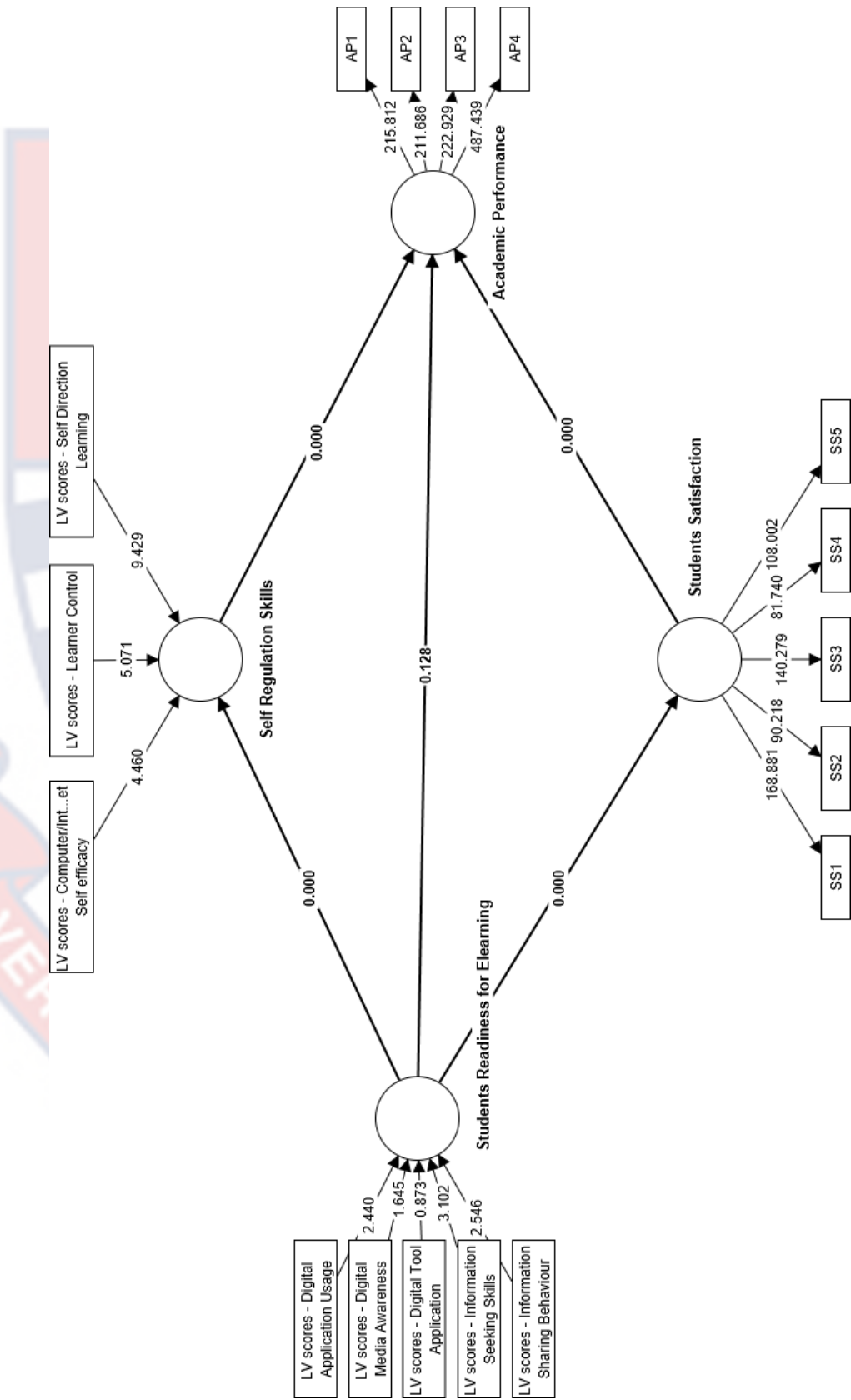


Figure 4: Assessment bootstrap model for the second-order construct

Assessment of Mediation (Indirect) Effects

Based on the study's conceptual framework, this section tries to give more insight into the impact that other contextual elements play in transforming Students Readiness for eLearning into Academic Performance. The preparation of students for eLearning is linked to their academic achievement, and H6 and H7 examine the role that self-regulation skills and student happiness play as mediators of this connection. According to the parameters laid forth by Zhao et al. (2010), a substantial indirect impact was required to assess mediation in this research. In order to identify the particular indirect effects, a bootstrapping approach (including 5000 subsamples) was carried out.

Firstly, the mediating roles self-regulation skills on students' readiness for e-learning and academic performance was examined. The indirect effect from *students' readiness for e-learning* via *self-regulation skills* to *academic performance* was found to be positive and significant ($\beta = 0.165$, $SD = 0.040$, $p < 0.05$). The forecast is further supported with a 95% confidence level at lower and higher bounds of 0.101 and 0.233 respectively. The fact that the confidence interval values were uni-dimensionality showed that the forecast was accurate and not just a guess. Consequently, the study concludes that *self-regulation skills* plays a mediation role between *students' readiness for e-learning* and *academic performance*.

Finally, the mediating role of students' satisfaction on students' readiness for e-learning and academic performance was examined. Following the same procedure, it was found that the indirect effects of students' readiness for e-learning

via students' satisfaction to academic performance was found to be positive and significant ($\beta = 0.184$, $SD = 0.035$, $p < 0.05$). The forecast is further supported with a 95% confidence level at lower and higher bounds 0.131 and 0.245 respectively.

The fact that the confidence interval values were uni-dimensionality showed that the forecast was accurate and not just a guess. Consequently, the study concludes that students' satisfaction plays a mediation role between *students' readiness for e-learning* and *academic performance*. Thus, H_{60} and H_{70} are Reject.

Summary of Hypothesis

A summary of the conclusions from the tested hypothesis is shown in Table 19.

Table 19: Summary of Direct and Indirect effects for the hypothesized paths

Hypothesis	Effect (Direct & Indirect)	Original sample (O)	P values	Results
H_{10}	Students Readiness for eLearning -> Academic Performance	0.082	0.128	Not Reject
H_{20}	Students Readiness for eLearning -> Self-Regulation Skills	0.640	0.000*	Reject
H_{30}	Students Readiness for eLearning -> Students Satisfaction	0.489	0.000*	Reject
H_{40}	Self-Regulation Skills -> Academic Performance	0.257	0.000*	Reject
H_{50}	Students Satisfaction -> Academic Performance	0.377	0.000*	Reject

Hypothesis	Effect (Direct & Indirect)	Original sample (O)	P values	Results
H6 ₀	Students Readiness for eLearning -> Self-Regulation Skills -> Academic Performance	0.165	0.000*	Reject
H7 ₀	Students Readiness for eLearning -> Students Satisfaction -> Academic Performance	0.184	0.000*	Reject

*Significant at 5%

Source: Field survey (2022)

Discussion of Results

The purpose of the study was to assess the mediation roles of self-regulation skills and students' satisfaction on the relationship between students' readiness for e-learning and academic performance of students in selected universities in Ghana. The study formulated seven (7) null hypotheses, which will be discussed in this section based on the findings.

Students' Readiness For E-Learning and Academic Performance

The first hypothesis of this study (H1₀) states that students' readiness for e-learning does not significantly influence academic performance. After analysing data collected from respondents, it was found that students' readiness for e-learning does not have any significant effect on academic performance. Therefore, this hypothesis is not rejected. This finding is contrary with that of the following

studies: Bazargan (2021); Joosten and Cusatis (2020); Torun (2020) and Khatib Zanjani et al. (2017).

The significance of students' readiness for e-learning in relation to academic performance has been explored through various studies. Bazargan (2021) examined this connection during the Covid-19 era, highlighting that well-prepared students tend to achieve higher academic success in an online learning environment. Similarly, Joosten and Cusatis (2020) found that e-learning preparedness influences students' performance, indicating that effective online learning influences academic achievement. However, Torun's (2020) research presents a contrasting view. His study emphasized that self-directed learning and a desire for e-learning notably impact academic achievement, with self-directed learning being the most influential factor. This finding diverges from the study's conclusion, suggesting that students' readiness for e-learning might not significantly affect academic success, even if students are motivated and self-directed.

Students' Readiness For E-Learning and Self-Regulation Skills

There is no significant effect of students' readiness for e-learning on self-regulation skills was the second hypothesis (H_{2o}) of this study. This hypothesis was rejected after analysing the data from respondents. This finding is consistent with that of: Landrum's (2020); Ergun and Adibatmaz (2020) and Ngampornchai and Adams (2016). Low level of readiness can affect students' self-regulation skills. Students who are well prepared for e-learning understand that they need to manage or regulate their own learning (Ergun & Adibatmaz, 2020). Such students who understand and have confidence in using e-learning are therefore more open to

aligning their learning needs with online learning. They try to set goals, pace their learning and plan their study patterns to suit e-learning so as to obtain the best results.

The above conclusion is supported by Landrum's (2020) research on the relationship between students' perceptions of competence using online learning platforms, self-regulation behaviours, and learning. The study indicates that students who possess confidence in online learning tend to exhibit better self-regulation skills. Additionally, well-prepared students who recognize the value of e-learning tend to proactively set goals, manage their time effectively, and engage in guided online learning, leading to enhanced performance and the improvement of computing and internet skills.

Students' Readiness For E-Learning and Students Satisfaction

The third hypothesis (H3₀) tested for this study was there is no significant effect of students' readiness for e-learning on students' satisfaction. The study subsequently found after data analysis that students' readiness for e-learning indeed had a positively significant effect on students' satisfaction. The study therefore rejects this hypothesis. This result is consistent with that of: Topal (2016); Pham et al. (2019); Bismala and Manurung (2021) and Yilmaz (2017). Online learning provides students with the flexibility to tailor their educational pursuits, offering the advantage of remote access to course materials via the university's e-learning platform. This convenience allows them to choose when and where they study, particularly benefiting those who juggle work and academics.

This satisfaction with online learning is particularly pronounced when students possess a high level of readiness for e-learning, including technical skills and internet navigation abilities, enhancing their appreciation of the online learning experience (Pham et al., 2019; Bismala & Manurung, 2021). Moreover, such preparedness aligns with greater satisfaction as it contributes to students' overall positive engagement with online courses, content, professional benefits, and academic success, fostering an enriched learning experience (Ziegelmeier & Topaz, 2015; Yilmaz, 2017). Comparing these findings with the present study's findings, which uncovered a significant positive impact of students' readiness for e-learning on their satisfaction, the congruence highlights the consistent role of readiness in enhancing students' overall contentment with the e-learning process.

Self-Regulation Skills and Academic Performance

The fourth hypothesis (H₄₀) assessed in this study was self-regulation skills have no significant effect on academic performance. From the results, it was shown that self-regulation skills had a significant positive effect on academic performance. This hypothesis was therefore rejected. This finding is consistent with those of: Zimmerman and Kitsantas (2014); Morrison et al. (2010) and Motlagh et al. (2011). The findings highlight how important self-regulation is in influencing academic performance, especially in the context of online learning. The study's conclusions support the view that students' proficiency in self-regulation is advantageous to effective e-learning engagement and, as a result, enhanced academic performance.

The role of self-regulation in academic success is emphasised by Zimmerman and Kitsantas (2014), who highlight its predictive significance

compared to self-discipline. Students with strong self-regulation skills are more inclined to excel academically, as emphasized by Motlagh et al. (2011). Such students familiarize themselves with e-learning tools, effectively manage their time, set study goals, and maintain focus amidst potential online distractions. This capability is attributed to self-efficacy, a belief in one's capacity to plan and execute tasks necessary for achievement. Self-efficacy empowers individuals to engage in effective learning strategies, goal-setting, self-evaluation, and positive thinking (Motlagh et al., 2011). The absence of self-regulation driven by self-efficacy may hinder academic achievement.

Students Satisfaction and Academic Performance

There is no significant effect of students' satisfaction on academic performance was the fifth hypothesis (H5₀) tested in the study. The study found that students' satisfaction has a positive and significant influence on academic performance of students. The study therefore rejects this hypothesis. This finding is in line with those of: Jegathesan et al. (2018); Dhaqane and Afrah (2016); and Afzal and Afzal (2015). However, Khan and Iqbal's (2016) research on distance education suggests that satisfaction may not always predict achievement. It's possible that variations in context or unaccounted-for elements are to blame for the conflicting findings.

Student satisfaction has been acknowledged as an essential metric, as demonstrated by its use in assessing students' academic performance in previous research. E-learning satisfaction depends on students' expectations and experiences, showing the subjectivity of satisfaction due to different perspectives.

This subjectivity positively impacts student academic progress (Dhaqane & Afrah, 2016). Jegathesan et al. (2018) also found that student satisfaction increases trust in the course's potential to improve academic and professional success. Positive course involvement and flexibility boost student satisfaction and academic performance. Student contentment improves academic performance regardless of educational situation, as shown by Afzal and Afzal's (2015) comparison of private and public schools. The recent study found that student satisfaction significantly impacts academic performance.

Students' Readiness For E-Learning through Self-Regulation Skills and Students' Satisfaction to Academic Performance

From the last objective of the study, two hypotheses were formulated, hypothesis six and hypothesis seven. These hypotheses were that self-regulation skills does not significantly mediate between students' readiness for e-learning and academic performance (H6₀) and students' satisfaction does not significantly mediate between students' readiness for e-learning and academic performance (H7₀). After analysis of data collected from the respondents, both hypotheses were rejected. These findings are in line with those of Landrum (2020), Inan et al. (2017), Hamdan et al. (2021), and Yavuzalp and Bahcivan (2021). The findings of these studies show how student readiness, self-regulation, satisfaction, and performance are interconnected.

The obtained results strongly indicate a positive and significant relationship between students' readiness for e-learning, self-regulation skills, satisfaction, and academic performance. Landrum's (2020) study underlines the role of self-

regulation and time management in influencing student satisfaction and perceived usefulness in online learning. These characteristics show that students with strong e-learning readiness and self-regulation are more satisfied and perform better academically. Inan et al.'s (2017) and Yavuzalp and Bahcivan's (2021) studies further support these findings, indicating that self-regulation strategies, readiness, and satisfaction significantly influence academic performance, reinforcing the interdependence of these factors. Collectively, the findings emphasize that students' readiness, self-regulation skills, and satisfaction are crucial components contributing to their academic success in online learning.

Chapter Summary

Results of the data analysis and the study's findings were presented in this chapter. The data was analyzed using mean, standard deviation, correlation and regression. The study found that students' readiness for eLearning does not have any significant effect on academic performance but has a significant effect on self-regulation skills. Students' readiness for eLearning has a significant and positive effect on students' satisfaction. Self-regulation skills and students' satisfaction has a significant positive effect on academic performance. Also, self-regulation skills and students' satisfaction significantly mediate between students' readiness for eLearning and academic performance.

Previous research has also provided support for the conclusions of this study. The next chapter is devoted to a discussion of the study's abstract, findings, and recommendations.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter looked at the summary of the research. This chapter also summarises the significant results obtained in line with the study's hypotheses, makes conclusions on them and outlines the implications of these results for study and practice. The final section of the chapter gives recommendations and makes suggestions for further research on the topic.

Summary

Online education has become prevalent, enabling widespread access to tertiary education. Recognizing the challenges of unpreparedness in online learning, this research assessed the influence of students' e-learning readiness, satisfaction, and self-regulation skills on their academic performance. The study's specific objective was to assess the mediation roles of self-regulation skills and students' satisfaction on the relationship between students' readiness for e-learning and academic performance of students in selected universities in Ghana.

The social cognitive theory and social presence theory were used to underlie the study. These theories were employed as they best explain the various concepts employed in the study. This study employed an explanatory design as the study sought to identify the causal relationships between variables and provides an in-depth understanding of the research problem. In terms of research philosophy, the

study employed the positivism paradigm for its objectiveness and its suitability to the quantitative nature of the study.

The study area comprised three universities in Ghana, namely the University of Cape Coast, the University of Ghana, and Kwame Nkrumah University of Science and Technology. The study's population was identified as all students enrolled on distance education programs in these tertiary institutions in Ghana. The convenience non-probability sampling procedure was employed for the selection of study participants. The utilization of this method in this study was justified by its practicality and suitability for accessing the targeted population of distance education students from specific universities in Ghana. The data collection instrument employed was the questionnaire which was used to gather quantitative data from respondents.

The questionnaire was made up of close ended questions which required respondents to select or tick their choices which are easy to decipher and analyze. The components for students' readiness for e-learning were adopted from Hong and Kim (2018), those of self-regulation skills and students' satisfaction were adopted from Kirmizi (2015) and the components of academic performance were adopted from Hsieh and Cho (2011) and Damjanovic et al. (2015). IBM SPSS version 26 were used to summarize, describe, and analyze the data using descriptive (mean and standard deviation) while SmartPLS 4.0 (Ringle, Wende & Becker, 2022) was used for the inferential statistics (PLS-SEM analysis for the path model). The findings of the data analysis are summarized in table 20.

Table 20: Summary of the key findings (Research objectives and Major findings)

Research Objective	Major Results/Findings
Research Objective One (1) - assess the influence of students' readiness for e-learning on academic performance.	Students' readiness for e-learning did not have significant effect on academic performance.
Research Objective Two (2) - evaluate the influence of students' readiness for e-learning on self-regulation skills.	Students' readiness for e-learning had a positive and significant effect on self-regulation skills.
Research Objective Three (3) - analyze the influence of students' readiness for e-learning on students' satisfaction.	Students' readiness had a significant and positive effect on e-learning on students' satisfaction.
Research Objective Four (4) - determine the influence of self-regulation skills on academic performance.	Self-regulation skills had a significant positive effect on academic performance.
Research Objective Five (5) - assess the influence of students' satisfaction on academic performance.	Students' satisfaction had a positive and significant influence on academic performance.
Research Objective Six (6) - estimate the mediating roles self-regulation skills and students' satisfaction on students' readiness for e-learning and academic performance.	Self-regulation skills and students' satisfaction positively mediated between students' readiness for e-learning and academic performance.

Source: Author's construct (2022)

Conclusions

From the findings obtained after analysis of data, the study made the following conclusions. The study concludes that students' readiness for eLearning (blended mode – hybrid learning environment) did not significantly affect their academic performance. Students' proficiency in various digital skills such as dealing with computer viruses, using software applications, and engaging with online platforms like social media does not significantly impact their academic performance. While these skills may have value in enhancing students' technological literacy and communication abilities, they do not significantly contribute to their overall academic success. These qualities may play a supporting role in the broader context of factors influencing academic performance, yet their individual influence remains limited in this regard.

The study's findings indicate that students' readiness for e-learning has a direct influence on their self-regulation skills. Specifically, students who are adequately prepared for e-learning exhibit increased comfort and proficiency in using fundamental Microsoft Office tools, online learning software, and internet research for learning purposes. This readiness prompts students to become acquainted with essential e-learning tools, shaping their ability to effectively navigate digital platforms. Furthermore, e-learning environments encourage adaptive study patterns and self-paced learning, distinguishing them from traditional classroom settings.

In terms of self-regulation skills and academic performance, the study concludes that student self-regulation patterns positively affect their academic

performance. When students manage their time well, stick to their study schedules, seek help when they are having difficulty learning, establish learning SMART objectives, have higher learning expectations, guide their own learning development and repeat educational materials based on their study needs have enhanced academic success. When students regulate their studies, it enhances their studies such that they learn at their own pace but are able to get the best out of their studies thus resulting in enhanced academic performance.

When it comes to students' readiness for e-learning and student satisfaction, the study concludes that preparedness for e-learning affects students' satisfaction with e-learning. When students are well prepared for e-learning, it makes them more welcoming and appreciative of e-learning. Their appreciativeness of e-learning will lead to them being more satisfied with it when they do use it. The study again concludes that student satisfaction positively academic performance. This means that when students are satisfied with online learning lessons and the degree of engagement with instructors and colleagues, it enhances their academic performance. Satisfaction on the part of students in e-learning courses aids their academic success. When students are dissatisfied, it may result in them performing poorly in that course.

Finally, this study establishes that students' readiness for e-learning yields an indirect and positive impact on academic performance through the mediating factors of self-regulation skills and students' satisfaction. While the direct effect of students' e-learning preparedness on academic success is not significant, it exerts a meaningful indirect influence that enhances students' overall learning performance,

and fosters active learning engagement on online platforms. The synergy of e-learning readiness, self-regulation proficiency, and satisfaction emerges as a catalyst for elevated academic performance, emphasising the significance of a comprehensive approach to optimizing students' learning experiences in the digital realm.

Recommendations of the Study

Based on the study's findings, several recommendations can be made to enhance the effectiveness of online education and students' academic performance:

1. While Students' readiness for e-learning might not directly impact academic performance, the study reveals its positive influence on self-regulation skills. Institutions should consider implementing interventions and programs that aim to enhance students' self-regulation abilities. These could include workshops, online resources, and guidance on time management, goal setting, and effective study strategies, enabling students to navigate the demands of online learning more effectively.
2. The study identifies a significant and positive relationship between Students' readiness and their satisfaction with e-learning. To improve students' e-learning experiences, educational institutions should invest in initiatives that enhance students' technological literacy and skills. Providing training and support for utilizing online learning platforms, digital tools, and internet resources can increase students' confidence and engagement, consequently bolstering their overall satisfaction.

3. Given the notable impact of students' satisfaction on academic performance, educational institutions should focus on creating a supportive and engaging online learning environment. This could involve designing courses with clear objectives, relevant content, interactive activities, and regular communication channels between students and instructors. Gathering regular feedback from students and implementing adjustments based on their suggestions can contribute to higher satisfaction levels and, consequently, improved academic performance.
4. Since self-regulation skills have a significant positive effect on academic performance, institutions should consider integrating self-regulation strategies into their e-learning curriculum. Providing guidance on self-monitoring, goal setting, time management, and study techniques can empower students to take control of their learning process and achieve better academic outcomes.
5. The study highlights that self-regulation skills and students' satisfaction mediate the relationship between Students' readiness for e-learning and academic performance. Institutions should acknowledge the interconnectedness of these factors and design comprehensive support systems that address all three components. By nurturing self-regulation skills and fostering satisfaction, institutions can indirectly enhance students' academic performance in online learning environments.

In conclusion, these recommendations aim to leverage the study's findings to create an enhanced online learning experience that maximizes students' self-regulation abilities, satisfaction, and ultimately, academic performance.

Suggestions for Further Research

The study makes some recommendations for further research on the topic based on the findings of this study and methods used. These suggestions were on the different methodologies that could be adopted, different perspectives from when this study can be examined and data processing and analysis methods for a diverse knowledge base on the topic.

First and foremost, complementing quantitative findings with qualitative research methods, such as interviews or focus groups, can provide in-depth insights into students' perceptions, experiences, and motivations related to e-learning readiness, self-regulation, satisfaction, and academic performance. This qualitative exploration can shed light on the underlying factors influencing the observed relationships. Also, on the same topic, further study could measure academic performance using either the objective measures such as examinations, assessments, grades, or diplomas, or hybrid (objective and subjective) measures. This current study used subjective academic performance measures.

Further research can consider the subject on the institutional level. It may be that due to some differentiating factors, the results obtained at the institutional level can differ. This will identify whether there are any differences in the results as a result of differences in tertiary institution for more profound understanding and

conclusions on the topic. Also, further research on the topic can examine regular students or sandwich students. These different groups of students may have different perceptions on the various concepts examined. Regular students for example, may use e-learning in a different way and their self-regulation practices may differ as compared to sandwich and distance students. This line of examination is another way of approaching the subject.



REFERENCES

- Adam, A. M. (2020). Sample Size Determination in Survey Research. *Journal of Scientific Research and Reports*, 26(5), 90-97.
<https://doi.org/10.9734/jsrr/2020/v26i530263>
- Adams, D., Chuah, K. M., Sumintono, B., & Mohamed, A. (2021). Students' readiness for e-learning during the COVID-19 pandemic in a South-East Asian university: a Rasch analysis. *Asian Education and Development Studies*, 11(2), 324-339.
- Adams, D., Sumintono, B., Mohamed, A., & Noor, N. S. M. (2018). E-learning readiness among students of diverse backgrounds in a leading Malaysian higher education institution. *Malaysian Journal of Learning and Instruction*, 15(2), 227-256.
- Adjabeng, S. (2017). *The Status and Challenges of Online Distance Education Programs in Post-Secondary Institutions in Ghana*. ProQuest LLC.
- Afzal, M. T., & Afzal, M. (2015). Comparison of students' satisfaction and achievement at secondary level in Islamabad. *American Journal of Educational Research*, 3(12), 1524-1527.
- Agholor, A. I. (2019). A review of extension self-efficacy: Bases, features, goal realisation and implications for extension. *South African Journal of Agricultural Extension*, 47(2), 140-149.

Alharahsheh, H. H., & Pius, A. (2020). A review of key paradigms: Positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, 2(3), 39-43.

Ali, F., Rasoolimanesh, S. M., Sarstedt, M., Ringle, C. M., & Ryu, K. (2018). An assessment of the use of partial least squares structural equation modeling (PLS-SEM) in hospitality research. *International journal of contemporary hospitality management*, 30(1), 514-538.

Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher education studies*, 10(3), 16-25.

Alqurashi, E. (2019). Predicting student satisfaction and perceived learning within online learning environments. *Distance Education*, 40(1), 133-148.

Alt, D., & Naamati-Schneider, L. (2021). Health management students' self-regulation and digital concept mapping in online learning environments. *BMC Medical Education*, 21(1), 1-15.

Amponsah, S., Torto, B. A., & Badu-Nyarko, S. K. (2018). Ghanaian mature students' motivation to pursue degree programmes through distance education. *International Review of Education*, 64(5), 585-606.

Asad, M. M., Khan Soomro, R. B., Shamsy, A., & Churi, P. (2021). Students' Satisfaction towards E-Assessment for Academic Achievement in ESL at Public Schools and Colleges. *Education Research International*, 1(1) 1-10.

Asenahabi, B. M. (2019). Basics of research design: A guide to selecting appropriate research design. *International Journal of Contemporary Applied Researches*, 6(5), 76-89.

Atmowardoyo, H. (2018). Research methods in TEFL studies: Descriptive research, case study, error analysis, and R & D. *Journal of Language Teaching and Research*, 9(1), 197-204.

Baker, C. (2020). Quantitative research designs: Experimental, quasi-experimental, and descriptive. In Hall, H. R., & Roussel, L. A. *Evidence-based practice: An integrative approach to research, administration, and practice*, (pp.155-183). Jones & Bartlett Learning.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall, Inc.

Banerjee, A., & Chaudhury, S. (2010). Statistics without tears: Populations and samples. *Industrial psychiatry journal*, 19(1), 60-65.

Bazargan, K. (2021). Relationship between Students' Readiness for e-Learning, Learner Satisfaction and Student Performance: The case of a post-graduate education program. *Quarterly Journal of Research and Planning in Higher Education*, 1400(3), 113-141.

Berndt, A. E. (2020). Sampling methods. *Journal of Human Lactation*, 36(2), 224-226.

Bervell, B., & Umar, I. N. (2020). Blended learning or face-to-face? Does Tutor anxiety prevent the adoption of Learning Management Systems for distance education in Ghana? *Open Learning: The Journal of Open, Distance and e-Learning*, 35(2), 159-177.

Bettinger, E., & Loeb, S. (2017). Promises and pitfalls of online education. *Evidence Speaks Reports*, 2(15), 1-4.

Bhardwaj, P. (2019). Types of sampling in research. *Journal of the Practice of Cardiovascular Sciences*, 5(3), 157-163.

Biney, I. K. (2021). Revitalizing Blended and Self-Directed Learning Among Adult Learners Through the Distance Education Mode of Learning in Ghana. In *Re-Envisioning and Restructuring Blended Learning for Underprivileged Communities* (pp. 185-203). IGI Global.

Bismala, L., & Manurung, Y. H. (2021). Student Satisfaction in E-Learning along the COVID-19 Pandemic with Importance Performance Analysis. *International Journal of Evaluation and Research in Education*, 10(3), 753-759.

Bosman, A., & Agyei, S. K. (2022). Technology and instructor dimensions, e-learning satisfaction, and academic performance of distance students in Ghana. *Heliyon*, 8(4), 1-16.

Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education*, 27(1), 1-13.

Brown, T. A. (2015). *Confirmatory factor analysis for applied research*. Guilford publications.

Cheah, J. H., Sarstedt, M., Ringle, C. M., Ramayah, T., & Ting, H. (2018). Convergent validity assessment of formatively measured constructs in PLS-SEM: On using single-item versus multi-item measures in redundancy analyses. *International Journal of Contemporary Hospitality Management*, 30(11), 3192-3210.

Chin, W. W. (2010). How to write up and report PLS analyses. In *Handbook of partial least squares* (pp. 655-690). Springer, Berlin, Heidelberg.

Cho, M. H., & Cho, Y. (2017). Self-regulation in three types of online interaction: A scale development. *Distance Education*, 38(1), 70-83.

Chung, E., Subramaniam, G., & Dass, L. C. (2020). Online learning readiness among university students in Malaysia amidst COVID-19. *Asian Journal of University Education*, 16(2), 45-58.

Cochran, W. G. (1977). *Sampling techniques*. John Wiley & Sons.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*, 2nd ed. Hillsdale, NJ: Erlbaum.

Cohen, J. (1992). Statistical power analysis. *Current directions in psychological science*, 1(3), 98-101.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). London: Sage Publications Ltd.

- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Damnjanovic, V., Jednak, S., & Mijatovic, I. (2015). Factors affecting the effectiveness and use of Moodle: students' perception. *Interactive learning environments*, 23(4), 496-514.
- Dannels, S. A. (2018). Research design. In *The reviewer's guide to quantitative methods in the social sciences* (pp. 402-416). Routledge.
- Denis, D. J. (2018). *SPSS data analysis for univariate, bivariate, and multivariate statistics*. John Wiley & Sons.
- Dhaqane, M. K., & Afrah, N. A. (2016). Satisfaction of Students and Academic Performance in Benadir University. *Journal of Education and Practice*, 7(24), 59-63.
- Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. *MIS quarterly*, 39(2), 297-316.
- Duran, A. (2021). Intersectional Perspectives on Meaning-Making Influences: Theoretical Insights from Research Centering Queer Students of Color. *Journal of College Student Development*, 62(4), 438-454.
- Elliott, K. M., & Healy, M. A. (2001). Key factors influencing student satisfaction related to recruitment and retention. *Journal of marketing for higher education*, 10(4), 1-11.

El-Sayad, G., Md Saad, N. H., & Thurasamy, R. (2021). How higher education students in Egypt perceived online learning engagement and satisfaction during the COVID-19 pandemic. *Journal of Computers in Education*, 8(4), 527-550.

Emans, D. J., & Murdoch-Kitt, K. M. (2023, July). Multimedia and Multisensory International Learning: Making a Case for Going Beyond the Screen During Creative Virtual Exchanges. In *International Conference on Human-Computer Interaction* (pp. 77-87). Cham: Springer Nature Switzerland.

Ergun, E., & Adibatmaz, F. B. K. (2020). Exploring the predictive role of e-learning readiness and e-learning style on student engagement. *Open Praxis*, 12(2), 175-189.

Farhadi, P. (2019). *The social presence of jibo*. Northern Illinois University.

Fisher, M., King, J., & Tague, G. (2001). Development of a self-directed learning readiness scale for nursing education. *Nurse education today*, 21(7), 516-525.

Forson, I. K., & Vuopala, E. (2019). Online learning readiness: perspective of students enrolled in distance education in Ghana. *The online journal of distance education and e-learning*, 7(4), 277-294.

Fuller, C. M., Simmering, M. J., Atinc, G., Atinc, Y., & Babin, B. J. (2016). Common methods variance detection in business research. *Journal of business research*, 69(8), 3192-3198.

Gatzka, T. (2021). Aspects of openness as predictors of academic achievement. *Personality and Individual Differences, 170*(1), 1-7.

Gay, G. H., & Betts, K. (2020). From Discussion Forums to eMeetings: Integrating High Touch Strategies to Increase Student Engagement, Academic Performance, and Retention in Large Online Courses. *Online Learning, 24*(1), 92-117.

Geisser, S. (1974). A predictive approach to the random effect model. *Biometrika, 61*(1), 101-107.

Ghana Tertiary Education Commission (GTEC)s. (n.d.). Accredited Institutions. Retrieved from: <https://gtec.edu.gh/accredited-institutions>.

Goeman, K., De Grez, L., van den Muijsenberg, E., & Elen, J. (2020). Investigating the enactment of social presence in blended adult education. *Educational Research, 62*(3), 340-356.

González-Gómez, D., Jeong, J. S., & Airado Rodríguez, D. (2016). Performance and perception in the flipped learning model: an initial approach to evaluate the effectiveness of a new teaching methodology in a general science classroom. *Journal of Science Education and Technology, 25*(3), 450-459.

Greenhow, C., Graham, C. R., & Koehler, M. J. (2022). Foundations of online learning: Challenges and opportunities. *Educational Psychologist, 57*(3), 131-147.

Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research, 109* (C), 101-110.

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*(2), 107-123.

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*(2), 107-123.

Hair, J. F., Astrachan, C. B., Moisescu, O. I., Radomir, L., Sarstedt, M., Vaithilingam, S., & Ringle, C. M. (2021). Executing and interpreting applications of PLS-SEM: Updates for family business researchers. *Journal of Family Business Strategy, 12*(3), 100392.

Hair, J. F., Harrison, D., & Risher, J. J. (2018). Marketing research in the 21st century: Opportunities and challenges. *Brazilian Journal of Marketing-Revista Brasileira de Marketing, 17*(5), 666-699.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed, a silver bullet. *Journal of Marketing theory and Practice, 19*(2), 139-152.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review, 31*(1), 2-24.

Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, 26(2), 106-121.

Hair, Joseph F., William C. Black, Barry J. Babin, and Rolph E. Anderson (2010), *Multivariate Data Analysis*. Englewood Cliffs, NJ: Prentice Hall.

Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., AL-Habashneh, S., & Shaheen, A. M. (2021). University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management*, 35(3), 713-725.

Hanafiah, M. H. (2020). Formative vs. reflective measurement model: Guidelines for structural equation modeling research. *International Journal of Analysis and Applications*, 18(5), 876-889.

Harriss, D. J., & Atkinson, G. (2015). Ethical standards in sport and exercise science research: 2016 update. *International journal of sports medicine*, 36(14), 1121-1124.

Hendra, R., & Hill, A. (2019). Rethinking response rates: new evidence of little relationship between survey response rates and nonresponse bias. *Evaluation review*, 43(5), 307-330.

Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., ... & Calantone, R. J. (2014). Common beliefs and reality

about PLS: Comments on Rönkkö and Evermann (2013). *Organizational research methods*, 17(2), 182-209.

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial management & data systems*, 116(1), 2-20.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, 43(1), 115-135.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International marketing review*, 33(3), 405-431.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In *New challenges to international marketing*. Emerald Group Publishing Limited.

Hesse-Biber, S. (2015). Mixed methods research: The “thing-ness” problem. *Qualitative health research*, 25(6), 775-788.

Hoft, J. (2021). Anonymity and Confidentiality. In *The Encyclopedia of Research Methods in Criminology and Criminal Justice* (pp.223-227). John Wiley & Sons, Inc.

Hong, A. J., & Kim, H. J. (2018). College students' digital readiness for academic engagement (DRAE) scale: Scale development and validation. *The Asia-Pacific Education Researcher*, 27(4), 303-312.

Hope, A., & Guiton, P. (Eds.). (2006). *Strategies for sustainable open and distance learning* (Vol. 6). Psychology Press.

Hsieh, P. A. J., & Cho, V. (2011). Comparing e-Learning tools' success: The case of instructor–student interactive vs. self-paced tools. *Computers & Education*, 57(3), 2025-2038.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6(1), 1-55.

Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: Scale development and student perceptions. *Computers & Education*, 55(3), 1080-1090.

Inan, F., Yukselturk, E., Kurucay, M., & Flores, R. (2017). The impact of self-regulation strategies on student success and satisfaction in an online course. *International Journal on E-learning*, 16(1), 23-32.

Jegathesan, R., Noryati, A., Amar Hisham, J., & Wan Nordiana, W. H. (2018). Learners' Satisfaction and Academic Performance in Open and Distance Learning (ODL) Universities in Malaysia. *Global Business and Management Research: An International Journal*, 10(3), 511.

Joosten, T., & Cusatis, R. (2020). Online learning readiness. *American Journal of Distance Education*, 34(3), 180-193.

Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. *Social sciences*, 8(9), 1-17.

Kaya, M., & Erdem, C. (2021). Students' well-being and academic achievement: A meta-analysis study. *Child Indicators Research*, 14(5), 1743-1767.

Kelly, L. M., & Cordeiro, M. (2020). Three principles of pragmatism for research on organizational processes. *Methodological innovations*, 13(2), 1-10.

Khan, J., & Iqbal, M. J. (2016). Relationship between student satisfaction and academic achievement in distance education: A case study of AIOU Islamabad. *FWU Journal of Social Sciences*, 10(2), 137-145.

Khatib Zanjani, N., Ajam, A. A., & Badnava, S. (2017). Determining the relationship between self-directed learning readiness and acceptance of e-learning and academic achievement of students. *Iran Journal of Nursing*, 30(106), 11-22.

Khusainova, R. M., & Ivutina, H. P. (2016). Styles of Self-Regulation of Learning Activities of University Students. *International Journal of Environmental and Science Education*, 11(13), 5980-5992.

Kirmizi, Ö. (2015). The influence of learner readiness on student satisfaction and academic achievement in an online program at higher education. *Turkish Online Journal of Educational Technology-TOJET*, 14(1), 133-142.

Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1-10.

Kock, N. (2016). Non-normality propagation among latent variables and indicators in PLS-SEM simulations. *Journal of Modern Applied Statistical Methods*, 15(1), 299-315.

Kosiba, J. P. B., Odoom, R., Boateng, H., Twum, K. K., & Abdul-Hamid, I. K. (2022). Examining students' satisfaction with online learning during the Covid-19 pandemic-an extended UTAUT2 approach. *Journal of Further and Higher Education*, 46(7), 988-1005.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610.

Kuhn, T. (1962). *The structure of scientific revolutions* (1st Edition). Chicago: Univ. Chicago.

Kuo, Y. C., Walker, A. E., Schroder, K. E., & Belland, B. R. (2014). Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The internet and higher education*, 20(1), 35-50.

Kwame Nkrumah University of Science and Technology (KNUST). (2021). *Facts & Figures - 2020/2021*. KNUST. Retrieved from: <https://reg.knust.edu.gh/sites/reg.knust.edu.gh/files/2022-02/FACTS%20AND%20FIGURES-2021.pdf>.

Landrum, B. (2020). Examining Students' Confidence to Learn Online, Self-Regulation Skills and Perceptions of Satisfaction and Usefulness of Online Classes. *Online Learning*, 24(3), 128-146.

Lee, B., & Kim, J. (2023). Managing Social Presence in Collaborative Learning with Agent Facilitation. *Sustainability*, 15(7), 1-26.

Leung, S. O., & Xu, M. L. (2013). Single-item measures for subjective academic performance, self-esteem, and socioeconomic status. *Journal of Social Service Research*, 39(4), 511–520.

Li, T., Higgins, J. P., & Deeks, J. J. (2019). Collecting data. In *Cochrane handbook for systematic reviews of interventions*, (pp.109-141). John Wiley & Sons, Inc.

Lim, J. R. N., Rosenthal, S., Sim, Y. J. M., Lim, Z. Y., & Oh, K. R. (2021). Making online learning more satisfying: the effects of online-learning self-efficacy, social presence and content structure. *Technology, Pedagogy and Education*, 30(4), 543-556.

Limniou, M., Varga-Atkins, T., Hands, C., & Elshamaa, M. (2021). Learning, student digital capabilities and academic performance over the COVID-19 pandemic. *Education Sciences*, 11(7), 1-15.

Liu, L., Luo, Y., & Yin, N. (2023). Does Review Replying Matter? Influence of online course eWOM on learning satisfaction. *Education and Information Technologies* 1(1), 1-28.

Lockman, A. S., & Schirmer, B. R. (2020). Online instruction in higher education: Promising, research-based, and evidence-based practices. *Journal of Education and e-Learning Research*, 7(2), 130-152.

Lund, B. (2023). The questionnaire method in systems research: An overview of sample sizes, response rates and statistical approaches utilized in studies. *VINE Journal of Information and Knowledge Management Systems*, 53(1), 1-10.

Mackinnon, D. (2015). Mediating variable. In *International Encyclopedia of the Social & Behavioral Sciences: Second Edition* (pp. 64-69). Elsevier Inc.

Mahdy, M. A. (2020). The impact of COVID-19 pandemic on the academic performance of veterinary medical students. *Frontiers in Veterinary Science*, 7(1), 1-8.

Malhotra, N., Nunan, D., & Birks, D. (2017). *Marketing research: An applied approach*. Pearson.

Miao, J., Chang, J., & Ma, L. (2022). Teacher–student interaction, student–student interaction and social presence: their impacts on learning engagement in online learning environments. *The Journal of Genetic Psychology*, 183(6), 514-526.

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, 1(1), 1-8.

Mohajan, H. K. (2020). Quantitative research: A successful investigation in natural and social sciences. *Journal of Economic Development, Environment and People*, 9(4), 50-79.

Morrison, F. J., Ponitz, C. C., & McClelland, M. M. (2010). Self-regulation and academic achievement in the transition to school. In *Child development at the intersection of emotion and cognition*. (pp. 203-224). American Psychological Association.

Motlagh, S. E., Amrai, K., Yazdani, M. J., Altaib Abderahim, H., & Souri, H. (2011). The relationship between self-efficacy and academic achievement in high school students. *Procedia-Social and Behavioral Sciences*, 15, 765-768.

Müller, T., Schuberth, F., & Henseler, J. (2018). PLS path modeling—a confirmatory approach to study tourism technology and tourist behavior. *Journal of Hospitality and Tourism Technology*, 9(3), 249-266.

Mykota, D. (2022). Protocol for a Systematic Review and Meta-Analysis on Social Presence. *International Journal of E-Learning & Distance Education*, 37(1), 1-23.

Naoum, S. G. (2007). *Research and Writing for Construction Students* (Doctoral dissertation, Dissertation, British Library Cataloguing in Publication Data).

Ngampornchai, A., & Adams, J. (2016). Students' acceptance and readiness for E-learning in Northeastern Thailand. *International Journal of Educational Technology in Higher Education*, 13(1), 1-13.

Nguyen, Q. V. (2020, November). Increasing Mutation Testing Effectiveness by Combining Lower Order Mutants to Construct Higher Order Mutants. In *International Conference on Computational Collective Intelligence* (pp. 205-216). Springer, Cham.

Opoku, A., Ahmed, V., & Akotia, J. (2016). Choosing an appropriate research methodology and method. In *Research Methodology in the Built Environment* (pp. 32-49). Routledge.

Palmatier, R. W. (2016). Improving publishing success at JAMS: contribution and positioning. *Journal of the Academy of Marketing Science*, 44(6), 655-659.

Park, Y. S., Konge, L., & Artino, A. R. (2020). The positivism paradigm of research. *Academic Medicine*, 95(5), 690-694.

Pei, L., & Wu, H. (2019). Does online learning work better than offline learning in undergraduate medical education? A systematic review and meta-analysis. *Medical education online*, 24(1), 1-13.

Pham, L., Limbu, Y. B., Bui, T. K., Nguyen, H. T., & Pham, H. T. (2019). Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam. *International Journal of Educational Technology in Higher Education*, 16(1), 1-26.

Polites, G. L., Roberts, N., & Thatcher, J. (2012). Conceptualizing models using multidimensional constructs: a review and guidelines for their use. *European Journal of Information Systems*, 21(1), 22-48.

Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences*, 6(2), 1-5.

Rahman, M. S., Zaman, M. H., Hossain, M. A., Mannan, M., & Hassan, H. (2019). Mediating effect of employee's commitment on workplace spirituality and executive's sales performance: an empirical investigation. *Journal of Islamic Marketing*, 10(4), 1057-1073.

Ramayah, T. J. F. H., Cheah, J., Chuah, F., Ting, H., & Memon, M. A. (2018). *Partial least squares structural equation modeling (PLS-SEM) using smartPLS 3.0: An updated guide and practical guide to statistical analysis*. Kuala Lumpur, Malaysia: Pearson.

Rasouli, A., Rahbani, Z., & Attaran, M. (2016). Students' Readiness for E-Learning Application in Higher Education. *Malaysian Online Journal of Educational Technology*, 4(3), 51-64.

Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, 100(71), 402-417.

Richter, N. F., Cepeda-Carrion, G., Roldán Salgueiro, J. L., & Ringle, C. M. (2016). European management research using partial least squares structural equation modeling (PLS-SEM). *European Management Journal*, 34 (6), 589-597.

Ringle, C. M., Wende, S., & Becker, J. M. (2022). *SmartPLS 4*. Boenningstedt: SmartPLS. Retrieved from <https://www.smartpls.com>

Roldán, J. L., & Sánchez-Franco, M. J. (2012). Variance-based structural equation modeling: Guidelines for using partial least squares in information systems research. In *Research methodologies, innovations and philosophies in software systems engineering and information systems* (pp. 193-221). IGI global.

Rönkkö, M., & Cho, E. (2022). An updated guideline for assessing discriminant validity. *Organizational Research Methods*, 25(1), 6-14.

Rumjaun, A., & Narod, F. (2020). Social Learning Theory—Albert Bandura. In: *Akpan, B., Kennedy, T.J. (eds) Science Education in Theory and Practice* (pp.85-99). Springer, Cham.

Samuels, P. (2020). *A really simple guide to quantitative data analysis*. Research Gate.

Sarstedt, M., Hair Jr, J. F., Cheah, J. H., Becker, J. M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian Marketing Journal (AMJ)*, 27(3), 197-211.

Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair Jr, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of family business strategy*, 5(1), 105-115.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students* (6th ed.). Harlow: Pearson.

Selivanov, V. V., & Savchenko, O. Y. (2019). Investigation of some aspects of the history of distance learning. In *CEUR Workshop Proc* (Vol. 2522, pp. 41-49). Scientific Electronic Library LLC

Senaviratna, N., & Cooray, T. (2019). Diagnosing multicollinearity of logistic regression model. *Asian Journal of Probability and Statistics*, 5(2), 1-9.

Shah, S. S., Shah, A. A., & Khaskhelly, N. (2018). Service quality, customer satisfaction and customer loyalty: some evidences from Pakistani banking sector. *Grassroots*, 51(2).

Sheard, J. (2018). Quantitative data analysis. In *Research Methods: Information, Systems, and Contexts, Second Edition* (pp. 429-452). Elsevier.

Shmueli, G., Ray, S., Estrada, J. M. V., & Chatla, S. B. (2016). The elephant in the room: Predictive performance of PLS models. *Journal of Business Research*, 69(10), 4552-4564.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London: John Wiley & Sons.

Shrestha, N. (2020). Detecting multicollinearity in regression analysis. *American Journal of Applied Mathematics and Statistics*, 8(2), 39-42.

Sileyew, K. J. (2019). *Research design and methodology* (pp. 1-12). Rijeka: Intech Open.

Smith, S. M. (2013). *Determining Sample Size: how to ensure you get the correct sample*. Qualtrics online sample. Retrieved from: <https://www.ndsu.edu/gdc/wpcontent/pdf/Determining-Sample-Size.pdf>.

Stadler, M., Kemper, C. J., & Greiff, S. (2021). Assessing subjective university success with the Subjective Academic Achievement Scale (SAAS). *The European Educational Researcher*, 4(3), 283-290.

Steinmayr, R., Meiner, A., Weideinger, A. F., & Wirthwein, L. (2014). *Academic achievement* (pp. 9780199756810-0108). Oxford, UK: Oxford University Press.

Stone, M. (1974). Cross-validation and multinomial prediction. *Biometrika*, 61(3), 509-515.

Story, D. A., & Tait, A. R. (2019). Survey research. *Anesthesiology*, 130(2), 192-202.

Strachota, E. (2006, October). The use of survey research to measure student satisfaction in online courses. In *Midwest Research to Practice Conference in Adult Continuing and Community Education, University of Missouri-St. Louis*. Citeseer.

Stratton, S. J. (2021). Population research: convenience sampling strategies. *Prehospital and disaster Medicine*, 36(4), 373-374.

Su, Y., Li, Y., Liang, J. C., & Tsai, C. C. (2019). Moving literature circles into wiki-based environment: the role of online self-regulation in EFL learners'

attitude toward collaborative learning. *Computer Assisted Language Learning*, 32(5-6), 556-586.

Sutiah, S., Slamet, S., Shafqat, A., & Supriyono, S. (2020). Implementation of distance learning during the covid-19 pandemic in faculty of education and teacher training. *Cypriot Journal of Educational Science*, 15(1), 1204-1214.

Syahrivar, J. (2019). Does the Green Image Enhance Student Satisfaction? (Evidence from Indonesia). *The New Educational Review*, 57(3), 52-62.

Tabachnick B. G., Fidell L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.

Tehseen, S., Ramayah, T., & Sajilan, S. (2017). Testing and controlling for common method variance: A review of available methods. *Journal of management sciences*, 4(2), 142-168.

Teng, L.S. & Zhang, L.J. (2016). A questionnaire-based validation of multidimensional models of selfregulated learning strategies. *The Modern Language Journal*, 100 (3), 674-701.

Theunissen, M. H., de Wolff, M. S., & Reijneveld, S. A. (2019). The strengths and difficulties questionnaire self-report: a valid instrument for the identification of emotional and behavioral problems. *Academic pediatrics*, 19(4), 471-476.

Topal, A. D. (2016). Examination of University Students' Level of Satisfaction and Readiness for E-Courses and the Relationship between Them. *European Journal of Contemporary Education, 15*(1), 7-23.

Torun, E. D. (2020). Online distance learning in higher education: E-learning readiness as a predictor of academic achievement. *Open Praxis, 12*(2), 191-208.

Udeogalanya, V. (2022). Aligning digital literacy and student academic success: Lessons learned from COVID-19 pandemic. *International Journal of Higher Education Management, 8*(2), 54-65.

Umar, M., & Ko, I. (2022). E-Learning: Direct Effect of Student Learning Effectiveness and Engagement through Project-Based Learning, Team Cohesion, and Flipped Learning during the COVID-19 Pandemic. *Sustainability, 17*24-1724.

University of Cape Coast (UCC). (2022, March) *Enrolment Facts*. University of Cape Coast. Retrieved from: <https://ucc.edu.gh/main/explore-ucc/summary-statistics>.

University of Ghana (UG). (2020, July). *Enrolment and Graduation Statistics*. University of Ghana. Retrieved from: <https://www.ug.edu.gh/about/enrolment-and-graduation-statistics>.

Weigle, B. D. (2022). *Academic Performance between Resident and Distance Education Programs in the US Army War College* (Doctoral dissertation, The George Washington University).

Wetzels, M., Odekerken-Schröder, G., & Van Oppen, C. (2009). Using PLS path modeling for assessing hierarchical construct models: Guidelines and empirical illustration. *MIS quarterly*, 33(1), 177-195.

Wisenthige, K. (2023). Research Design. In *Social Research Methodology and Publishing Results: A Guide to Non-Native English Speakers* (pp. 74-93). IGI Global.

Wong, K. K. K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin*, 24(1), 1-32.

Wut, T. M., & Xu, J. (2021). Person-to-person interactions in online classroom settings under the impact of COVID-19: a social presence theory perspective. *Asia Pacific Education Review*, 22(3), 371-383.

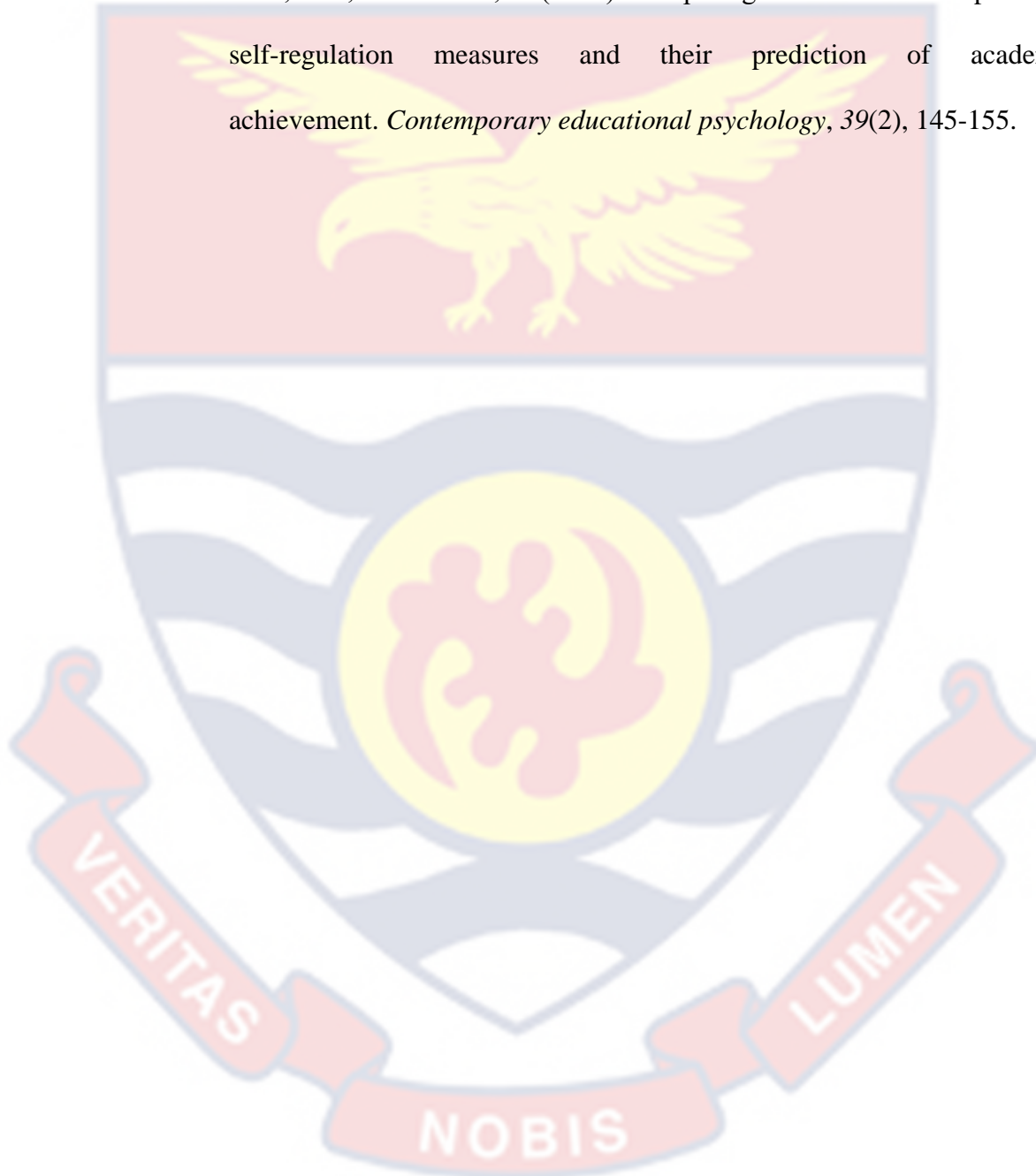
Yavuzalp, N., & Bahcivan, E. (2021). A structural equation modeling analysis of relationships among university students' readiness for e-learning, self-regulation skills, satisfaction, and academic achievement. *Research and Practice in Technology Enhanced Learning*, 16(1), 1-17.

Yilmaz, R. (2017). Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom. *Computers in Human Behavior*, 70(C), 251-260.

Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of consumer research*, 37(2), 197-206.

Ziegelmeier, L. B., & Topaz, C. M. (2015). Flipped calculus: A study of student performance and perceptions. *PRIMUS*, 25(9), 847–860.

Zimmerman, B. J., & Kitsantas, A. (2014). Comparing students' self-discipline and self-regulation measures and their prediction of academic achievement. *Contemporary educational psychology*, 39(2), 145-155.



APPENDIX

A. Questionnaire

SURVEY COVERING LETTER

Dear Sir/ Madam,

I am Kenneth Kitson, a final year Masters Student of University of Cape Coast. I am currently conducting research on **“the mediation roles of Self-Regulation Skills and Students Satisfaction on the relationship between students’ readiness for e-learning and Academic performance”**. This survey is a requirement for the award of Master of Education (Information Technology).

I would be extremely grateful if you will participate in this study by taking few minutes off your time to answer the attached questionnaire. All information given will be kept totally confidential and used only for academic reasons.

God richly bless you for accepting to fill in this questionnaire. For any further clarification please do contact me on kenneth.kitson@stu.ucc.edu.gh.

Thank you.

Yours sincerely,

Kenneth Kitson.

General Information

The questionnaire is structured into five (main) **Sections: A, B, C, D, and E.**

Section A is on demographic data of respondents, **Section B** looks at students' readiness for e-learning, **Section C** is on Student satisfaction, **Section D** seeks on Self-regulation skills, and the last **Section E** looks on academic performance.

-----SECTION A-----

Demographic Characteristic

Please respond to the statement by a tick (✓) where appropriate

1. Age
 - a. 20 and Below
 - b. 21 – 30
 - c. 31 – 40
 - d. 41- 50
 - e. above 50

2. Sex
 - a. Male
 - b. Female

3. Educational Level
 - a. Diploma
 - b. Undergraduate
 - c. Research Postgraduate (M.Phil/M.Com/PhD)
 - d. Taught Postgraduate (MA/MBA/Med/PGDE)
 - e. Others Specify

4. Academic Fields
 - a. Arts and Social Science
 - b. Business
 - c. Education
 - d. Mathematics and Sciences
 - f. Others Specify.....

5. Marital status a. Single b. Married c. Divorced.
 d. Widow(er)

6. Skill in the use of online learning tools a. Novice
 b. Intermediate Expert

7. Skill in the use of online learning Platform(s) a. Beginner
 b. Intermediate c. Advanced

-----SECTION B-----

Students' Readiness For E-Learning

This section seeks to understand students' readiness for e-learning and the extent to which you agree or disagree with the statement on a scale of 1 to 5, where 1 means very low, and 5 means very high.

	Statement	1	2	3	4	5
	Digital tool application					
1	I know how to remove a computer virus or malware from my laptop or desktop computer.					
2	I have the ability to upload and download material such as online images, files, video files, and sound files.					
3	I have the ability to control software or applications from a computer or mobile device.					
4	In a web browser, I may configure and modify security settings.					
	Digital application usage					

5	I am able to use the basic features of a presentation application (e.g., Microsoft PowerPoint) to create class presentations.					
6	I can utilize basic word-processing capabilities to produce and update documents for class assignments.					
7	I can manage and analyze data in spreadsheet applications (such as Microsoft Excel) for class assignments.					
	Digital media awareness					
8	In digital media material, I can spot bias or rumors.					
9	I am capable of critically interpreting digital media information.					
10	When I utilize digital media material, I know how to preserve intellectual property rights.					
	Information seeking skills					
11	I may look for information that my colleagues are unaware of using a number of accessible methods.					
12	I can educate my colleagues on several methods for doing good information searches.					
13	I may create keywords to look for content for academic purposes.					
	Information sharing behaviour					
14	I can communicate with students utilizing real-time communication options such as video conferencing or messengers.					
15	Blogs, social networking sites, and web pages, for example, allow me to air my views on the internet.					
16	Using internet software, I can share my files with my students.					

17	Using online tools, I can collaborate with peers.					
----	---	--	--	--	--	--

-----SECTION C-----

Student Satisfaction

This section seeks to understand Student satisfaction and the extent to which you agree or disagree with the statement on a scale of 1 to 5, where 1 means very low, and 5 means very high

	Statement	1	2	3	4	5
1	Overall, I'm satisfied with online learning lessons.					
2	My academic growth was aided as a result of taking online learning.					
3	This training helped me advance professionally.					
4	I am pleased with the degree of engagement that occurred throughout the course.					
5	I would be prepared to take a totally online course again in the future.					

-----SECTION D-----

Self-Regulation Skills

This section seeks to understand self-regulation skills and the extent to which you agree or disagree with the statement on a scale of 1 to 5, where 1 means very low, and 5 means very high

	Statement	1	2	3	4	5
	Computer/internet self-efficacy					
1	I am comfortable with the fundamental capabilities of Microsoft Office products (Word, MS Excel, PowerPoint)					
2	I am confident in my understanding and abilities to handle software for online learning.					
3	I am confident in my ability to use the Internet to search or acquire information for online learning.					
	Self-directed learning					
4	I stick to my own study schedule.					
5	When I am having difficulty learning, I seek help.					
6	I'm good at managing my time.					
7	I established my learning objectives.					
8	My learning expectations are greater.					
	Learner control					
9	I have the ability to guide my own learning development.					
10	When I am studying online, I am not sidetracked by other internet activities (Facebook, Twitter, etc.)					
11	I repeat the educational materials based on my need.					

-----SECTION E-----

Academic Performance

This section seeks to understand Academic Performance and the extent to which you agree or disagree with the statement on a scale of 1 to 5, where 1 means very low, and 5 means very high

	Statement	1	2	3	4	5
1	The content on eLearning system improves my grade.					
2	The e-learning tool improves my grade for the subject					
3	Use of the e-learning tool has improved my overall learning performance					
4	Applying e-learning encourages me to continue learning on the Internet by myself					

Thank You

