UNIVERSITY OF EDUCATION, WINNEBA

AN ASSESSMENT OF THE USE OF LEARNING MANAGEMENT SYSTEM BY ACADEMIC STAFF OF THE UNIVERSITY OF EDUCATION, WINNEBA DURING THE COVID-19 PANDEMIC

HANNAH ANNAN

MASTER OF BUSINESS ADMINISTRATION

2021

UNIVERSITY OF EDUCATION, WINNEBA

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HANNAH ANNAN
(200024137)

A Dissertation in the School of Business, Department of Management Sciences submitted to the School of Graduate School in partial fulfilment of the requirements for the award of the degree of Master of Business Administration (Organizations and Human Resource Management) in the University of Education, Winneba

NOVEMBER, 2021

DECLARATION

Student's Declaration

I, **Hannah Annan**, declare that this work except quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my original work, and it has not been submitted either in part or whole for another degree anywhere.

Signature: …….....

Date: …….....

Supervisor's Declaration

I, hereby declare that the preparation and presentation of this work were supervised by the guidelines for the supervision of dissertations as laid down by the University of Education, Winneba.

Mr. Isaac Nyarko Adu (Supervisor)

Signature: ……

Date: ……

DEDICATION

This work is dedicated to my husband, children, and Mother, Mr. Albert Obed Annan, Obed Annan JNR., John Gracious Annan, Emmanuella Nana Ama Aseda Annan, and Madam Hannah Inkoom.

ACKNOWLEDGEMENTS

I would like to express my gratitude to my supervisor Mr. Isaac Nyarko Adu, for his enthusiasm, patience, insightful comments, helpful information, practical advice, immense knowledge, profound experience, and unceasing ideas that have helped me tremendously in making this work a success. He consistently allowed this paper to be my work, by steering me in the right direction whenever he thought I needed it. I couldn‘t have imagined having a better supervisor in my study.

I would also like to thank Ephrem Kwaa-Aidoo (Ph.D.) Director, IT Services Directorate, and participants who without their passionate participation and input, the validation survey could not have been successfully conducted.

Finally, I must express my very profound gratitude to Mr. Rafique Kwadwo Agyare, Mr. William Emmanuel Kwame Offei, Mr. Knapps Kofi Appiah, Ms. Dorothy Amo and, Ms. Abigial Opoku who have supported me throughout the entire process, both by keeping me harmonious and helping me put pieces together. This accomplishment would not have been possible without them.

Thank you all for your encouragement!

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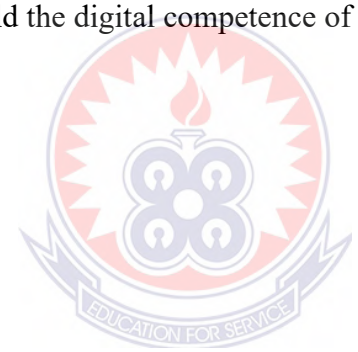
ABSTRACT

Following the outbreak of the Covid-19 pandemic, people living in regions with recorded cases resorted to live socially distant from one another. This caused school to close temporarily. For a drive to ensure the continuity of school business, the internet offered a means to realize school continuity through online educational media. The University of Education, Winneba was not immune to this tendency and adopted the Learning Management System (LMS) to host academic activities. This study sought to assess the use of the LMS by the academic staff of the University. The study assumed the pragmatic philosophical worldview with mixed methods backing, employing convenience and cluster sampling approaches to sample academic staff of the University. A total of 231 academic staff responded to the electronic instrument (questionnaire) the study administered. The study used SPSS v.20 to run descriptive and inferential statistics, making use of means and independent sample t-test. The study found that the use of the LMS has enhanced staff problem skills, stimulated staff interest on its usage, yielded timely feedback and the interactive nature of the system. The study further observed statistically significant differences in the experiences of academic staff based on their gender, rank, level of IT skill, training in the use of the LMS, and their class size. Based on the findings, the study recommended that the University through the Department for Continuing Professional Development should build the digital competence of academic staff.



CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In December 2019, Wuhan, a city in China officially declared the outbreak of an unknown virus (now called COVID-19) which soon assumed a pandemic status, and claimed lives around the world; making Spagnuolo, De Vito, Rengo, and Tatullo (2020) to perceive COVID-19 as the latest infectious disease to develop rapidly worldwide, to the extent of a severe global pandemic. The World Health Organization (WHO) declared COVID-19 as a global public health emergency of international concern on 30th January 2020, as well as a pandemic on 11th March 2020 as expressed by Cucinotta and Vanelli (2020). The COVID-19 outbreak disrupted the flow of everyday life around the globe throughout 2020. As in every other sector, the COVID-19 pandemic affected education in many ways; certainly, like many other aspects of everyday life, COVID-19 has had a serious impact on students, instructors, and educational organizations over the globe (Mailizar, Almanthari, Maulina, & Bruce, 2020).

The pandemic caused schools, colleges, and universities across the globe to shut down their campuses so that students could follow social distancing measures (Toquero, 2020). Many countries suspended face-to-face teaching and examinations as well as placed restrictions on immigration thus affecting students. While some countries such as Mexico and the Dominican Republic and some areas of Ecuador and Brazil were in the middle of the school year when the pandemic began, the vast majority were at the beginning. The temporary closures of higher education institutions (HEIs) due to the COVID-191 pandemic are no longer news because most universities in respective countries have halted face-to-face teaching.

Fortunately, there is a range of modern tools available to mitigate the challenges with the execution of the roles of universities as a result of the COVID-19 pandemic. However, the transformation of all the existing courses from the traditional face-to-face to online platforms simultaneously with administrative procedures within days is a test of organisational agility (Wu, 2020), and a challenge for all the educational process participants.

1.2 Problem Statement

The outbreak of the coronavirus disease (COVID-19) has increased tension and anxiety among Ghanaian citizens. The virus, unlike other cases we have had in this country is highly transmittable with severe signs, symptoms, and opportunistic infections (Upoalkpajor & Upoalkpajor, 2020). The deficiency of research on guidance for planning educational continuousness is calamitous, as education itself is a type of psychosocial backing that encourages all-inclusive well-being during disasters. Planned investment in education-based psychosocial care, emotional and social learning for youth and children affected by disasters can aid them to learn more eagerly. Indeed, psychosocial well-being is an important forerunner to education and has a significant bearing on the imminent projections of both persons and societies (Reynolds, 2020). As put forward by Wu (2020), the transformation of the existing traditional course of academic business is a test of the competencies of educational institutions.

Following the address by H. E. Nana Addo Danquah Akuffo-Addo, the President of Ghana to close down schools as a measure to foster the social distancing protocols, Ghanaian schools from the crèche stage to universities and other institutions of higher learning heeded and closed down indefinitely on 16th of March, 2020. In line with

this, as the time coincided with the flow of the second academic semester, there was the need to make some strategies and modalities available to ensure the continuity of the University with her roles. The University of Education, Winneba replaced the traditional face-to-face classroom activities with the Learning Management System (LMS). Administrative duties also assumed a virtual order, and face-to-face interactions were limited in the University. While some universities were expressing weariness with coping with the COVID-19 pandemic in discharging their mandate, the case with the University of Education, Winneba was different. The University recorded a success story in conveying her role, despite COVID-19. There were claims by authorities of the University that the _COVID semester' was brought to a successful conclusion. How the semester was concluded by the management of the University remains a myth.

Despite computers being known for efficiency, using them remotely for work may pose some challenges to users. These problems are however not usually computer-inherent performance issues, but are problems resulting from users' inability to use and not conversant with a specific computer application. Issues of internet connectivity, software host glitches, and others are also known to be regular impedance to computer use. Though, ICT tools were used to conclude the semester, the question of how the virtual tools adopted impacted the discharge of academic duties by academic staff remains unattended. This study seeks to establish an empirical assessment of the use of the LMS adopted by the University of Education, Winneba which aided her to complete the semester, as no study has investigated into the use of the LMS by academic staff.

1.3 Research Objectives

The study principally assesses the technological adjustments and strategies which were adopted by the University of Education, Winneba to ensure the continuous business of the University during the Covid-19 pandemic. The study seeks to achieve the objectives below:

1. Examined the interactive experience of the LMS in teaching and learning among academic staff during the Covid-19 pandemic.
2. Examined how the LMS enhanced the problem-solving skills of academic staff, during the Covid-19 Pandemic.
3. Examined how the LMS stimulated interest in academic activities during the Covid-19 Pandemic.
4. Examined how the LMS facilitated the provision of timely feedback in academic activities during the Covid-19 Pandemic.

1.4 Research Questions

The study, therefore, answers the questions:

1. How interactive was the use of the LMS in teaching and learning among academic staff during the Covid-19 pandemic?
2. How did the use of the LMS enhance the problem-solving skills of academic staff, during the Covid-19 Pandemic?
3. How did the use of the LMS stimulate the interest of academic staff during the Covid-19 Pandemic?
4. How did the use of the LMS facilitate the provision of timely feedback in academic activities during the Covid-19 Pandemic?

1.5 Hypotheses

Based on the objectives of the study, the following hypotheses are drawn:

$H1_O$: There is no statistically significant difference between the interactive experience of male and female academic staff in LMS usage.

H1a: There is a statistically significant difference between the interactive experience of male and female academic staff in LMS usage.

$H2_O$: There are no statistically significant differences between the enhanced problem-solving skills of lecturers and senior lecturers in LMS usage.

H2a: There is a statistically significant difference between the enhanced problem-solving skills of lecturers and senior lecturers in LMS usage.

$H3_O$: There is no statistically significant difference between the stimulated interest of academic staff with basic IT skills and academic staff with advanced IT skills in LMS usage.

$H3_a$: There is a statistically significant difference between the stimulated interest of academic staff with basic IT skills and academic staff with advanced IT skills in LMS usage.

$H4_O$: There are no statistically significant differences between the experience of timely feedback from the use of the LMS.

$H4_a$: There is a statistically significant difference between the experience of timely feedback from the use of the LMS.

$H5_O$: There is no statistically significant difference between the stimulated interest of academic staff with small-sized classes and academic staff with large sized classes in the use of the LMS.

$H5_a$: There is a statistically significant difference between the stimulated interest of academic staff with small-sized classes and academic staff with large sized classes in the use of the LMS.

1.6 Significance of the Study

The outbreak of the COVID-19 pandemic has affected almost every facet of the human race. Cultural values of societies, economic competencies of nations and individuals, and political and international relations and travels are all affected. Academia and education are aspects that are greatly affected. All expressions of academic work from student learning to research and peer review are all affected. Despite this, academicians and researchers have managed to research, report, and publish a series of studies during the lockdowns as a result of the outbreak, and even on topics relating to the pandemic itself. Significant among studies on COVID-19 focus on the health implications of the virus, how to contain it and defeat it. Impact studies have also focused on areas as travel and education. On education, these studies, examples of which are Balkhi, Nasir, Zehra, and Riaz (2020), Murphy and Wyness (2020), Lindson (2020), Upoalkajor and Upoalkajor (2020), Kuhfield and Tarasawa, (2020a), Garcia and Weiss (2020), etc focus on the whole impact on schools. Only a few studies assess the role of remote and e-learning on education, whereas some others focus on school closures and their impact on education. In all, studies conducted in our region of the world have marginalized cases specific to institutions. It is against this backdrop that this study seeks to address the specific case to the University of Education, Winneba in terms of assessing the virtual strategies adopted which mediated work practices in the University of Education, Winneba to realize successful management of academic course amid a pandemic.

This study, although it is not a pioneer study on COVID-19 in Ghana, it is when the binoculars are narrowed to the University of Education, Winneba. This study will supplement existing knowledge and information on the role of technological tools to ensure the continuity of work in universities following the outbreak of COVID-19. This study will inform policy and decision making in post-COVID-19 times on implementing e-learning and remote work approaches and it will be beneficial to the management of schools, teachers, students, researchers, institutions, and organizations.

1.7 Scope and Delimitation of the Study

The scope of the study focuses on the University of Education, Winneba's main campus in Winneba, and the Ajumako campus, all in the Central Region of Ghana. The Mampong campus is not directly considered in this study. The justification for this is that the Winneba campus is the seat of administration and the hub that connects all other satellite campuses or affiliates. The IT Directorate sited on the Winneba campus, who were and are the managers of the e-learning platforms, coordinates and supervises all IT services of the University, across all satellite campuses from the Winneba campus.

The Ajumako campus is considered in the study because there is an overlap of lecturers and professors who in a single academic semester, take courses at both the Ajumako and Winneba campuses. The study considers an empirical assessment of the e-learning strategies adopted by the University of Education, Winneba where the tools and the technologies adopted are identified. Also, the study seeks to establish how non-academic management and the administration of the university were conveyed amidst COVID-19.

1.8 Organisation of the Study

The principal issues of the study are organised into five chapters.

Chapter One of the study which is the introductory chapter is dedicated to the background of the study, statement of the problem, the study's objectives, research questions, research hypotheses, the significance of the study, the scope and delimitation of the study as well as expression of the study‘s organization.

Chapter Two of the study also deals with the review of related literature. The issues which this chapter discusses include a review on global pandemics; SARS COV 2 (COVID-19); global response to COVID-19; spread and containment of the virus; school closures and student performance; relief, recovery, and rebuilding; COVID-19 and school assessment; the concept of online education and e-learning; challenges of learning from home; the reality of lockdown and school staff; the new normal with COVID-1; the health front in COVID times; continuity of teaching and academic integrity; students‘ adaptation; and academic research in COVID-19 times, as well as the conceptual framework underpinning the study.

Chapter Three passably dealt with the methodology used for this study which constituted the research approach and design; population and sampling issues.

Chapter Four is for presenting the data and findings of the study. Also under Chapter Four, the findings are analyzed and discussed. Lastly,

Chapter Five summarizes and concludes the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a synthesis of themes relevant to the outbreak of the COVID-19 pandemic and the resultant impact on schools and education in general. This is a presentation of what available literature has on the thematic areas some of which include: global pandemics, a brief history of some pandemics, global response to COVID–19, school closure and students' performance, technology, and student learning, online learning, etc.

2.2 Global Pandemics

In the past century, there have been several pandemics. Within the context of global health, these pandemics have often been viewed from the lens of determinants such as population, poverty, and pollution. Scientists and medical researchers have for years had differences over the exact definition of a pandemic: *is it a pandemic, or an epidemic?* One thing everyone agrees on is that the word describes the widespread occurrence of disease, over what might normally be expected in a geographical region. World Health Organization, (2018) defines a pandemic as the worldwide spread of a new disease.

Pandemics are not new and have occurred at different stages in human history (Hogan et al., 2020). While there have been many outbreaks and human catastrophes, there has been a notable rise in the frequency of pandemics from the year 2000 and thereafter. This is particularly due to increased emergence of viral disease amongst animals (Madhav et al., 2017). In the 21st century, we have experienced infectious disease epidemics and pandemics and have heard or read about ones that may emerge

in the future. Cholera, bubonic plague, smallpox, influenza, and the most recent one, coronavirus are some of the most brutal killers in human history. Outbreaks of these diseases across international borders are properly defined as a pandemic, especially smallpox, which throughout history, has killed between 300-500 million people in its 12,000-year existence (WHO, 2018).

2.3 A Brief History of Some Pandemics

2.3.1 HIV/AIDS pandemic (peaking at 2005-2012)

HIV/AIDS was first identified in the Democratic Republic of Congo in 1976, HIV/AIDS has truly proven itself as a global pandemic, killing more than 36 million people since 1981 (WHO, 2018). Currently, between 31 and 35 million people are living with HIV, the vast majority of those are in Sub-Saharan Africa, where 5% of the population is infected, roughly 21 million people (WHO, 2018). As awareness has grown, new treatments have been developed that make HIV far more manageable, and many of those infected go on to lead productive lives.

2.3.2 Flu Pandemic

Another pandemic in human history is the FLU pandemic which was identified as caused by influenza. The flu pandemic occurred in the year 1968 which led to the death of a large number of people in the world. However, the good news is the vaccines of the flu pandemic were successfully obtained and marked the end of the pandemic. It is sometimes referred to as the Honk Kong flu pandemic caused by the H3N2 strain of the influenza A virus.

2.3.3 Sixth Cholera Pandemic (1910-1911)

Apart from HIV, Flu pandemic, and Hong Kong Flu as discussed earlier, the world has experienced the sixth cholera pandemic. The sixth cholera pandemic originated in

India between 1910 and 1911. The basic cause of the outbreak was known to be cholera. The sixth cholera pandemic like the previous pandemic quickly spread all over the world particularly the Middle East, North Africa, Eastern Europe, and Russia where it is estimated to cause the death of about 800,000 of the world population (Sansa, 2020).

2.3.4 Black Death

In addition to that, the world experienced the black death pandemic from 1346 to 1353 which led to the loss of life to a significant number of the world population; about 75 to 200 million people lost their lives. The black death spread quickly in the world particularly in Europe, Africa, and Asia (Sansa, 2020).

2.3.5 Corona Virus Disease 19 (COVID-19)

The world was gripped by a pandemic over the first half of 2020. It was identified as a new coronavirus (severe acute respiratory syndrome coronavirus 2, or SARS–COV 2), and later named as coronavirus disease–19 or COVID-19 (Qiu et al., 2020). While COVID -19 originated in the city of Wuhan in the Hubei province of China, it has spread rapidly across the world, resulting in a human tragedy and tremendous economic damage. By mid-June of 2020, there had been over 8 million cases of COVID-19 globally, with over 436,000 deaths. The current COVID-19 pandemic is estimated to be the worst pandemic in world history. Studies show that the current COVID-19 pandemic will cause the deaths of a significant number of the world population. This is because global efforts to find a vaccine have delayed in getting the vaccines for COVID-19, however, scientists are trying in different investigations to find the proper vaccine for COVID-19. Meanwhile, the World has already witnessed the death of a significant number of people particularly in China and Italy.

2.3.6 Global Response to COVID – 19

Given the rapid spread of COVID -19, globally countries have adopted several public health measures intended to prevent its spread, including social distancing (Fong et al., 2020). As part of social distancing, businesses, schools, community centers, and non-governmental organizations (NGOs) have been required to close down, mass gatherings have been prohibited, and lockdown measures have been imposed in many countries, allowing travel only for essential needs to happen. The goal is that through social distancing, countries will be able to "flatten the curve", that is, reduce the number of new cases related to COVID-19 from one day to the next to halt exponential growth and hence reduce pressure on medical services (Brodeur et al., 2020).

2.4 School Closure and Students' Performance

Despite an emerging novel option of closing schools as a mechanism to improve students' achievement and school quality, school closure has always been on a flawed note. Studies on school closure, including Sunderman, Coghlan, and Mintrop (2017), and Kirshner, Gaertner, and Pozzoboni (2010) define the concept as closing low-performing schools and transferring their students to better-performing schools: an interruption in the school year; after a 1-year hiatus, schools are reopened with new students and staff (Kirshner, Gaertner & Pozzoboni, 2010). In this, student achievement is expected to improve. This is, however, not always the case as it is not automatic that students from a closed school will excel in a higher-performing school. In the domain of this study, school closure is defined as the hibernation or a pause of schools as a result of enforcing the ban on public gathering to foster social distancing, a way of life induced by the outbreak of COVID-19. This definition is after the one by

Kirshner, Gaertner, and Pozzoboni (2010); an interruption in the school year; after a 1-year hiatus, schools are reopened with new students and staff.

The closures of schools would cause major interruptions to student learning (Burgess and Sievertsen 2020). Sunderman and Payne (2009) note a lack of research on the effect school closures have on students‘ outcomes. While it is difficult to estimate what missing months of school could mean for students‘ achievement, research on learning loss in the COVID-19 school‘s closure period can offer some insights on the impacts of this extended pause in classroom instruction (Kuhfield & Tarasawa, 2020b). Schools‘ closings raise concerns about the possible negative impacts on student achievement and teaching staff (Winkler et al., 2012).

School closure as a result of the outbreak of COVID-19 caused students to be transferred. This took forms of whether students move from one school environment to another, or staff in the school are replaced. Because closure causes unplanned mobility for students who are or are not in their graduation year, closure may have outcomes similar to other types of student mobility (Kirshner, Gaertner & Pozzoboni, 2010). Researchers have found that mobility, defined as non-promotional school transfer, is associated with lower test scores, grades, and low school completion rates (Engec, 2006; Rumberger, 2003; Rumberger & Larson, 1998; Lacruz, Smith, Fine, & Paine, 2008).

However, studies as Pribesh and Downey's (1999) found that school mobility, when not accompanied by residential mobility, showed no effect on reading or math scores. They concluded that the effect of school mobility was due to differences between movers and non-movers that are evident before any movement occurs. A comprehensive study by Engberg et al. (2012) which evaluated the effect of the

shutdown of approximately 20 schools found that displacement has a persistent, negative effect on achievement, but this effect can be substantially alleviated by placing the students in higher-performing schools. Other studies controlled background variables and found negative effects associated with school mobility. Rumberger and Larson (1998) performed regression analyses that controlled prior student performance and family background and found that even just one change in schools between 8th and 12th grade constituted an important risk factor that reduces the odds of graduating from high school. Also, Rumberger (2003) reported findings from a longitudinal study that found that school mobility predicted increases in behavior problems.

Specific to COVID-19, preliminary estimates according to Kuhfield and Tarasawa (2020a) suggests that impacts of school closure may be larger in mathematics than in reading and that students may return in fall 2020 with less than 50% of typical learning gains, and some grades, nearly a full year behind what we would expect in a subject during normal conditions. Students would potentially begin fall 2020 with roughly 70% of the learning gains in reading relative to a typical school year. In mathematics, students were predicted to show even smaller learning gains from the previous year, returning with less than 50% of typical gains (Kuhfeld, Soland, Tarasawa, Johnson, Ruzek, & Lewis, 2020).

Similar to COVID-19 studies, Sacerdote (2012) examines the effects of Hurricanes Katrina and Rita on evacuees' academic performance and found that evacuees experience significant temporary drops in their test scores in the year immediately following the Hurricanes. However, this finding is not on the effect of the school

closure due to the Hurricanes but the effects of the Hurricanes on the performance of the students.

2.5 Technology and Student Learning

The promotion of digital literacy, underpinned by the use of computers for the collection and exchange of information (Conclusions, 2006), finds its best course of development in the educational setting. For this, the past decade has seen a strong focus on increasing the use of technology in schools in many countries to spur innovation and foster global economic competitiveness. The scale of e-learning has expanded continuously in the past 10 years due to its unique characteristic of being unconstrained by time or geographical limits. In 2008, Congress of the United States jointly authorized the nonprofit Digital Promise to support comprehensive research and development to provide Americans with the knowledge and skills needed to compete in a global economy (Cator, Schneider, & Vander Ark, 2014)). In June 2013, President Obama announced ConnectED, an initiative to connect 99% of U.S. schools to the Internet within 5 years (Slack, 2013). Additionally, the U.S. Department of Education, together with the Federal Communications Commission and more than 300 educational thought leaders, proposed a blueprint to expand digital learning into the nation‘s K–12 schools through the LEAD commission report (Hartlapp, Metz, & Rauh, 2013).

As a result of these policies, school systems are rapidly incorporating technology, as evidenced by district and statewide adoptions of digital conversion initiatives. Access to technology is an important first step in the digital conversion of school systems; however, for the conversion to be successful, it is critical to move the focus beyond the technology itself, to how technology enables teaching and learning. Applications

such as Wikis (Biasutti & El-Deghaidy, 2012) and blogs (Valentín, Mateos, González-Tablas, Pérez, López, & García, 2013) are initiatives to improve learning in the teaching–learning processes to motivate students and improve their performance. Several studies have focused on analyzing the incorporation of ICTs in the context of Higher Education (Balasubramanian *et al*., 2009).

A report by Ghislandi, Calidoni, Falcinelli, and Scurati (2008) found that 90% of university teachers and students already use Virtual Learning Environments (VLEs). The number of registered students in American colleges and universities who participated in at least one online course from 2002 to 2010 has maintained an annual growth rate of about 10-20%, and in 2010 the number reached 6.14 million, accounting for 31.3% of all registered students. According to statistics from the Chinese Ministry of Education, in 2011, the scale of distance education for bachelor/ college students reached 4.53 million persons. Research comparing the effects of digital learning to traditional classroom instruction has yet to show a consistent, significant advantage for digital learning (Bernard *et a*l., 2004). Some studies report that digital classrooms outperform traditional classrooms (Clariana, 2009; Holcomb, et al., 2009; Silvernail & Gritter, 2007; Suhr, Hernandez, Grimes, & Warschauer, 2010), while others report no difference or the reverse (Cuban, 2006; Holcomb, et al., 2009; Penuel, 2006; Silvernail & Lane, 2004; Warschauer & Grimes, 2005).

2.6 Internet use and University Students

The internet, widely used in educational environments, is an important teaching and learning resource when used in a manner appropriate to its aims. Thanks to the internet, students can easily access the materials they need for their works and obtain information by different routes (Chou & Tsai, 2002; Chuang & Tsai, 2005). However,

as with all technologies, in addition to facilitating individuals‘ lives to a considerable extent, the internet also brings problems with it; in particular, unhealthy or improper use of the internet may be described as negativity that has begun affecting social life. ―Healthy internet use‖ has been described as internet use to achieve a specific purpose, within an appropriate time frame, involving no emotional or behavioral disorder (Davis, 2001; Odacı & Kalkan, 2010). However, the number of ―problematic internet users‖ to whom the concept of health provided in this definition does not apply is also too great to ignore. Researchers have at various times referred to this in the literature as ―internet dependence‖ (Lin & Tsai, 2002), ―internet addiction‖ (Douglas, Mills, Niang, Stepchenkova, Byun, Ruffini, et al., 2008; Scherer, 1997), ―pathological internet use‖ (Davis, 2001) and ―problematic internet use‖ (Davis, Flett, & Besser, 2002; Odacı & Kalkan, 2010). The common point in these descriptions involves such indicators as spending excessive time on the internet, a state of distress and irritability in situations when internet use is not available, and feeling the need to spend even more time online (Young & Rodgers, 1998). Internet use is highest in the 16–24 age groups (Kandell, 1998; Öztürk, Odabasıoglu, Eraslan, Genç, & Kalyoncu, 2007), and this suggests that university students, at a critical time in terms of their social and emotional development, are a potential risk group for internet dependence (Odaci & Kalkan, 2010).

The fact that internet access is easier and faster in the university environment increases the likelihood of university students being affected by the negative consequences of the internet. Remaining online for a long period, without being aware of the passage of time, in other words, problematic internet use can soon lead to tasks the individual needs to complete being postponed unrealistically (Lay, 1988). There are major inconsistencies between the aims and behavior of individuals with

postponement problems. Such people appear to approach the tasks to be performed with good intentions and determination, but they fail to make good their intentions over the long-term and even to embark on them on time (Schouwenburg, Lay, Pychyl, & Ferrari, 2004). Academic procrastination, one variant of general procrastination, is a problem in such areas as preparing for exams in school, doing homework and holding meetings with student counselors, and completing projects (Lay, 1988; Milgram, Mey-Tal, & Levison, 1998).

Academic success is very important for students, whose aim in attending university is to obtain the diploma necessary to enter a profession. Students‘ belief in their academic self-efficacy and their ability to begin and continue their studies is also highly important. Academic self-efficacy is a belief regarding the student‘s ability to complete an academic task (Solberg, O‘Brien, Villareal, Kennel, & Davis, 1993; Zimmerman, 1995).

Academic self-efficacy is one important variable in the estimation of student success (Elias & Loomis, 2002; Wood & Locke, 1987). In the light of the above, concerns have that students need to use the internet healthily, otherwise they will encounter difficulties in displaying a good academic performance and that their belief in their academic self-efficacy will be impaired and academic procrastination behaviors may increase.

Studies have examined the correlation between problematic internet use and depression (Ceyhan & Ceyhan, 2008; Fortson, Scotti, Chen, Malone, & Del Ben, 2007; Kim, Ryu, Chon, Yeun, Choi, Seo et al., 2006; Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000; Yen, Ko, Yen,Wu & Yang, 2007; Young & Rodgers, 1998), anxiety and psychomotor agitation (Ferraro, Caci, D‘Amico, & Di Blasi,

2007), loneliness and social anxiety (Kraut et al., 1998; Nalwa & Anand, 2003; Whang, Lee, & Chang, 2003), hostility (Yen et al., 2007), intolerance and obstinacy (Yang, Choe, Baity, Lee, & Cho, 2005), shyness (Yang & Tung, 2007; Yuen & Lavin, 2004), locus of control, antisocial trends and social adaptation (Ceyhan & Ceyhan, 2008), social self-efficacy and academic locus of control (Iskender & Akin, 2010), dating anxiety (Odaci & Kalkan, 2010), academic performance (Kandell, 1998), psychiatric symptoms (Jang, Hwang, & Choi, 2008; Shapira et al., 2003; Whang et al., 2003; Yen et al., 2007), parent–adolescent conflict (Yen, Yen, Chen, Chen, & Ko, 2007), low family function (Armstrong, Phillips, & Saling, 2000), psychological well-being (Kraut et al., 1998), anger, strain and tiredness (Beard &Wolf, 2001).

There seems to be a dearth of studies that set out the relationship between problematic internet use and academic self-efficacy and academic procrastination. Bearing in mind the negative impacts of problematic internet use on academic success, (Young, 2004) hypothesized it would also be correlated with academic self-efficacy and academic procrastination (main source).

2.8 Mobile Learning

Mobile learning is a term to denote learning involving the use of a mobile device. The term is fully defined as ―learning across multiple contexts, through social and content interactions, using personal electronic devices" (Author, 2013a, p. 4.). This definition provides insight into the educational affordances of learning with mobile devices, as learning is untethered, happening across contexts, time, subjects, people, and technologies (Author, 2013a; Laurillard, 2007; Traxler, 2010). In an educational context, mobile phones can be used for accessing content, finding additional data,

searching for specific information, and promoting interaction and sharing within peer groups (Echeverrı´a et al., 2011).

Several reviews of mobile learning have been conducted across the past ten years. Each contributed important information for scholars to better understand the use of mobile devices in educational settings. Some of these reviews were researched that did not identify the educational setting in which the studies took place. The researchers reported their findings without describing the educational level of the learners. Frohberg, Goth, and Schwabe (2009) conducted a review of 102 mobile learning projects to analyze the context, tools, control, communication, subject, and objective of each study. Wingkvist and Ericsson (2011) reviewed 114 papers from the World Conference on Mobile Learning (mLearn) focusing on research purposes and methods. Some reviewers have focused exclusively on k-12 educational settings. Liu, Scordino, Geurtz, Navarrete, Ko, and Lim, (2011) reviewed k-12 mobile learning articles from 2007-2012, investigating academic areas, research purposes, methods, and outcomes. The author (2017) reviewed 113 studies that took place in pk-12 settings, investigating research purposes, methods, and outcomes. In addition, they investigated subject matter domains, educational levels and contexts, types of mobile devices, geographic distribution, and learning theories. Some researchers have specifically identified multiple educational settings in their reviews. Hwang and Tsai (2011) reviewed K-12, higher education, and adult learner mobile learning articles from 2001 to 2010. They reported subject areas, grade level, and countries where the studies took place. Wu et al. (2012) reviewed K-12, higher education, and adult learner mobile learning articles from 2003-2010. They investigated research purposes, methods, outcomes. Sung, Chang, and Liu (2016) analyzed 110 studies published from 1993-2013 which took place in k-12, higher education, and adult settings. They

investigated the overall effect of using mobile devices in education. Chee, Yahaya, Ibrahim, and Hassan (2017) reviewed 114 articles in k-12 and higher educational settings investigating longitudinal trends from 2010-2015. All of these studies add to the scholarly understanding of the use of mobile learning across all grades and subjects.

However, it is not easy to parse out what is specifically happening in higher education to understand how the devices are supporting learners in those settings. A few researchers (viz., Alrashedi, Capretz, & Raza, 2015; Kaliisa & Picard, 2017; Pimmer et. al., 2016) have conducted more granular reviews with a focus on higher education. However, these reviews narrowed the focus further to only cover certain aspects of higher education. Alrashedi et al. (2015) studied critical factors that impact mobile learning implementation. Using Rogers‘ diffusion of innovations theory (Rogers, 2003), Alrashedi et al. (2015) reviewed 30 studies from 2005-2013. Their analysis identified 14 critical factors which strongly impact mobile learning implementation. Their findings showed that the most critical factor for success was whether or not students perceived that their productivity was increased by using mobile learning. They also found that students were fairly satisfied with the usage of mobile learning in their courses and were interested in using mobile learning in the future.

Pimmer et al. (2016) analyzed 36 studies from 2000-2013 to uncover how mobile learning is used in higher education about existing learning theories. Their research indicated that instructions, rooted in the concept of behaviorism, were the most prevalent educational design. Kaliisa and Picard (2017) conducted a study examining various characteristics, such as type of device, instructor‘s and student‘s perceptions,

methodologies, and theoretical frameworks. This study was narrow in focus as it only included studies conducted in Africa.

The integration of mobile phone (including smartphones) technologies into the education process is an issue that is yet to be addressed, with on one side the significant potential of instant messaging, and on the other, its distractive nature (Rambe & Bere, 2013). Interaction and sharing can be done by using some specific applications on mobile phones. Some of these applications provide instant messaging functions.

The instant messaging function of these mobile phone applications merits further study, given the potential it can bring to an interactive educational environment (Rambe & Bere, 2013). WhatsApp, which is an instant messaging application that can be run on most mobile platforms, is one of the most popular/used applications worldwide (Priyono, 2016). There are only a limited number of studies examining the use of WhatsApp in an educational environment (e.g., Giordano et al., 2015; Johnston et al., 2015; Ngaleka & Uys, 2013; Rambe & Chipunza, 2013), although the number of users keeps growing. However, Vanderhoven et al., (2015) highlight that the lack of studies to date into peer assessment and the use of the instant messaging function of mobile phones in education.

2.9 Efficiency and Student Success in Online Learning and Traditional Face-to-Face Learning

Distance education and more recently, ~~–o~~nline education" have been studied extensively in the last 20 years. Rapid advances in technology have recently made access to higher education more readily available (Heirdsfield, Davis, Lennox, Walker, & Zhang, 2007). Traditionally, distance education required the usage of

access to print materials that were mailed or sent in and required significant time for communication. The development of learning management systems and web resources has drastically transformed both distance education and online education programs by speeding up the rate at which information can be disseminated and digested (Finger, McGlasson, & Finger, 2007).

Several meta-analytic studies have been completed, closely examining research on the effectiveness and feasibility of online instruction, including hybrid and blended environments in higher education learning programs. A report compiled in (2009) by the U.S. Department of Education identified 51 independent effects between 1996 and 2008 that compared online instructional formats to more traditional face-to-face instruction. Of these 51 effect sizes, 44 were reported in higher education programs with the rest in K-12 education. The report identified several key findings: (1) On average, students who participated in all or most of their courses through an online format performed better than students who took the same course in the more traditional, face-to-face format; (2) A combination of online with face-to-face elements (often referred to as blended or hybrid instruction) resulted in stronger overall performance than strictly face-to-face instruction than when compared with sole online performance; (3) Students that reported more time on task in online courses reported more benefit for online courses than students in the face-to-face section in comparable circumstances; and (4) Online learning formats were effective for a variety of content areas and learner characteristics (i.e. K-12, undergraduates, and graduate students). Means, Toyama, Murphy, and Baki (2013) concluded in their analysis of the findings from their study that ~~"p~~urely online learning has been equivalent to face-to-face instruction ineffectiveness, and blended approaches have been more effective than instruction offered entirely in face-to-face mode" (p. 35).

Furthermore, Shachar and Neumann (2010) found in their review of more than 20 studies comparing course delivery methods, that students taking courses by distance and/or online courses outperformed their counterparts taking traditional or face-to-face courses. More recently, meta-analytic data compiled by Wu (2015) evaluated 12 studies completed in 2013–2014 that compared learning in a fully online or hybrid format versus learning in a traditional or face-to-face environment. Results from this analysis indicate similar conclusions to the U.S. Department of Education report; students in online and hybrid formats performed as well or better than students in more traditional versions of comparable courses. We recommended several important considerations for future studies including measuring more consistent short and long-term outcomes overall and studying outcomes in more online humanities courses. Students participating in online and traditional courses often experience completely different objectives and characteristics, making it more difficult to compare actual outcomes from the two types of courses. Additionally, long-term learning effects such as impact to the field are unknown at this time, especially in the social sciences and humanities fields (Wu, 2015).

Additional studies in online education courses and programs of higher education have shown promising results for comparable learning. Ogunleye (2010) found that online learning effectively facilitated collaborative and cooperative learning among students that served to deepen student interest and understanding of course material. Schrum & Hong (2002) identified several aspects that contributed to student success in online learning as compared to traditional course formats including access to resources, experience with learning tools, learning styles and preferences, existing study habits and/or skills, overall learning objectives, and goals, personal life issues, and personal traits and characteristics.

Furthermore, course design and consistency, contact with course instructors, and dynamic/interactive discussions through online forums were all found to be significant predictors of a successful online learning experience (Heirdsfield et al., 2007; Swan, Shea, Fredericksen, Pickett, & Pelz, 2000; Swan et al., 2000). Regarding online instruction blended with face-to-face interactions, Terras, Chiasson, and Sansale (2012) reported that blended instruction was perceived as an effective method for learning among teacher education students in the areas of meeting course objectives, involvement of the course instructor, media elements, and overall learning experience.

The recent development of learning management systems such as Blackboard or Canvas has further instigated this type of course delivery by allowing a method for instructors to house and organize materials efficiently. Heirdsfield, Walker, Tambyah, and Beutel (2011) found that both students and faculty using certain interactive features of the Blackboard learning management system responded positively to the system‘s ability to provide organized content, interactive features, and tools to facilitate higher-level discussions and collaboration among participants. While research has shown great promise in using online and blended formats in higher education, research is lacking in the best pedagogical methods for instructors to use in such courses. Prieto-Rodriguez, Gore, and Holmes (2016) concluded that the use of a quality teaching model, often implemented in traditional teacher education courses, was also effective when used effectively in purposefully designing online learning environments. The authors indicate a stronger need for research regarding the best pedagogical practices of online teaching since online teaching requires different skillsets for success from more traditional or face-to-face methods.

2.10 Blended Learning

The inclusion of technology into face-to-face teaching has attracted huge attention and has provided various research avenues over the years. Due to increasing student numbers, student populations in higher education are generally becoming more and more diverse (Fry, Ketteridge, & Marshall, 2008). This trend has sparked a surging interest in blended learning, an instructional approach that combines online and face-to-face instructional activities, to create more flexible modes of education, and personalized learning trajectories (Fry et al., 2008; McKenzie et al., 2013; Wanner & Palmer, 2015; Watson, 2008). Today, blended learning is considered the most effective and most popular mode of instruction adopted by educational institutions due to its perceived effectiveness in providing flexible, timely, and continuous learning. Blended learning involves the combination of face-to-face and technology-mediated instruction (Wendy W. Porter, Graham, Spring, & Welch, 2014). (D. R Garrison & Kanuka, 2004) defines blended learning as ~~"a~~ thoughtful integration of classroom face-to-face learning experiences with online experiences". Since early 2000, educational institutions have adopted different forms of mixing online with traditional face-to-face instructions; commonly referred to as blended, hybrid, and flipped or inverted, which are categorized based on the sequence of integrating face-to-face and online sessions.

This idea of blending instructional materials with online interventions has proven to be an upgrade to both face-to-face traditional mode and the fully online mode of instruction. Because, if done well, the approach combines the benefits afforded by both face-to-face and online learning modes of instruction (Broadbent, 2017). For example (Jusoff & Khodabandelou, 2009) shows that blended learning reduces online transactional distance and increases the interaction between teachers and their

students; blended learning offers flexibility, pedagogical richness, and an increase in cost-effectiveness (R. Graham, 2006, pp. 3–21); blended learning ensures value interaction and learning engagement (Dziuban, Moskal, & Hartman, 2005, pp. 88–89); and it is considered valuable for different sorts of learners (Heinze & Procter, 2004). There are different points of view on how blended learning may contribute to achieving this goal.

Traditionally, blended learning has been used to make higher education more accessible to students (Graham, Woodfield, & Harrison, 2013), as online activities allow students to go through the learning materials when and wherever they want (Norberg, Dziuban, & Moskal, 2011). However, more recent conceptualizations of blended learning go beyond this notion of flexibility in terms of time and place. In addition to this increased accessibility, blended learning also offers opportunities to cater to students‘ individual needs and achieve real personalized instruction (Wanner & Palmer, 2015; Watson, 2008). For instance, the popular flipped-classroom approach to blended learning aims to free up classroom time for student questions, in-depth discussion, and personal feedback, by requiring students to prepare for learning activities online, according to their levels of understanding (Kim, Kim, Khera, & Getman, 2014; Wanner & Palmer, 2015).

Unfortunately, there is not much information about how instructors in higher education use blended learning to provide more personalized instruction. This issue is especially important, as blended learning may help instructors to overcome several challenges that frequently obstruct more personalized instruction in traditional contexts, such as large classrooms or a lack of time (Nicolae, 2014; Tomlinson et al., 2003).

2.11 Benefits of Online Learning

The recent decade has been witnessing dramatic growth and various benefits in the use of online learning in education (Allen & Seaman, 2017). A great number of students are taking their courses online, which urged teachers to design online courses to improve learning and teaching effectiveness (Evans, 2014). Numerous studies reported that online learning could increase student participation, improve discussion quality, and foster online interactions. The discussion forum fused in e-learning could support students and improve learning by solving difficult problems. Mobile technologies such as applications and computers could enable easy access to an online learning platform and facilitate mobile learning effectiveness (Panigrahi et al., 2018).

Collaboration and virtual community could be established in the online learning context. Online learning, assisted with information technologies such as laptops, tablets, iPads, and mobile phones, has been widely used and well accepted in higher educational institutes (Starr-Glass, 2013). Online learning brings numerous benefits to learners, including diverting students' attention to important knowledge and enabling them to engage in collaborative learning activities (Alwi et al., 2012). Collaborative learning is strongly and positively correlated with peer discussions and engagement rates (Brown, 2001). The formation of virtual communities is relevant to online learning outcomes (Panigrahi et al., 2018).

2.12 Challenges with the Online Component of Blended Learning

While the merits and benefits of the blended learning approach in optimizing teaching and learning are apparent from countless influential studies and regarded by many scholars as _the new normal' (Dziuban, Graham, Moskal, Norberg, & Sicilia, 2018) in education due to its high rate of adoption, popularity and perceived benefits; the

inclusion of technology into instruction thereby creating the online component has brought some level of unease to students, teachers, and educational institutions. For example, it becomes necessary for students to have self-regulation skills and technological competence since they are required to manage and carry out their studies independent of their instructor, at their own pace, and also using online technology out of their face-to-face sessions.

Secondly, it becomes necessary for teachers to be technologically competent, to effectively use and manage technology for teaching, and also to create and upload learning materials to students (e.g. creating quality online videos). Thirdly, it is the responsibility of educational institutions in providing the necessary training and technical support to both teachers and students to ensure the effective utilization of the available technology, and in addition, to efficiently utilize the online component. Several studies have reported the problems that students e.g. (Broadbent, 2017; Prasad, Maag, Redestowicz, & Hoe, 2018), teachers e.g. (Cuesta, 2018; Ocak, 2011) and educational institutions e.g. (Cuesta, 2018) encounter with the online component of blended learning.

However, these studies are limited in providing an overall and clearer picture of the challenges in managing to teach and studying out of the face-to-face class sessions. Some studies are also characterized by reporting from a single type of blended learning. For example, the study of (Akçayır & Akçayır, 2018) that reported the advantages and challenges of the flipped classroom is only limited to flipped classroom-type of blended learning, and it specifically reported the technological challenges found in flipped classrooms. Similarly, the study of (Brown, 2016) reported the challenges from teachers‘ perspectives only. Results of the study found

teachers' technological anxiety, complexity, and illiteracy, students' technological illiteracy as the challenges teachers encounter in using online technology for instruction. Another related study to that of (Brown, 2016) is the study of (Ocak, 2011) which revealed the reasons for teachers not teaching blended courses.

Additionally, some of the recent and most pronounced studies in blended learning have focused on the design challenges as a whole, but not particularly focusing on the online component. For example, the study of (Boelens, De Wever, & Voet, 2017b) identifies incorporating flexibility; facilitating interaction; facilitating students' learning processes; and fostering an effective learning climate as the four key challenges to the design of the blend in a blended learning environment. Similarly, the series of influential studies of Graham and his teams (Graham, Woodfield, & Harrison, 2013; Halverson, Graham, Spring, Drysdale, & Henrie, 2014; Wendy W Porter & Graham, 2016; Wendy W Porter, Graham, Bodily, & Sandberg, 2016; Wendy W. Porter et al., 2014) that filled a huge gap in blended learning literature by providing the framework, directions, and guidelines for educational institutions in implementing an effective blended learning instruction, have also considered examining blended learning (face-to-face and online components) as a whole in offering such contributions.

Blended learning literature is short in providing a detailed picture of the challenges in the online component of blended learning. As blended learning constitutes of two instructional components (face-to-face and online components) amalgamated as one, literary, by disregarding the face-to-face component, students and teachers are automatically relocated to the online (out of face-to-face sessions) component and are

therefore expected to proper self-regulate and manage their tasks using technology, and at their own pace.

2.13 Massive and Opened Online Courses (MOOCs) in Developing Worlds

The potential benefits of MOOCs are particularly high for a developing society's learners, for those who travel and tuition expenses to register for face-to-face education at top western universities would be challenging (Liyanagunawardena et al., 2013). Studies suggest that 40% of MOOCs are reported to be from developing countries (Zhenghao et al., 2015). According to Zhenghao et al. (2015), economically and academically disadvantaged learners are taking particular advantage of remotely-run courses that are hosted over digital networks. This supports the aim for establishing remote learning and making online studies possible; to provide a life-changing opportunity for those who are less advantaged and have limited access to education. Zhenghao et al., (2015) contend that more research should focus on how learners from developing societies can be supported to complete to realize career and educational benefits.

In a typical developing nation, the demographic of internet users are young and active; one-half of internet users are under age 25. A developing nation as Egypt for instance has an internet penetration rate of 48%, a 1.38% share of global internet users, and the largest population of internet users in the Middle East and North Africa region (internet live stats, 2015).

E-learning has been recognized by the Egyptian government as an alternative delivery method to provide the growing population with quality and accessible educational opportunities (Abdel-Wahab, 2008). Online courses can provide innovative solutions to education problems in developing countries such as overcrowded classrooms, high

prices of materials and books, commuting difficulty due to high traffic, and a need for continued education and specialized training for the workforce (Baraka, 2005).

2.14 Implications of the Massiveness of MOOCs: Quality, Security, and Relevance

The issue of quality is salient regarding eLearning programs (Nawaz & Khan, 2012; Al-Saif & Anandhavalli, 2013). It pertains to the content of the program, the human resources engaged in the delivery, and the technological facilities (hardware and software including the Internet). Quality has also been established as a critical measure by which to assess the value that eLearning brings to the learner. The word quality is applied to the learners themselves and the outcome of the eLearning process for those learners. Lecturers and content are all scrutinized under the microscope of quality (ibid).

Security is important when eLearning is used as an in-house corporate tool for staff training to protect trade secrets and other proprietary material. It is also necessary to protect student grades when eLearning forms part of a university program and where official grading is performed online. This is concerning protection from intruders as 4 well as from manipulation by students themselves (Graf, 2002). Security, therefore, is a vital component in the creation, delivery, and management of eLearning programs. It follows that the implementation of an eLearning system must be accompanied by security features to protect it from external and internal threats.

The third area of importance in eLearning is relevance. This appears to be the least represented in the literature. By definition, it is ~~–t~~he bearing on or having reference to the matter in hand" (The Concise Oxford Dictionary, 1990). Drawing on this and in the context of this study, relevance refers to the degree to which what is offered has a

bearing on those to whom it is offered. Relevance in eLearning relates to whether the designers are cognizant of the goals, abilities, and proclivities of the users. In the context of HE, regarding the relevance of eLearning programs, they need to take into account the diverse groups of users who become engaged in this form of learning. In particular, of interest in the current study are the varying requirements of the different genders. There has been some implicit reference to the need for relevance in HE. Dias (1992) in discussing the need for policy reforms that will improve the quality and pertinence of HE systems, posits that relevance concerns the role of HE within the wider social system including the development and democratization of work.

The concept of relevance in HE, which has received some attention in this context, has not been adequately extended to eLearning for HE purposes or concerning gender. Martinez et al. (2012), when considering the training of instructional design professionals, draw attention to the need for relevance in how these technologists are trained in what they need to do, namely, design instructional programs in educational technology. Tarus and Gichoya (2015) consider the slow growth of eLearning in Africa, highlighting the challenge of adapting imported eLearning policies from developed countries with different cultures. Relevance to the audience is an issue in that study, but the authors pay little attention to it, preferring to focus on the quality of the technological infrastructure. The importance of John Keller‘s (1987) ARCS Model (Attention, Relevance, Confidence, and Satisfaction) is identified by Jones (2010) as motivating learners for in-house organizational training. However, in the model, the concept of relevance is restricted to the narrow context of training within an organization. In this study, we examine the importance of relevance through a gender lens 5 by identifying the roles this plays in the choice regarding eLearning in the pursuit of HE.

2.15 Students' Dropout in e-Learning

Along with the rapid growth of e-learning, its problem of having a much higher student dropout rate than traditional learning has also become more prominent. Studies assert that the dropout rate for e-learning is 10-20% higher than traditional learning (Doherty, 2006), while other literature indicates an even higher dropout rate. For example, the dropout rate for the Open University (UK) is as high as 78% (Simpson, 2014). In China, the dropout rate for traditional learning is about 5%, while the dropout rate for e-learning is as high as 15-40% (Li, Niu, & Ding, 2012; Ran & Guo, 2008; Jiang, & Zhou, 2006). High dropout rates have negative effects on both the educational institutions and students and are not conducive for the healthy development of E-learning.

Dropouts increase the average cost per student for education institutions (Yang, Han, Niu, & Li, 2011). As the cost for recruiting a new student is usually several times that of retaining a potential dropout (Simpson, 2014). From the perspective of students, termination of learning is a waste of their initial economic investment and effort, while the universal phenomenon of dropping out is not conducive to the popularization of online learning (Chen, 2006). In addition, high dropout rates will inevitably lead to lower graduation rates, which may hurt the social reputation of educational institutions, and in turn, may result in reduced government funding and subsequently lead to a vicious cycle (Liu & Li, 2012). The United States, Australia, Britain, and South Africa all consider student retention rates as an indicator of governmental assessment of the quality of higher education institutions (Blom & Meyers, 2003). The means through which student dropout rates can be effectively reduced has become an unavoidable issue in the development process of e-learning, which has received the utmost attention from educational institutions and researchers.

Most of the existing empirical researches investigates the patterns and reasons for student dropout from statistical patterns of attributions, such as demographic characteristics, semesters lost, course passing rates, and the field of study. Based on empirical analysis, researchers have proposed a series of models to explain the factors for losing online learners and attempt to reduce the loss rate by preventing negative factors while improving positive factors at the macro level. However, as the individual differences of learners are large, improvement strategies on the macro level are often ineffective due to their lack of specificity. The premise for reducing dropout rates is to understand the various factors associated with dropping out. The key to reducing dropout rates is to make use of these factors to screen out potential dropout students and take targeted retention measures before the dropout behavior happens.

2.16 Student Engagement

In 1984, Alexander Astin proposed his developmental theory of college student involvement, which he later renamed ―engagement.‖ Astin (1984) defined engagement as ―the amount of physical and psychological energy that the student devotes to the academic experience‖ (p. 297). His theory of student engagement was based on five tenets-engagement refers: to the investment of physical and psychological energy; engagement occurs along a continuum (some students are more engaged than others and individual students are engaged in different activities at differing levels); engagement has both quantitative and qualitative features; the amount of student learning and development associated with an educational program is directly related to the quality and quantity of student engagement in that program, and the effectiveness of any educational practice is directly related to the ability of that practice to increase student engagement.

Today, engagement is conceptualized as the time and effort students invest in educational activities that are empirically linked to desired college outcomes (Kuh, 2009). Engagement encompasses various factors, including investment in the academic experience of college, interactions with faculty, involvement in co-curricular activities, and interaction with peers (Kuh, 2009; Pascarella & Terenzini, 2005). Kuh (2009) emphasizes two major aspects: in-class (or academic) engagement and out-of-class engagement in educationally relevant (or co-curricular) activities, both of which are important to student success. Since 1984, the construct of engagement has been extensively researched. As Kuh (2009) states: ~~–s~~tudent engagement and its historical antecedents are supported by decades of research showing positive associations with a range of desired outcomes of college" (p. 698). In their meta-analysis of how college affects students, Pascarella and Terenzini (2005) highlight the relationship between student engagement, student development, and success: College environments that emphasize close interactions between faculty and students are related to improved critical thinking, knowledge acquisition, analytic competencies, and intellectual development; Close on-campus friendships and engagement in college-sponsored activities maximize persistence and educational attainment; Environments that emphasize engagement in class discussions and involvement with faculty in the academic community maximize psychological adjustment and maturity; Students' perception of faculty as accessible, caring, and helpful promotes persistence and degree completion; Extracurricular involvement has a positive effect on persistence and educational attainment, women's choice of non-traditional careers, and development of a positive social self-concept; The higher the level of student engagement in academic work and in the academic experience of college, the greater his/her level of knowledge acquisition and cognitive growth;

Interaction with peers is a powerful force in student persistence and degree completion.

Academic and co-curricular engagement is other powerful forces in both student psychosocial development and academic success. Even minority students, first-generation students, and students who are not adequately prepared for college academic work see improvements in grades and persistence with increased engagement (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008; Pascarella & Terenzini,2005). While student engagement has been extensively researched in offline environments (Pascarella & Terenzini, 2005), little research exists on the relationship between student engagement and internet, and social media use.

2.17 Professional Development of Staff of Universities

There are several terms used internationally to define the professionalization of university teachers: continuing professional development, academic development, staff development, instructional training, among others (De Rijdt, Dochy, Bamelis, & van der Vleuten, 2016). While each of these terms refers to aspects of teacher professionalization, they do have subtle differences. Research indicates that there has been improvement in the quality of education through the implementation of Professional Development Initiatives (Popovic & Fisher, 2016).

Accordingly, universities design and implement professional development initiatives for their teachers to enhance innovation and bring about reforms (Baume & Baume, 2013). Following this scheme, university teachers are expected to participate in professional development initiatives to improve their skills and apply their learning to the workplace (De Rijdt et al., 2016). Researchers from various disciplines use the terms _transfer of learning‘ or _transfer of training‘ to refer to the successful

application of the knowledge acquired in training. As these terms have somewhat different meanings, the use of the term ‗transfer' here means to denote the application of new learning acquired in a professional development initiative to the workplace (Gegenfurtner, 2011). While the transfer is expected, the application of learning does not always occur (Botma, Van Rensburg, Coetzee, & Heyns, 2015).

Previous researches on professional development in academic settings have identified several variables that influence transfer, commonly grouped into three clusters: intervention design, work environment, and characteristics of the learner (De Rijdt, States, van der Vleuten, & Dochy, 2013). The first cluster concerns ‗intervention design,' which encompasses factors that relate to the format or structure of a professional development initiative, such as content relevance, active learning, technological support, and learning climate. The second cluster concerns the ‗work environment,' which comprises factors related to the work setting, such as a strategic link, organizational support, accountability, and supervisory support. The third cluster refers to ‗characteristics of the learner,' which includes the various aspects directly related to the teacher, such as motivation, career planning, cognitive ability, among others.

It is however on record that research on the attention given to these variables by designers of professional development initiatives is scarce. The transfer should not be reduced to a mere transmission or ‗passing over' of information from training to the workplace. Instead, the transfer should be considered as a dynamic process where the learner – in this case, the teacher – transforms the knowledge acquired in a professional development program before implementing it in a different setting (Larsen-Freeman, 2013). For this reason, the transfer is an essential area of study in

education due to its impact on teacher learning and educational improvement (Aelterman, Vansteenkiste, Van Keer, & Haerens, 2016; Renta Davids, Van den Bossche, Gijbels, & Fandos Garrido, 2017). Since professional development initiatives are set up to improve the quality of education for students, teachers, and the institution, a lack of transfer is a concern to all involved (Avalos, 2011; Drew & Klopper, 2014). Nevertheless, while the above-mentioned variables can be categorized into separate clusters, the variable that is common to all in terms of its influence on the application of learning is the teacher (Hattie, 2009).

2.18 Theoretical Underpinnings: Digital Competence

Digital competence has become a major focus in educational policies in the past few years as a result of a technology-driven society and workplace. It involves a set of skills, knowledge, attitudes, and strategies that enable citizens to use digital technologies in a creative, critical, meaningful, and responsible manner for all spheres of life – independently and with others (Ferrari, 2012; Hatlevik, Guðmundsdóttir, & Loi, 2015; Ilomäki et al., 2016). The need to equip students with this competence has put great demands and placed new expectations upon teachers. They should be competent not only in infusing the pedagogical use of digital technologies to enhance students‘ learning in all subject areas but also in teaching them how to use and take advantage of them for the future. This has resulted in an increased focus on teachers‘ digital competence.

Teachers‘ digital competence is a complex concept, which includes facets of social, cultural, pedagogical, ethical, and attitudinal dimensions (Engen, 2019; Krumsvik, 2014; Lund et al., 2014). Different frameworks attempt to capture such complexity by describing the specific competencies teachers need to be digitally competent (e.g.

ISTE, 2000; Johnson & Mielke, 2013; Kelentrić et al., 2017; MENTEP, 2016; Mishra & Koehler, 2006; Tondeur et al., 2017; UNESCO, 2011). These frameworks often serve as a basis for the development of self-assessment instruments, which enable the study of such competencies and their relation to personal (e.g. age, gender, and general attitude towards technology) and contextual factors (e.g. infrastructure and facilitation for using digital technology in teaching by the school management).

One concern regarding the existence of different frameworks is that they do not provide specific orientations for teachers‘ pedagogical practice.

2.19 The DigCompEdu Framework

The DigCompEdu framework assumes that teachers‘ digital competence can be described by a set of competencies that are specific to the teaching profession and valid for all teachers, indifferent of the education sector or level concerned (Redecker, 2017). This is to say that, the DigCompEdu framework borders on contexts ranging from early childhood to post-university education, and including vocational and adult education.

Furthermore, it assumes teachers‘ digital competence as a professional competence rather than (general) digital competence. Thus, the framework integrates the pedagogical, methodological, and contextual competencies a teacher needs to possess. According to Redecker, 2017, digitally competent teachers use digital technologies effectively and creatively to enhance all areas and aspects of their professional activities. Whenever digital competence is mentioned, it is to connote the comprehensive concept of teacher-specific competence in the digital age. It presents six competence areas and a total of 22 competencies as shown in table 2.1 below.

The focus of the framework is on the pedagogical and methodological aspects specific to the teaching process (competence areas 2–5). While competence areas 2 to 4 detail the digital competencies teachers need to plan, implement and assess teaching and learning, competence area 5 details the digital competencies teachers need to place students at the center of the teaching and learning process. The remaining competence areas specify the digital competencies required to interact with the professional working environment (competence area 1) and the broader digital societal context (covered by competence area 6, e.g. equipping students for the changing labor market).

Table 2.1: Competence Areas and Competencies Proposed by the DigCompEdu Framework

Competences Areas	**Competences**
1. Professional engagement	1.1 Organizational communication
	1.2 Professional collaboration
	1.3 Reflective practice
	1.4 Digital continuous professional development
2. Digital resources	2.1 Selecting
	2.2 Creating and modifying
	2.3 Managing, protecting, sharing
3. Teaching and learning	3.1 Teaching
	3.2 Guidance
	3.3 Collaborative learning
	3.4 Self-regulated learning
4. Assessment	4.1 Assessment strategies
	4.2 Analyzing evidence
	4.3 Feedback and planning
5. Empowering learners	5.1 Accessibility and inclusion.
	5.2 Differentiation and personalization
	5.3 Actively engaging learners
6. Facilitating learners‘ digital competence	6.1 Information and media literacy
	6.2 Communication
	6.3 Content creation
	6.4 Responsible use
	6.5 Problem solving

Source: Redecker (2017)

In this respect, it answers calls by different authors, who claim teachers‘ digital competence should take into consideration various social and cultural aspects about the technology, schools, and the teaching profession (Engen, 2019; Kelentrić et al., 2017).

Similar to other frameworks (e.g. Johnson & Mielke, 2013; MENTEP, 2016; UNESCO, 2011), the DigCompEdu framework proposes proficiency levels. It distinguishes six different, progressively advancing competence levels, which are aligned with the CEFR language competence levels (Council of Europe, 2001). Just like in the CEFR, the progression is inspired by Bloom‘s taxonomy starting from ~~–r~~emembering” (A1) and ~~–u~~nderstanding” (A2) to ~~–a~~pplying” (B1) and ~~–a~~nalyzing” (B2) and, finally, to ~~–e~~valuating” (C1) and ~~–e~~reating” (C2). Each level is further accompanied by role descriptors: newcomer (A1), explorer (A2), integrator (B1), expert (B2), leader (C1), and pioneer (C2). For each competence and each proficiency level, the DigCompEdu framework provides a descriptor and examples of activities exemplifying them. For instance, about competence 3.1 Teaching, a newcomer (A1) is a teacher who rarely uses digital technologies or resources in his/her teaching, an expert (B2) uses digital technologies to improve and diversify pedagogic strategies and a pioneer (C2) is a teacher who uses digital technologies to create new teaching strategies and methods (Redecker, 2017).

2.20 Covid-19 and Digital Learning

Due to the spread of COVID-19, countries worldwide implemented unprecedented measures in various sectors of society to contain the pandemic (OECD, 2020). This situation affected the education sector as well, causing the largest disruption of education systems in history (UN, 2020). As of March 2020, a majority of countries

had announced temporary school closures, preventing around 1.6 billion children and young people from physically attending school (UNICEF, 2020). As a response, most schools switched to digital learning, creating a unique situation for all actors in the education field (UN, 2020). While various European Union bodies and international organizations had long called for technology adoption in education systems (OECD, 2001; European Commission, 2018), most European school systems had continued to employ face-to-face teaching as their main modus operandi before COVID-19 (Wahlmüller-Schiller, 2017; Schrenk, 2020). The urgent imperative to move online following the outbreak of the virus forced digital learning upon unprepared school systems (Hodges et al., 2020).

2.21 Gender and Digital Learning

The discussion on e-learning from a gender perspective is derived from the viewpoint that all spaces are gendered. The study at this point draws on Barriteau's (2001, p.30) opinion that: "Gender ideologies reveal what is appropriate or expected of the socially constituted beings 'women' and 'men'". As such, these ideologies expose how individuals create gender identities. The social expectations and the personal constructions of gender identities form the core of gender ideologies within a particular society. These ideologies establish the sexually-differentiated, socially-constructed boundaries for 'males' and 'females'. Gender is discussed in this study, not as a power dynamic, which might or might not be the case, as this belongs in a different discourse, but rather as a socially constructed driver of what is right and expected of either gender within the context of higher education.

As girls seem to face specific barriers and difficulties in their experiences with computers and information and communication technologies (ICT) in general,

concerns about equity in digital learning have been raised (Yates, 2001; Price, 2006). There have been suggestions that boys may have an advantage over girls in the online classroom solely based on their higher perceived ability, comfort, and engagement with computers (Ashong and Commander, 2012).

Despite this, the results of studies investigating sex differences in this context are heterogeneous. While boys have a clear advantage over girls in confidence in their ICT abilities (Mumtaz, 2001; Durndell & Haag, 2002; Broos, 2005; Broos & Roe, 2006; Meelissen & Drent, 2007) a more recent meta-analysis with university students argue that there are higher competence beliefs regarding learning in digital setting in young women compared to young men (Perkowski, 2013). This might be due to higher academic competence beliefs in girls and women (Britner & Pajares, 2001) that annuls the negative stereotyped effects in this digital context.

When it comes to values toward ICT and digital learning, some studies have shown that girls tend to have less positive beliefs about the value of ICT and their ICT skills compared to boys (Volman & van Eck, 2001); have less positive perceptions of digital learning (Ong and Lai, 2006); and have lower satisfaction with digital learning than male students (Lu & Chiou, 2010). On the other hand, studies are suggesting that there are no differences between boys and girls in attitudes toward digital learning (Cuadrado-García et al., 2010; Hung et al., 2010) or in average ICT participation and motivation (Cuadrado-García et al., 2010). Other studies express advantages for girls when it comes to learning motivation in digital contexts (McSporran & Young, 2001; Price, 2006). In general, some authors argue that sex differences in digital competence, attitudes, and motivation are becoming less prevalent, indicating a narrowing of the gender digital gap (e.g., Vekiri, 2013).

However, as ICT is perceived as a stereotypically masculine field, it seems plausible that gender differences in digital learning map onto students' gender role self-concepts rather than their biological sex. The recognition that individuals can describe themselves in terms of both stereotypically feminine and stereotypically masculine attributes regardless of their biological sex has led to an increased focus on gender role self-concept and its relationship with gendered domains (Athenstaedt, 2002; Kessels & Steinmayr, 2013; Wolter & Hannover, 2016).

Previous studies have shown that adolescents who describe themselves using masculine qualities (e.g., independent, competitive, and brave) have higher perceived mathematics-related competence (Wolter & Hannover, 2016) and performance (Signorella & Jamison, 1986), whereas adolescents who describe themselves with feminine traits (e.g., gentle, kind, and sensitive) have better reading performance and motivation in reading; a stereotypically feminine domain (McGeown et al., 2012; Wolter & Hannover, 2016).

Furthermore, it has been found that individuals high on both masculinity and femininity, thus androgynous individuals are more flexible and adaptable to different situations, as they possess a broader repertoire of traits and behaviors (Bem, 1981; Pauletti et al., 2017). Conversely, individuals scoring low on both dimensions exhibit the lowest levels of adaptability and functioning (Markstrom-Adams, 1989; Pauletti et al., 2017).

While some strands of researchers argue that there are gender-specific behavior patterns that may lead to a discrimination of women using e-learning (e.g. McSporran & Young, 2001; Astleitner & Steinberg, 2005), others argue that e-learning, through its flexible and interactive learning approach favors particularly women (e.g. Bruestle

et al., 2009). Notwithstanding, neither gender roles nor technology can be seen as stable categories (Bruestle et al., 2009).

There is evidence supporting that men and women express varying degrees of anxiety, acceptance, and interest in new technologies across time (McCoy & Heafner, 2004), and the gender gap is narrowing over time (Shaw & Gant, 2002). Among the factors that contribute to reducing the gender gap, it has been pointed out access and training. Notwithstanding, women prefer – according to their point of view of computers as social media – communicative activities. Thus the development of web 2.0 with its focus on communication and social tools has led to the increasing number of female Internet users (Adamus et al., 2009). This female focus on communication and cooperation also highly influence learning situations. Men tend to live longer and more frequent statements while women show more openness for others‘ proposals and willingness to cooperate. Women prefer working in groups while men are more likely to solve problems on their own (Adamus et al., 2009).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter explains the procedures, methods, and approaches that were employed in the collection, collation, and analyses of data used for the study. It deals with the research design, profile of the University of Education, Winneba: the study area, data and sources of data, population, the sampling approach and the sample size, methods and instrument for data collection, data analysis, and the mode and media for the presentation of the findings.

3.2 Research Design

The study is framed in the postpositivist philosophical worldview and adopts the cross-sectional survey design with a descriptive objective. The pragmatic philosophical assumption by the study is worth it as it builds the rationale for the adoption of the mixed method. In the assertion of Creswell & Creswell (2018), pragmatism as a worldview arises out of actions, situations, and consequences rather than antecedent conditions; instead of focusing on methods, it emphasizes the research problem and questions and adopts all approaches available to investigate into the problem. Morgan (2007); Patton (1990) and Tashakkori & Teddlie (2010) posit that pragmatism is a philosophical underpinning for mixed methods studies as it expresses the focusing of the attention on the problem to be researched by using pluralistic approaches to derive knowledge about the problem Creswell & Creswell (2018).

The quantitative approach is an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. Postpositivists view reality as a set of sense impressions that can be best ascertained through quantitative methods (Sarantakos, 2012). Sarantakos' view justifies the adoption of the quantitative approach by this study as Creswell and Creswell (2018) express that the quantitative approach is a form of design in which the researcher employs numbered data to provide a comprehensive analysis of the research problem.

3.3 Profile of University of Education, Winneba-Winneba Campus

The University of Education, Winneba (UEW) was established in September 1992 as a University College under PNDC Law 322. On 14th May 2004 the University of Education Act, Act 672 was enacted to upgrade the status of the University College of Education of Winneba to the status of a full University. The University College of Education of Winneba brought together seven diploma awarding colleges located in different towns under one umbrella institution. These Colleges were the Advanced Teacher Training College, the Specialist Training College and the National Academy of Music, all at Winneba; the School of Ghana Languages, Ajumako; the College of Special Education, Akwapim-Mampong; the Advanced Technical Training College, Kumasi; and the St. Andrews Agricultural Training College, Mampong-Ashanti. The three sites in Winneba now referred to as the Winneba campus is the seat of the Vice-Chancellor with satellite campuses at Kumasi, Mampong, and Ajumako (UEW, 2021).

The University has the mandate to produce professional educators to spearhead a new national vision of education aimed at redirecting Ghana's efforts along the path of rapid economic and social development. In its mandate to train teacher workforce for all levels of education for the Ghanaian economy and ones beyond, the University aims at providing higher education and fostering a systematic advancement of the science and the art of teacher education; training tutors for the colleges of education and other tertiary institutions; providing teachers with professional competence for teaching in pre-tertiary institutions such as preschool, basic, senior secondary school and non-formal education institutions; and to foster links between the schools and the community to ensure the holistic training of teachers (UEW, 2021).

3.4 Data and Sources

Primary data was employed in the study to assess the e-learning modalities adopted by the University of Education, Winneba. The data constitute the responses of academic staff from the University of Education, Winneba as they responded to the questionnaire that was administered by the study to them.

3.5 Population

The study considered all the academic and administrative staff of the University of Education Winneba who were on the active assignment of discharging roles assigned to them by the University before the closure of the University in 2020, during the period of closure where e-learning and virtual approaches and modalities were resorted to, and after the respite of the university was withdrawn. For academic staff, the study did not consider segregating between lecturers based on their respective campuses of the University or their rank. All academic staff who as at the stated periods were not on active duty as those who were on leave do not fall within the

population frame. Also, staff who were recruited soon after the University resumed hibernation and as such assumed duty after the period of closure, as well fall outside the scope of the study's population frame. Lastly, staff who were away for further studies just before and or during the period of closure of schools and as such did not participate in the COVID-19 informed approaches to work were also not considered in this domain.

3.6 Sampling Technique

The study adopted a combination of sampling procedures to select participants. As the study is framed in the pragmatic philosophical paradigm, the need to combine approaches, techniques, and procedures is relevant to achieve the study's objectives. The study thus combined both probability and non-probability techniques, where cluster sampling and convenience or haphazard sampling were blended.

The nature of the population of the study is such that everyone in the population so defined is relevant to be sampled, despite potential differences with their discipline backgrounds. For this reason, the study adopted the convenience sampling technique since Neuman (2014) sees it as a criterion for selecting cases that are readily available and easy to reach. However, Sarantakos (2012) views that in studies where convenience sampling is employed, representativeness is not significant; Neuman (2014) adds that convenience sampling often produces very non-representative samples, so it is not recommended for creating an accurate sample to represent the population.

To overcome this shortcoming with the convenience sampling technique, the study sought cluster sampling as a supplementary approach to respect and ensure the representativeness of the population in the sample. Probability sampling is the gold

standard for creating a representative sample (Neuman, 2014); as a probability sampling technique, the cluster sampling technique is employed when the cluster criteria are significant for the study (Sarantakos, 2012). In this study, clusters are defined as the various faculties (academic) and units (administrative) in the University of Education, Winneba‘s Winneba, and Ajumako campuses. This was done to ensure that every faculty is represented in the study. This is also to ensure that issues that border on the suitability of a course‘s content for e-learning are addressed by the study. In the clusters, participants were selected by the convenience sampling technique. With the sample size determined for academic and administrative staff, the figures were divided by the number of faculties and units present on the two campuses to arrive at the number of respondents per faculty and unit.

3.7 Sample Size

To ensure easy and efficient management of data, 231 lecturers and professors were sampled from the Ajumako campus and all three sites of the Winneba campus. This number of lecturers was determined after Krejcie and Morgan (1970), who by a general formula posit that for a population of 550, a sample size of 226 is appropriate. Applying the same formula for the case of administrative staff, the study settled on sampling 108 administrative staff to inform the study; for a population of 150, a sample of 108 is appropriate. In arriving at this figure, the Human Resource Division of the University was consulted for information on the total numbers of academic and administrative staff the University has on the Winneba and Ajumako campuses.

However, instead of 226 academic staff, the study considered 231 because an attempt to eliminate the decimal figure with human counting which resulted from the sampling procedures adopted, led to that. As the study determined a sample size of

226 lectures who were to be sampled from seven clusters (faculties), the determined size (226) was divided by 7 faculties to give 32.2857 lecturers per faculty. This figure was rounded up to 33 lecturers per faculty and this resulted in 231 lecturers as the final sample size for academic staff.

3.8 Methods and Instruments for Data Collection

The study used questionnaires conveyed in Microsoft forms, an electronic survey tool hosted by Microsoft, to collect both quantitative and qualitative data. The questionnaire was constructed based on items and variables captured in the extant literature and constituted questions of both closed and open-ended forms. The quantitative data were the responses to the closed-ended items on the questionnaire whilst the qualitative data were from the open-ended items. The link (URL) to the instrument was sent electronically in e-mails to the institutional email addresses of staff. Copies were also shared on the WhatsApp group chat platforms of the academic and administrative staff of the University so that those who are present on WhatsApp who could not be reached through the e-mails could also participate in the study.

3.9 Data Analysis, Presentation, and Discussion

Data from the questionnaire was exported as a CSV file and downloaded for use in Microsoft Excel. In Excel, the data was managed, organized, and made ready for export into SPSS v.20. Values of cells in the Excel document were exported into SPSS after a suitable codebook has been written for it. Descriptive analysis expressing the means and frequency of variables was run and the results were presented in a table. Inferential statistics were also employed and in this, an independent sample t-test was used to establish the significant differences between variables. Thus groups based on the socio-demographic characteristics of staff were

compared with the aid of a t-test, and in all, the results were used to test the stated hypotheses. The results are all presented in tables. The discussion of the findings was done under various subheadings in agreement with the order of the objectives of the study, and have been discussed by examining the resemblances and the deviations of the findings with the findings of other relevant studies.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents the data from the study and discusses the findings. It is divided into sections based on the themes from the objectives of the study.

4.2 Socio-Demographic Characteristics of Respondents

To appreciate the findings of the study, the socio-demographic characteristics of respondents were sourced. However, it is worthy to note that the researcher focused attention on the socio-demographic attributes of academic staff which are relevant to the scope of the study since this information influences the quality and reliability of the data. As such, the ages and gender of respondents, staff's level of computer literacy, the status of respondents about information technology training in the use of the LMS, the rank of staff, and the class size were considered. The study revealed that the academic staff who are aged between 18 and 35 were 13 out of 231, which constitute 5.6%. For those aged between 31 and 40 years, the study found 109 respondents and this represents 47.2%. Considering the years or period individuals spend in school to undergo relevant training to acquire the requisite qualification to be able to apply for job portfolios in the University of Education, Winneba, this finding is regarded as the reality by the researcher. Academic staff who are aged between 41 and 50 years were found to constitute 40.3% of the total of 231 respondents to the study, with 6.9% (16) representing staff aged 51 to 60 years.

Table 4.1: Socio-Demographic Characteristics of Respondents

Variable	Response	Frequency	Percentage
Age	18 – 30	13	5.6
	31 – 40	109	47.2
	41 – 50	93	40.3
	51 – 60	16	6.9
Gender	Male	141	61.0
	Female	90	39.0
Level of computing skills	Basic	88	38.1
	Advanced	143	61.9
Information technology	Yes	209	90.5
training on LMS use	No	22	9.5
Rank	Lecturer or below	155	67.1
	Senior lecturer and above	76	32.9
Class size	Below 100	61	26.4
	100 and above	170	73.6

Source: Field data (2021)

Based on the gender of academic staff, the study revealed that 141 respondents who constitute 61% were males with 90 representing 39% being females. The researcher reiterates that this finding on the gender of respondents is not the case with the reality since this is an expression of gender bias. The researcher has come to this position because the University of Education, Winneba is not biased on the grounds of gender to recruit or employ more males than females. The researcher is of the view that the case witnessed in this study means that more male staff offered to respond to the study than female staff per the data collection technique adopted for the study.

The study further revealed that the majority of staff have advanced levels of skills in computing and information literacy. This was established when the study found that 61.9% (143) of the respondents have expressed that they have advanced levels of skill instead of basic levels of skills in computing. This is affirmed by the finding on the status of staff regarding training in the use of the LMS. Giving numbers to this, the

study found that 209 (90.5%) respondents have expressed that they have at least tasted training in the use of the LMS with only 22 expressing that they have never been trained in this regard.

Moving on, the study saw that 155 (67.1%) of the respondents are of the rank of lecturer, with 76 (32.9%) expressing that they are of the rank of a senior lecturer. According to the data gathered for the study, about 26.4% of the academic staff handle classes with an average class size of up to or below 100 students, and 73.6% of staff handle classes with average constituents of over 100 students. The case found here symbiotically relates with the finding on the rank of respondents since the academic staff of higher ranks are usually assigned to more advanced levels students who tend to be smaller in number or class size.

4.2.1 The interactive experience, enhanced problem-solving skills, stimulated interest, and the timely feedback observed by academic staff of the University of Education, Winneba from their use of the LMS

The study explored how the use of the LMS by academic staff of the University of Education, Winneba gained interactive yielded interactive experience to the academic staff of the University from their use of the LMS for teaching and learning purposes. The study also investigated the role of the use of the LMS in enhancing the problem-solving skills of staff, and how they use of the LMS stimulated the interest of academic staff. As presented in table 4.2, the study finally examined the role of the LMS in yielding timely feedback to academic staff in their discharge of academic duties.

The study employed a five-point Likert scale instrument with five items each for all the four scales used. As presented in table 4.2, the study found Cronbach‘s alpha

values of 0.72, 0.688, 0.675, and 0.859 for the scales which measured the interactive experience, the enhanced problem-solving skills, the stimulated interest, and the timely feedback from the use of the LMS respectively. According to Pallant (2016), reliability values above 0.7 are considered acceptable. This expresses that the reliability values obtained for the interactive experience and the timely feedback scales suggest good internal homogeneity reliability for the scales with this sample considered by this study.

Pallant (2016) however avers that with scales with a small number of items as employed in this study, it is difficult to get a decent Cronbach's alpha values. As such, the scales for examining the enhanced problem-solving skills and the stimulated interest from the use of the LMS to have alpha values less than the accepted value of 0.7; enhanced problem-solving skills has a Cronbach's alpha value of 0.688, while the stimulated interest scale has a Cronbach's alpha value of 0.675. In a case as observed here, Pallant (2016) advises that a better mean inter-item correlation value should be reported. In this case, the study observed a mean inter-item correlation value of 0.312 with values ranging from 0.086 to 0.605 for the enhanced problem-solving skills. This suggests a moderate correlation among the items that make up the scale of enhanced problem-solving skills; this expresses a better internal homogeneity. The stimulated interest scale observed a mean inter-item correlation value of 0.294 with values ranging from 0.104 to 0.616. This is an expression of a somewhat moderate correlation among the scale's items and suggests a good internal homogeneity.

Based on the scales used, the study found that a mean of 2.404 with a standard deviation of 0.91 exists for the interactive experience scales. This is an expression that generally, respondents agree with the fact that they experienced the interactive nature

of the LMS. The study further revealed a mean of 2.73 with a standard deviation of 0.78 for the enhanced problem-solving skills scale indicating that the problem-solving skills of the academic staff of the University have been enhanced from their use of the LMS for teaching and learning.

Moving on, as it has been presented in table 3, the study observed a mean of 2.84 with s standard deviation of 0.85 for the stimulated interest scale. This interprets that there is a general agreement by the academic staff of the University of Education, Winneba that their interests were stimulated to use the LMS for teaching and learning. Finally, the study revealed that the use of the LMS was marked with the yielding of timely feedback. This was established when the study found a mean of 2.91 with a standard deviation of 1.04 for the timely feedback scale.

Table 4.2: Descriptive Statistics

	Mean	Std. D	Skewness		Kurtosis		Cronbach's Alpha
			Statistic	Std. E	Statistic	Std. E	
Enhanced Problem Solving Skills	2.73	0.78	1.380	0.160	1.726	0.319	0.688
Stimulated Interest	2.84	0.85	0.511	0.160	-0.142	0.319	0.675
Interactive Experience	2.86	0.91	0.960	0.160	-0.07	0.319	0.720
Timely Feedback	2.91	1.04	0.921	0.160	-0.261	0.319	0.859

Source: Field data (2021)

The normality of the scores observed for the variables was assessed by skewness and Kurtosis. The study established that the scores for all four scales; interactive experiences, enhanced problem-solving skills, stimulated interest, and timely feedback have positive skewness values of 0.96, 1.38, 0.511, and 0.021 respectively. This indicates that the scores are clustered to the low end of the distribution, expressing a general agreement to the Likert items that make up the scales. Kurtosis

values found in the study reveal that the scores for the enhanced problem-solving skills scale are peaked; that is the scores are clustered in the center of the distribution. The Kurtosis values found for the interactive experience scales, the stimulated interest scale and the timely feedback scales are -0.07, -0.142, -0.261 respectively; expressing that the distribution of their score is relatively flat with too many cases to the extremes.

The above findings on the skewness and the Kurtosis values express that the data violates the assumption of normality. This presupposes that the scales are not ideal for parametric analysis. However, Tabachnick and Fidel (2013) reiterate that with reasonably larger samples, skewness will not make a substantive difference to the analysis. They also added that despite kurtosis can result in under-estimation of the variance, the risk of the underestimation is reduced when samples of 200 cases or more are used. As this study considered 231 responses, the researcher is of the position that using parametric statistics is ideal for this study after Pallant (2016) who conveys that parametric statistics are more powerful than non-parametric statistics.

4.2.2 Differences in the interactive experience enhanced problem-solving skills and stimulated interest gained from the use of the LMS based on the rank of academic staff, the level of skills of staff in computing, and the status of staff regarding LMS use training

An independent sample t-test was employed to evaluate the differences between (1) the perceived interactive experience of the LMS, (2) enhanced problem-solving skills of staff, and (3) the stimulated interest of the staff due to the use of the LMS, based on (1) the rank of staff, (2) the level of IT competence of staff, (3) the status of staff with

regards to whether they ever received training in the use of the LMS or not, (4) and their view on whether the LMS yielded timely feedback as they used it.

4.3 Differences Based on the Gender of Academic Staff

This section presents the differences in the scores for an interactive experience, enhanced problem-solving skills, stimulated interest, and timely feedback based on the gender of academic staff. The study reveals that all four scales violate the assumption of equal variances and as such, the corresponding t-values are going to be reported. Making reference to the table 4, the study presents statistical significant differences between the interactive experience of male academic staff (M = 2.7248, SD = 0.86373) and female academic staff (M = 3.0933, SD = 0.94248). A t (177.56) = -2.993, p = 0.003 was found between the scores for either gender. Based on this establishment, the null hypotheses ($H1_O$) has been rejected, as a statistically significant difference has been found between the interactive experience of male and female academic staff

Table 4.3: Independent Samples Test Based on the Gender of Academic Staff

	Gender	N	Mean	Std. D	Levene's Test for Equality of Variances F	p.	t	df	p.
Interactive	Male	141	2.7248	0.86373	4.21	0.041	-3.051	229	0.003
Experience	Female	90	3.0933	0.94248			-2.993	177.56	0.003
Enhanced Problem	Male	141	2.6681	0.65763	15.15	0.000	-1.571	229	0.117
Solving	Female	90	2.8333	0.93964			-1.456	144.38	0.148
Stimulated Interest	Male	141	2.7986	0.77699	7.31	0.007	-1.059	229	0.291
	Female	90	2.9200	0.95320			-1.013	161.98	0.313
Timely Feedback	Male	141	2.7901	0.97228	5.13	0.024	-2.264	229	0.025
	Female	90	3.1044	1.11304			-2.197	171.02	0.029

Source: Field data (2021)

On finding that the scores for the scores found for the enhanced problem-solving skills of staff violate the assumption of equal variances, the study reports no significant differences (t (144.38) = -1.456, p = 0.148) exists between the scores found for male academic staff (M = 2.6681, SD = 0.65763) and female academic staff (M = 2.8333, SD = 0.93964) of the University of Education, Winneba. Going forward, the study revealed that no significant differences also exist between the stimulated interest to use the LMS by male staff (M = 2.7986, SD = 0.77699) and female staff (M = 2.92, SD = 0.9532). the study reports at (161.98 0 = -1.013, p = 0.313 to arrive at this conclusion. In support of this finding, Teo, Luan, Thammetar, and Chattiwat (2011) avers that no significant gender difference in e-learning was found in their study.

Contradiction to these and adding a touch to this finding, Liaw (2002) found that female teachers expressed less interest in technology and placed lower importance on technology in the teaching and learning process compared to male teachers. On the other hand, male teachers demonstrate a greater interest in technology and exhibit a higher level of confidence in their ability to use technology. Despite this study have established that the stimulated interest is not significantly different on the levels gender, Anderson, Lankhear, Timms, and Courtney (2008) views that differences in interest in digital use have led to a possibility that females may not enter careers that are related to technology although equal opportunities are available for females.

Closing the curtain on the differences based on the gender of academic staff, the study found that a significant difference exists between the scores observed for male staff (M = 2.7904, SD = 0.97228) and female staff (M = 3.1044, SD = 1.11304) for the

timely feedback scale. The study found at (171.02) = -2.197, p = 0.029 for this difference.

The mean scores observed for males express a higher apprehension of the LMS modality by male staff than females. As such the interactive experiences as well as all other three scales used in this study found higher scores for male staff than that found for their female counterparts. In line with gender stereotypes associating technical and math-intensive fields with masculine qualities (Charles & Bradley, 2009), computers and technology use have been perceived as masculine and therefore more suitable for boys than girls (Cooper, 2006; Adamus et al., 2009). The ―digital gender gap" begins in early childhood, as parents and teachers act by the perception that computers are a male domain (Young, 2000). Alghamdi et al. (2020) posit that females have stronger self-regulation than males in remote contexts. The researcher, therefore, views that although the cause for the lower scores found for female staff has not been established, self-regulation of females put forth by Alghamdi et al. (2020), and the digital gender gap may have played to marginalize the apprehension of female staff of their use of the LMS. Males tend to hold more stable positive attitudes toward e-learning use (Nistor, 2013), and according to Alghamdi et al. (2020), males can use more strategies and have better technical skills than females in e-learning contexts so finding higher scores for males than females in this study has been grounded in the positions of Nistor (2013) and Alghamdi et al. (2020) stated above. This may have offset the compromises of females in the LMS use, which led to significant gender differences revealed in this study.

4.4 Differences based on the rank of staff

Table 4.4 presents the differences based on the rank of staff. Reading from table 5, the study reveals that the data violates the assumption of equal variance since Levene's test for equality of variances is less than 0.05 in all three instances. This presupposes that the t-values which correspond with the assumption that equal variances are not assumed are ideal for estimating the differences.

As shown in Table 4.4, a statistically significant difference is observed between the interactive experience gained from the use of the LMS by the staff of the rank of lecturer (M = 2.6606, SD = 0.73136) and staff of the rank of senior lecturer (M = 3.2921, SD = 1.08490) of the University of Education, Winneba, as at (109.49) = -4.58, p =, 0.00 was observed.

As the study has found that the mean score for the interactive experience of lecturers is significantly higher than that of senior lecturer, the researcher advice that policies and innovations in e-learning should increase the attention given to the staff of higher ranks such that they can be at par with a staff of lower ranks as lecturers were found to have found the use of the LMS more interactive than senior lecturers. The researcher is of the position that this case was found because, ceteris paribus, academic staff of higher ranks tend to be older and hence *"BBC"*; a jargon which means *"born before the computer"*, but does not necessarily mean one was born before the invention of computers but means or refers to a person who finds it difficult or less interactive to use the computer. As significant positive associations are found between interactive experience and the enhancement of the problem-solving skills of staff and interest stimulation of staff, increasing attention on the staff of

higher rank to increase their interactive experience will induce an increase in their problem-solving skills and stimulated interest.

In the case of the LMS enhancing the problem-solving skills of the staff of the University of Education, Winneba, the study statistically significant differences between the levels to which the use of the LMS could enhance the problem-solving skills of lecturers (M = 2.9045, SD = 0.78072) and senior lecturers (M = 2.3816, SD = 0.66146). Over here, the study found that at (173.12) = 5.31, p = 0.00 exists between the scores for lecturers and senior lecturers. The study, therefore, rejects the null hypothesis (H2o). The statistical significance found between the mean scores on the enhanced problem-solving skills of lecturers and senior lecturers is an expression that the problem-solving skills of the staff of the rank of senior lecturers were enhanced more than that for those of the rank of lecturers. The researcher views that when computer use is the topic under discussion, older persons have more room for improvement than younger individuals.

Table 4.4: Independent Samples Test Based on the Rank of Staff

	Rank	**N**	**Mean**	**Std. D**	**Levene's Test for Equality of Variances**		**t**	**df**	**p.**
					F	**p.**			
Interactive Experience	Lecturer or below	155	2.6606	0.73126	30.55	0.000	-5.224	229	0.000
	Senior lecturer and above	76	3.2921	1.08490			-4.589	109.49	0.000
Enhanced Problem Solving	Lecturer or below	155	2.9045	0.78072	0.627	0.429	5.021	229	0.000
	Senior lecturer and above	76	2.3816	0.66146			5.313	173.11	0.000
Stimulated Interest	Lecturer or below	155	2.8890	0.74386	17.24	0.000	1.102	229	0.272
	Senior lecturer and above	76	2.7579	1.03347			0.988	114.34	0.325
Timely Feedback	Lecturer or below	155	3.0348	0.97292	1.127	0.289	2.587	229	0.010
	Senior lecturer and above	76	2.6632	1.12675			2.461	131.31	0.015

Source: Field data (2021)

On the differences based on the rank of staff, the study investigated the differences between the lecturers and senior lecturers based on their interest stimulation as a result of using the LMS. It has been established that no statistically significant differences exist in the interest stimulation of lecturers (M = 2.889, SD = 0.74386) and senior lecturers (M = 2.7579, SD = 1.03347) as at (114.34) = 0.98, p = 0.033 was observed.

Concluding on the differences based on the rank of staff, the study avers that statistical significance expressed by a t (229) = 20587, p = 0.01 exist between the timely feedback scores for of the rank of lecturer (M = 3.0348, SD = 0.97292) and staff of senior lecturer (M = 2.7579, SD = 1.03347).

4.5 Differences Based on the Level of Skills of Staff in Computing

Reading from table 4.5, the study established the differences in the interactive experience gained from the use of the LMS, the enhanced problem-solving skills, and the stimulated interest from the use of the LMS between advanced level skilled academic staff and basic level skilled academic staff of the University of Education, Winneba. The study found a Levene‘s test for equality of variances with p-values of 0.205, 0.031, and 0.154 respectively for the perceived interactive experience gained from the use of the LMS, the level of enhanced problem-solving skills of staff, and the stimulated interest of staff from the use of the LMS. These values as well imply that the level of enhanced problem-solving skills violates the assumption of equal variances whilst the interactive experience and stimulated the interest of staff do not violate the assumption of the equality of variances. In this case, the t-value that corresponds with the assumption of equal variances is ideal for the estimation of the

differences in the interactive experience, and the stimulated interest of basic level skilled staff and that for advanced level skilled staff.

As shown in Table 4.5, no statistically significant difference exists between the interactive experience gained from the use of the LMS by staff with basic level skills (M = 2.7364, SD = 0.086651) and staff with advanced level skills (M = 2.9497, SD = 0.93129) in computing. This was established on finding at (229) = - 1.74, p = 0.084 between them.

Table 4.5: Independent samples test based on the level of IT skills of staff

	Level of IT skills	**N**	**Mean**	**Std. D**	**Levene's Test for Equality of Variances**		**t**	**df**	**p.**
					F	**p.**			
Interactive Experience	Basic	88	2.7364	0.86651	1.62	0.205	-1.735	229	0.084
	Advanced	143	2.9497	0.93129			-1.765	194.44	0.079
Enhanced Problem Solving	Basic	88	2.9000	0.87625	4.70	0.031	2.586	229	0.010
	Advanced	143	2.6294	0.70129			2.454	154.40	0.015
Stimulated Interest	Basic	88	2.7727	0.89143	2.04	0.154	-1.026	229	0.306
	Advanced	143	2.8909	0.82350			-1.007	173.12	0.315
Timely Feedback	Basic	88	2.9864	0.78245	11.32	0.001	0.847	229	0.398
	Advanced	143	2.8671	1.16883			0.928	227.34	0.354

Source: Field data (2021)

The significant difference found here presupposes that staff with advanced level skills in information technology have better scores than staff with basic level skills. The researcher is therefore of the position recommending that the University of Education, Winneba should implement policies to get staff to be equipped with advanced level skills in information technology. The researcher views that this can be made part of the course structure of the Post Graduate Diploma in Teaching in Higher Education

which has been made a prerequisite for employment into the University of Education, Winneba.

Considering the difference in how the use of the LMS enhanced the problem-solving skills of basic and advanced level skilled staff, the study found a statistically significant increase in the mean scores for staff. The study observed at (154.4) = 2.45, p = 0.015 between the LMS use induced problem solving skill enhancement of the academic staff with basic levels of IT skills (M = 2.9, SD = 0.87625) and staff with advanced levels of IT skills (M = 2.6294, SD = 0.70129).

According to the test of differences as presented in table 6, the study revealed no statistically significant differences in the mean scores for the stimulated interest of staff with basic levels of skills in IT (M = 2.7727, SD = 0.89143) and staff with advanced levels of skills in computing or information technology (M = 2.8909, SD = 0.82350). Finding at (229) = - 1.03, p = 0.306, the case presented was established. The study perches on this finding to retain the null hypothesis ($H3_O$).

Based on the level of IT skills of staff, the study advances the view that no statistical significance exists between the scores of the experience of timely feedback from the use of the LMS between basic skilled staff (M = 2.9864, SD = 0.78245) and advanced level skilled staff (M = 2.8671, SD = 1.16883). The study found at (227.34) = 0.928, p = 0.354 to establish the no significant differences.

The score found for groups of academic staff based on their digital skills levels has established that basic level skilled staff did not experience timely feedback from their use of the LMS as their advanced level skilled staff did. To this effect, the researcher concludes that it was due to their low digital competence that resulted in less score for timely feedback. The researcher therefore a calls the department of the University that

is charged with the professional development of staff to seek to build the competencies of staff. The recommends that as the DigCompEdu framework by Redecker (2017) has an outline, professional development of academic staff should address issues with staff digital competence by ensuring that all competence areas outlined in table 2.1 are attended to.

4.6 Differences based on the status of staff regarding training in the use of the LMS

Based on the status of staff regarding whether or not they received training in the use of the LMS, the study revealed that the scores for interactive experiences of staff violate the assumption of the equality of variances whilst that scores for the enhanced problem-solving skills and stimulated interest do not.

Table 4.6: Independent samples test based on LMS training

	Training in the use of the LMS	**N**	**Mean**	**Std. D**	**Levene's Test for Equality of Variances**		**t**	**df**	**p.**
					F	**p.**			
Interactive Experience	Yes	209	2.7129	0.79944	5.92	0.016	-9.386	229	0.000
	No	22	4.3455	0.48671			-13.88	34.342	0.000
Enhanced Problem Solving	Yes	209	2.7464	0.80396	2.095	0.149	0.835	229	0.405
	No	22	2.6000	0.52372			1.174	32.508	0.249
Stimulated Interest	Yes	209	2.7627	0.83109	1.213	0.272	-4.800	229	0.000
	No	22	3.6364	0.59084			-6.310	30.525	0.000
Timely Feedback	Yes	209	2.9856	1.03310	1.289	0.257	3.371	229	0.001
	No	22	2.2182	0.82557			4.040	28.416	0.000

Source: Field data (2021)

Reading from table 4.6, the study has found that statistically, a significant difference exists in the mean scores for interactive experience gained from the use of the LMS between staff who underwent training in the use of the LMS (M = 2.7129, SD =

0.79944) and staff who had no training in the use of the LMS (M = 4.3455, SD = 0.48671), as a t (34.342) = -13.884, p = 0.00 was established, owing to the violation of the assumption of the equality of variances.

In terms of the use of the LMS enhancing the problem-solving skills of staff, the study revealed no statistical significance in the differences between the scores observed for staff who have undergone training in the use of the LMS (M = 2.7464, SD = 0.80396), and staff who did not undergo such training (M = 2.6, SD = 0.52372). This conclusion has been drawn on finding that at (229) = 0.835, p = 0.405 exists between them.

On the use of the LMS stimulating the interest of staff, the study revealed that statistical significance exists between the scores for stimulated interest between staff who did undergo training in the use of the LMS (M = 2.7627, SD = 0.831), and staff who did not undergo training in the use of the LMS (M = 3.6364, SD = 0.59084). A t-value corresponding with the assumption of the equality of variances expresses that the interest of staff who underwent training in the use of the LMS was highly stimulated that staff who had no training as t (229) = -4.8, p = 0.00 was observed. This finding is supported by Teo, Luan, Thammetar, and Chattiwat (2011) who reiterated that users who perceive themselves to be highly or lowly competent in technology use accept e-learning differently in significant ways.

The study, based on the status of academic staff with relevance to training in the use of the LMS found that statistically significant differences exist between the timely feedback scores for staff who received training in the use of the LMS (M = 2.9856, SD = 1.0331) and staff who missed training in the use of the LMS (M = 2.2182, SD = 0.82557). to say this, the study found (229) = 3.371, p = 0.001 for the scores for

timely feedback. The study, on this finding, marks that the null hypothesis ($H4_O$) is rejected.

The significant differences established based on the status of staff with regards to training on the use of the LMS have found that staff who received training on the use of the LMS have higher scores than those who missed the training. The researcher, therefore, recommends that whenever training is organized for staff on the adoption of innovation as the LMS, the University should employ every means that possible to ensure that all staff is enrolled and as such have been trained to build the competence of staff in the use of innovation. This is a trickle-down effect will induce an increase in other benefits that the innovation will come with since the study found positive correlations among relevant variables.

A study by Teo, Luan, Thammetar, and Chattiwat, (2011) found that e-learning acceptance was significantly and positively correlated with perceived competence. This finding suggests that when users perceive themselves to be competent in the use of technology, they are likely to accept and participate in e-learning. This was consistent with Teo (2009) who found that users‘ favorable perceptions of their ability to use technology have a significant and positive influence on their behavioral intention to use technology. In addition, the perception of one‘s ability to use technology also positively and significantly influences behavioral intention to use technology, indirectly through perceived usefulness and perceived ease of use. These studies and findings provide a better and viable ground for the researcher to conclude that both the significant and not significant differences found in this study based on the level of IT skills of staff and the status of staff relevant to training in the use of the

LMS are due to the perceived easiness of use of the LMS by LMS-trained staff and or advanced level IT skilled staff.

4.7 Differences based on class size

The concept of what constitutes a ―small" or ―large" class is relative to professionals' context and experience Bettinger, Doss, Loeb, Rogers and Taylor (2017)**.** There is a lack of consensus by what is meant by ―small" and ―large" classes, in both research and practice. For example, some online faculty in Lowenthal et al.'s (2019) study (40%) considered a class of 30 or more students to be ―high enrollment", while others considered much larger classes to be ―high enrollment." This may be due to differences in average class size by institution or field. In this study, based on the nature of enrollment in the University of Education Winneba, the mid-point was perched at 100 students, below which is small, and above which is large.

Table 4.7: Independent samples test based on class size

	Class size	**N**	**Mean**	**Std. Deviation**	**Levene's Test for Equality of Variances**		**t**	**df**	**p.**
					F	**p.**			
Interactive	Below 100	61	2.8164	0.95100	0.21	0.649	-0.519	229	0.604
Experience	100 and above	170	2.8871	0.89862			-0.505	100.928	0.615
Enhanced	Below 100	61	2.6525	0.51756	4.798	0.030	-0.931	229	0.353
Problem Solving	100 and above	170	2.7612	0.85666			-1.165	175.676	0.246
Stimulated	Below 100	61	2.6557	0.79089	6.612	0.011	-2.051	229	0.041
Interest	100 and above	170	2.9141	0.86231			-2.136	114.695	0.035
Timely	Below 100	61	2.4984	0.46278	53.558	0.000	-3.732	229	0.000
Feedback	100 and above	170	3.0612	1.14345			-5.318	225.912	0.000

Source: Field data (2021)

Findings from the study presented in table 8 exhibit that the output from the independent sample t-test computed to explore the differences in the interactive experience, the enhanced problem-solving skills, the stimulated interest, and the timely feedback, based on the size of the classes handled by academic staff of the University. The study found that except the interactive experience scale, all other scales considered violates the assumption of equal variances, and that, the corresponding t-values to the assumption of equal variances not assumed will be reported for the differences in the enhanced problem-solving skills, the stimulated interest, and the timely feedback scales.

Based on this, the study puts forward that no significant differences exist in the scores for an interactive experience between academic staff who handle classes with less than 100 students (M = 2.8164, SD = 0.951) and staff who handle classes with over 100 students (M = 2.8871, SD = 0.89862), as at-value of -0.519 with 229 degrees of freedom, and a p-value of 0.604 were found. Despite no significant difference, the researcher is of the view that the higher scores for smaller classes handler in terms of interactive experience is the result of the growing argument in literature on the quality of education or instructional outcomes in online studies. According to Sorensen (n. d.), a concern by some is on what happens to the quality of instruction in courses with high enrollments? Low scores for interactive experience by staff who manage classes of more than 100 students may be due to traffic jams and chaos in the respective windows of larger classes on the LMS since other things are equal, more sanity is associated with lower sized than higher sized classes.

Hinging on the non-assumption of equal variances, the study states that statistical significance exists between the observed score for stimulated interest found for

handlers of classes with less than 100 students (M = 2.6557, SD = 0.79089) and handlers of classes with more than 100 students (M = 2.9141, SD = 0.86231). Same way, there exists a significant difference in the scores of timely feedback between staff with classes of less than 100 students (M = 2.4984, SD = 0.46278) and staff with classes of over 100 students (M = 3.0612, SD = 1.1434). T-values of t (114.695) = -2.136, p = 0.035, and t (225.912) = -5.318, p = 0.000 are respectively established for the stimulated interest scale and the timely feedback scale. The finding that the stimulated interest has no significant interest based on the class size of staff, the study takes the position of rejecting the null hypothesis ($H4_O$). The enhanced problem solving skills scale found no significant differences between staff who lecture to classes with less than 100 students (M = 2.6525, SD = 0.51756) and those who lecture classes of over 100 students (M = 2.7612, SD = 0.85666) by observing a t (175.676) = -1.165, p = 0.246 between the two groups.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This chapter deals with the summary of the research, the conclusion, and the recommendations that are drawn based on the findings of the study.

5.2 Summary of Research

The study, an assessment of the use of the learning management system by academic staff of the University of Education, Winneba during the covid-19 pandemic, was conducted with a sample of the academic staff of the University of Education, Winneba. The study principally assessed the technological adjustments and strategies which was adopted by the University of Education Winneba to ensure the continuous business of the University during the Covid-19 pandemic. The study employed a digital survey instrument conveyed in Microsoft forms and shared with staff to respond to. The study used SPSS version 20 to analyze its data. Descriptive statistics and independent sample t-tests were then used to achieve the objectives of the study.

5.3 Major findings

- The study found that the academic staff of the University of Education, Winneba experienced the interactive nature of the LMS, and admitted that their problem-solving skills were enhanced by their use of the LMS. The respondent academic staff of the University of Education, Winneba conceived that their interest in the use of the LMS for academic purposes stimulated their interest. Finally, the study revealed that the use of the LMS yielded timely feedback.

- Based on gender, the study found that statistical significance exists between male and female academic staff based on their scores for an interactive experience, and timely feedback. Based on stimulated interest and enhanced problem-solving skills, the study found no significant differences.
- Based on the rank of academic staff, the study found that statistically significant differences exist between lecturers and senior lecturers about their scores in interactive experiences, enhanced problem-solving skills, and timely feedback. In the scores for stimulated interest, the study found no statistical significance between lecturers and senior lecturers.
- Based on the level of skills of staff, the study found that a statistically significant difference exists between the advanced and basic level skills in terms of the enhancement of their problem-solving skills. The scores found for an interactive experience stimulated interest and timely feedback saw no significant difference between basic and advanced level skilled staff.
- In terms of which staff was trained in the use of the LMS, the study found that no statistical difference exists between LMS trained and LMS untrained staff on their score for enhanced problem-solving skills. Significant differences were found for their interactive experiences, stimulated interest, and the timely feedback scores for LMS-trained and untrained staff.
- Statistical significant and not significant differences were respectively found between the scores for stimulated interest and timely feedback on one part and interactive experience and enhanced problem-solving skills on the other part between staff who teach smaller sized classes and staff who teach larger sized classes.

5.4 Conclusions

The findings above, when examined to note the similarities and differences with what literature has, it is revealed that the gender, digital competence, and the training of staff in the use of the LMS significantly determines the scores their scores for the fours scales that assessed the use of the LMS by academic staff. The study, therefore, concludes that the University of Education, Winneba should expedite processes to train staff in the use of the LMS to root and stimulate the interests of staff in e-learning.

The study also concludes that since significant differences were observed between male and female staff on relevant scales, the University should make training enticing to female staff to encourage more females to enroll to bridge the digital gap identified to co-exist with the academic staff of the University.

5.5 Recommendations

Based on conclusions, conclusions, the following recommendations are drawn:

- The study recommends that the University of Education, Winneba, as well as other institutions of higher learning, through their departments for continuing professional development should encourage and make room for their staff to build their competence in the use of computer technologies.
- The study recommends that the competent areas outlined in the DigCompEdu framework should be the scheme for modalities to build staff competence in digital systems use. The areas so outlined should be adhered to.
- Considering the versatility of computers, educational institutions of higher learning, as well as all other institutions of formal learning are recommended to encourage the learning of digital skills. School curriculum planners, in this

case, the National Council and Assessment, should integrate ICT learning into all levels of education.

5.6 Areas for Further Studies

The researcher advances the view that this study skipped the establishment of the rationale for the findings on gender-based difference and therefore calls that future research should consider exploring the rationale for differences based on gender in the acceptance, enrollment, and participation in e-learning. The researcher reiterates that the focus of future research in this regard should be on gender role self-concept since there are no biases based on biological sex.

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APPENDIX

UNIVERSITY OF EDUCATION, WINNEBA
SCHOOL OF BUSINESS

QUESTIONNAIRE

This survey assesses the virtual teaching and learning modalities adopted by UEW to salvage the covid-19 situation. The questionnaire seeks to gather primary data for a research work in partial fulfillment for a Master's in Business Administration (Human Resource Management) at the University of Education, Winneba. The title of the study is ~~–a~~n assessment of technology enabled teaching and learning among academic of a Ghanaian tertiary institution in the covid-19 era".

I would be grateful if you could spare 5min or less to respond to this short survey. The information gathered would be used solely for academic purposes. I value your privacy and do not wish to sell your personal information to any third party.

Section A

Socio-demographic characteristics of respondent

1. What is your age? …….

2. What is your gender? Male [ ] Female [ ]

3. Level of IT skills Basic [ ] Advance [ ]

5. Have you undergone training in the Use of the LMS Yes [ ] No [ ]

6. Rank: Lecturer or Below [ ] Senior Lecturer or Above [ ]

7. Your Class Size Below 100 students [ ] 100 and above [ ]

Section B

This section examines the interactive experience of the LMS in teaching and learning among academic staff during the Covid-19 pandemic

Please respond by expressing your level of agreement or disagreement to the statement:

1= Strongly Agree, 2= Agree, 3= Undecided, 4= Disagree, 5= Strongly Disagree

Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
1	**2**	**3**	**4**	**5**

1. The LMS allowed me respond expediently to my actions, resulting in a fully responsive interaction.	1	2	3	4	5
2. The LMS enabled me to skilfully interact with the features in a responsive manner	1	2	3	4	5
3. The LMS allowed me to actively engage with the user-interface in a way that promotes dialogue	1	2	3	4	5
4. The LMS helped me to interact more effectively with peers through an engaging interface	1	2	3	4	5
5. The LMS facilitated the exchange of information by engaging with content presented in diverse formats	1	2	3	4	5

Section C

This section examines how the LMS enhanced my problem-solving skills of academic staff, during the Covid-19 Pandemic

Please respond by expressing your level of agreement or disagreement to the statement:

1= Strongly Agree, 2= Agree, 3= Undecided, 4= Disagree, 5= Strongly Disagree

Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
1	**2**	**3**	**4**	**5**

1. The LMS allowed me to methodically generate ideas by contributing information from multiple viewpoints	1	2	3	4	5
2. The LMS enabled me to solve a problem	1	2	3	4	5

systematically by taking into account different points of view					
3. The LMS encouraged me to think critically about the broader concepts related to the problem	1	2	3	4	5
4. The LMS allowed me to analyse my own views and their wider contexts in order to draw firm conclusions	1	2	3	4	5
5. The LMS allowed me to define the problem systematically by viewing it from different angles in an effort to find possible solutions	1	2	3	4	5

Section D

This section examines how the LMS stimulated your interest in academic activities during the Covid-19 Pandemic

Please respond by expressing your level of agreement or disagreement to the statement:

1= Strongly Agree, 2= Agree, 3= Undecided, 4= Disagree, 5= Strongly Disagree

Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
1	**2**	**3**	**4**	**5**

1. The LMS Allowed me to engage in thought-provoking dialogue with points of view that challenged my perspectives	1	2	3	4	5
2. The LMS encouraged me to explore a variety of different issues that I may not have otherwise considered	1	2	3	4	5
3. The LMS piqued my curiosity by exploring various options when navigating the user interface	1	2	3	4	5
4. The LMS held my attention by challenging me to look into issues that I may not have otherwise thought of	1	2	3	4	5
5. The LMS encouraged me to exert effort in the face of difficulty by persisting at tasks I found challenging					

Section E

This section examines how the LMS facilitated the provision of timely feedback in academic activities during the Covid-19 Pandemic

Please response by expressing your level of agreement or disagreement to the statement:

1= Strongly Agree, 2= Agree, 3= Undecided, 4= Disagree, 5= Strongly Disagree

Strongly Agree	**Agree**	**Undecided**	**Disagree**	**Strongly Disagree**
1	**2**	**3**	**4**	**5**

1. The LMS allowed me to receive timely feedback that helped me improve my performance	1	2	3	4	5
2. The LMS enabled me to receive inputs, so that I was able to keep track of my own performance	1	2	3	4	5
3. The LMS allowed me to receive prompt feedback, so that I was aware of my own progression towards knowledge acquisition	1	2	3	4	5
4. The LMS allowed me to receive prompt feedback, so that I was aware of my own progression towards mastery of my skills	1	2	3	4	5
5. The LMS enabled me to receive responses that allow further understanding					