THE EFFECTS OF QUALITY, INTERACTION, MOTIVATION, AND USER-CHARACTERISTICS ON STUDENTS' SATISFACTION AND LEARNING IN AN OPEN AND DISTANCE LEARNING ENVIRONMENT

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UNIVERSITI SAINS MALAYSIA

2022

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by

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Thesis submitted in fulfillment of the requirements
for the degree of
Doctor of Philosophy

August 2022

ACKNOWLEDGEMENT

Glory be to Almighty Allah the most benevolent, the most merciful and most generous for granting me the opportunity and the strength to stay through this PhD. journey. I owe a debt of gratitude to my supervisor, Professor Dr. Irfan Naufal Bin Umar for investing his time, energy, knowledge and wisdom to my dissertation. His support, guidance, and academic counsel which he graciously availed me, ensured the success of my study. I also deeply appreciate of the support and encouragement I received from Dr. Irwan, Dr. Chau Kien Tsong, Dr. Magesh, Dr. Nurulizzam, Dr. Reem Barragash, Dr. Jeya, Prof. Dr. Mona Masood, Dr. Mariam, and to all the other academic and auxiliary staff at the Center for Instructional Technology and Multimedia, Universiti Sains Malaysia who are too numerous to mention. Thank you most kindly to all of you. The hospitality, warmth and the spirit of mentorship and solidarity is evergreen in my heart. I must not miss to acknowledge the support; financial, and moral offered by the management and staff of Usmanu Danfodiyo University Sokoto, Nigeria. Most especially, Prof A.A. Zuru, Prof. S.H.Wara, Prof. M.U. Tambawal. Prof. A.K. Tukur. Prof. M. Ibrahim, Dr. N.M.Baba, Dr. Aisha Ibrahim, Dr. Murtala Akanbi Yusuf, Prof. Abubakar Sabo, the comrade chair ASUU UDUS branch, and to all those colleagues, friends, specifically Dr. Brandford Bervell for his support, Kamal Samaila, and all well-wishers who ensured that this journey yielded positive outcomes. May God reward you all. I remain profoundly grateful to my entire family, mum, dad, brothers, sisters, and immediate family. Special appreciation to my wife Mrs, Balkisu as well as the children for their sacrifice and endurance during my absence in search of this degree, I dedicate this achievement to you. May we all reap the benefits of this sacrifice.

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LIST OF ABBREVIATIONS

AMOS	Analysis of Moment Structures
aMOT	Autonomous Motivation.
CAQDAS	Computer-Assisted Qualitative Data Analysis
CFA	Confirmatory Factor Analysis
CITM	Instructional Technology and Multimedia
cMOT	Controlled Motivation.
CPD	Continuous Professional Development
CQ	Content Quality
D&MISS	DeLone and McLean Information Systems success model
DE	Distance Education
DL	Distance Learning
F2F	Face to Face
HLM	Hierarchical Linear Model
ICTs	Information and Communication Technologies
IF	Instructor factor
iLMS	Integrated Learning Management System
IPMA	Importance Performance Map Analysis
IS	Information System
LCI	Learner-Content Interaction
LLI	Learner-Learner Interaction
LMS	Learning Management System
MGA	Multigroup Analysis
MOOCs	Massive Open Online Courses
NOUNiLearn	National Open University of Nigeria e-Learning environment
NTV	National Television of Nigeria

NUC	Nigerian Universities Commission
ODL	Open And Distance Learning
OLSE	Online Learning Self-Efficacy
PE	Perceived Enjoyment
PEOU	Perceived Ease of Use
PLS-SEM	Partial Least Squares Structural Equation Modelling
PU	Perceived Usefulness
SCI	Student-Content Interaction.
SCT	Social Cognitive Theory
SDT	Self-Determination Theory
SF	Student Factor
SII	Student-Instructor Interaction
SQ	System quality
SRMR	Standardized Root Mean Square Residual
SSI	Student-Student Interaction
SVQ	Service Quality
TAM	Technology Acceptance Model
TCA	Thematic content analysis
TTD	Theory of Transactional Distance

LIST OF APPENDICES

KESAN KUALITI, INTERAKSI, MOTIVASI, DAN CIRI-CIRI PENGGUNA TERHADAP KEPUASAN DAN PEMBELAJARAN PELAJAR DALAM PERSEKITARAN PEMBELAJARAN TERBUKA DAN JARAK JAUH

ABSTRAK

Kajian ini menggunakan rangkaian nomologi yang dicadangkan (model bersepadu konsep) model dan teori yang diambil dari model kejayaan Sistem Maklumat DeLone dan McLean (D&MISS), Teori Jarak Transaksi (TTD), Teori Penentuan Diri (SDT) dan Pengguna Faktor Karakteristik untuk menilai kepuasan pelajar dan pembelajaran yang dirasakan berdasarkan pengalaman belajar mereka dengan Sistem Pengurusan Pembelajaran bersepadu (iLMS) universiti terbuka dan jarak jauh di Nigeria. Kajian ini didasarkan pada reka bentuk penyelidikan kaedah campuran tertanam, soal selidik bimodal dan wawancara separa berstruktur digunakan untuk mengumpulkan data dari 267 pelajar yang menawarkan kursus peringkat Sarjana Muda Pendidikan di semua peringkat di tiga pusat pengajian yang terletak di barat laut Nigeria. Daripada 267 responden, 14 daripadanya ditemu ramah untuk komponen data kualitatif. Akibatnya, data kuantitatif dianalisis melalui kaedah Partial Least Squares Structural Equation Modeling (PLS-SEM) dengan perisian SmartPLS 3.2.8, sementara analisis tematik digunakan untuk menganalisis data wawancara. Hasil kajian menunjukkan bahawa kualiti kandungan, kualiti sistem, interaksi pelajar-instruktur, motivasi autonomi, motivasi terkawal, faktor pelajar dan faktor instruktur adalah pemboleh ubah utama yang mempromosikan kepuasan pelajar dan pembelajaran yang dirasakan dalam persekitaran e-Pembelajaran dalam kajian. Selanjutnya, Analisis Peta Prestasi Kepentingan (IPMA) menunjukkan bahawa faktor pengajar terhadap kepuasan pelajar adalah faktor terpenting dan

berperanan dalam menentukan kepuasan pelajar, sementara, motivasi autonomi adalah faktor terpenting dalam mempromosikan pembelajaran yang dirasakan oleh pelajar dalam sistem e-Pembelajaran. Lebih-lebih lagi, pemboleh ubah demografi umur, jantina, pengalaman e-Pembelajaran, dan status pekerjaan terbukti dapat mengurangkan kesan hubungan antara pemboleh ubah eksogen dan endogen dalam kajian dengan pengalaman e-Pembelajaran mempunyai kesan paling sederhana terhadap kualiti kandungan , faktor pengajar, faktor pelajar, kualiti sistem, dan interaksi pelajar-pengajar. Kajian ini mendedahkan jarak transaksional yang luas serta penghambatan sambungan internet yang lemah dan bekalan kuasa yang mengganggu penggunaan sistem pelajar dengan cekap. Berdasarkan hasilnya, kajian tersebut disarankan dalam konteks teori, penyertaan kualiti kandungan, kualiti sistem, faktor pelajar, faktor pengajar dan interaksi pelajar-instruktur sebagai konstruk kritikal dalam memodelkan kepuasan pelajar dan pembelajaran yang dirasakan dalam lingkungan e-Pembelajaran. Selain itu, faktor penyederhanaan usia, jantina, pengalaman e-Pembelajaran, dan status pekerjaan harus disertakan untuk penjelasan dan pemahaman yang lebih baik mengenai kepuasan dan fenomena pembelajaran yang dirasakan. Kajian ini seterusnya mengesyorkan program latihan langsung secara berkala dan antara muka yang lebih kerap antara pengajar dan pelajar untuk mendapatkan maklum balas berharga yang memberitahu peningkatan sistem, perancangan kurikulum, e-Pembelajaran, serta amalan dan dasar pedagogi.

THE EFFECTS OF QUALITY, INTERACTION, MOTIVATION, AND USER -CHARACTERISTICS ON STUDENTS' SATISFACTION AND LEARNING IN AN OPEN AND DISTANCE LEARNING ENVIRONMENT

ABSTRACT

This study deployed a proposed nomological network (a conceptual integrated model) of models and theories drawn from the DeLone and McLean Information Systems success model (D&MISS), the Theory of Transactional Distance (TTD), Self-Determination Theory (SDT) and the User Characteristics Factors to evaluate students' satisfaction and perceived learning based on their learning experience with the integrated Learning Management System (iLMS) of the open and distance university in Nigeria. The study was grounded on the embedded mixed method research design, a bimodal questionnaire and semi-structured interviews were used to gather data from 267 students offering Bachelor of Education degree courses across the levels in the three study centers located in north-western Nigeria. Out of the 267 respondents, 14 of them were interviewed for the qualitative component of the data. Consequently, the quantitative data was analyzed through the Partial Least Squares Structural Equation Modelling (PLS-SEM) method with the SmartPLS 3.2.8 software, while thematic analysis was employed to analyze the interview data. Results from the study revealed that content quality, system quality, student-instructor interaction, autonomous motivation, controlled motivation, student factors and instructor factors were the key variables promoting students' satisfaction and perceived learning within the ODL environment in the study. Furthermore, the Importance Performance Map Analysis (IPMA) showed that instructor factor towards students satisfaction was the most important and performing

factor in determining students' satisfaction, while, autonomous motivation was the most important factor in promoting students' perceived learning within the ODL system. Moreover, the demographic variables of age, gender, e-Learning experience, and employment status were proven to partially moderate the effects of the relationships among the exogenous and endogenous variables within the study with ODL experience having the most moderating effects on content quality, instructor factor, students factor, system quality, and student-instructor interaction. The study further revealed the wide transactional distance as well as the inhibitions of poor internet connectivity and power supply hampering the students' efficient use of the system. Based on the results, the study recommended in the theoretical context, the inclusion of content quality, system quality, student factor, instructor factor and student-instructor interaction as critical constructs in modelling students' satisfaction and perceived learning within ODL environments. Additionally, moderating factors of age, gender, e-Learning experience, and employment status should be included for better explanation and understanding of the satisfaction and perceived learning phenomenon. The study further recommended periodic hands-on training programs and more regular interface between instructors and the students to obtain valuable feedbacks that informs system improvement, curriculum planning, e-Learning, as well as pedagogical practices and policies.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The exponential growth and spread of the internet witnessed over the years has inspired the adoption and implementation of new information and communication technologies (ICTs) within the educational systems the world over. These emerging technologies are impacting positive influence on the teaching and learning delivery process across contexts. The shifting dynamics from the traditional face to face (F2F) in classrooms pedagogic system where educators obtained immediate feedback in the classroom and vice-versa for the students (Sheard, Ceddia, Hurst, & Tuovinen, 2003; Woldeab et al., 2020). Distance learning affordances in flexibility, accessibility course management and organization is birthing new terminologies such as the 'open and distance learning (ODL)', 'distributed learning', 'electronic learning', 'open learning', 'virtual learning environment', 'online learning', 'e-Learning' and recently the 'massive open online courses' (MOOCs) which are gaining popularity and acceptance (Osman, Zakaria, & Abdulwahid, 2018). Although there is a raging debate on the definition and forms of these learning models (Singh & Thurman, 2019), there remains ambiguity and confusion around the concepts of online learning, distance learning and e-Learning. Despite been regarded as the most significant educational innovations that offer potential learners alternative learning environment that is different from the brick and mortar learning environment (Eze et al., 2018). Moore et al. (2011) captured succintly the confusion and difficulty around the definition of distance, e-Learning and online learning *"scholars believe that there is a relationship between distance*

education or learning and online learning but appear unsure in their own descriptive narratives" (Singh & Thurman, 2019).

Nonetheless, e-Learning is arguably used to describe open and distance learning medium, `as the generic conception of teaching and learning in the virtual space using emerging technology tools. As Parker and Parker, (2013) asserted, *"it is made up of network of learners and teachers who travel electronic highways and meet in virtual classrooms"* Literature have shown that all distance or online learning emerged from the web-based learning management system (LMS), the WebCT which is also known as Blackboard) in 1995 (Singh & Thurman, 2019). LMSs are used to provide the effective organization of learning, program management, and for supporting communication among the users within the system (Nichani, 2001; as cited in Blau & Hameiri, 2010; Alshehri et al., 2019). LMSs are also used for harnessing the potential of digital technologies to learn at scale through a network of peers (Conole, 2015).

Research have reported rapid growth in the adoption of online distance education by higher education institutions, professional organizations, and workplaces in the developed contexts (Alshehri et al., 2020). And this is credited to the immense advantages such as learning at scale, remote reach, learner's control, in terms of flexibility, adaptability, convenience, and cost effective course and program delivery and management (Eze, Chinedu-Eze & Bello, 2018; Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek, 2012). The recent global experience with the disruptions caused by the Covid-19 pandemic has made the need for distance learning more compelling (Segbenya et al., 2022)

However, despite the challenges faced by institutions in developing contexts ranging from funding, sub-optimal internet connectivity, competing budgetary issues and shortage of qualified personnel toward the effective adoption and implementation of the online, open and distance learning models (Eze et al., 2018). The importance of the LMS for distance/online educational delivery is driving institutions globally into adopting different models of the LMS technologies. especially in supporting distance learning and delivering hybrid form of education or blended learning (Ghazal, Aldowah, Umar, & Bervell, 2018;Alshehri et al., 2019).

Many of these institutions are adopting these technologies for the purpose of improving students learning performance, reducing students' dropout rates and increasing students satisfaction with their courses or programs (Naveh et al., 2012). It is however noteworthy that merely adopting the technology does not translate to its success. Moreover, there are reported imbalances in the usage and satisfaction of LMS by students and faculty (Dahlstrom et al., n.d.) with the faculty and IT leaders reporting higher satisfaction with the LMS than the students (Ghazal et al.,2018). Furthermore, scholars have argued that instructors and students do not fully benefit from these technology affordances as such many LMSs remain underutilized. Thus, more research is needed to understand students' usage, satisfaction, and learning fulfilment with LMS system in different contexts and from multiple perspectives. As Serdyukov (2020) Asserted, while distance learning offers immense benefits to the learners, institutions, and the faculty, it also comes with many inhibitions and obstacles given the 'formalism' within the environment. As highlighted by Kira and Sade (2006) as cited in Segbenya et al. (2022), effective teaching and learning experience is shaped by six critical factors: the affect, learners' perception of the course, perceived learning outcome, attitude, and intrinsic as well as extrinsic

motivation. Implicitly this suggest that in assessing the effectiveness of any open and distance or e-Learning system these factors should be considered.

Although there is a lack of agreement among scholars on the definitive concept of online learning, distance education and e-Learning (Singh & Thurman, 2019), there are commonalities and differences that makes either of these concepts better understood within a context. These contentions in the literature have aroused more research interests in the educational domain. Especially research on open, distance e-Learning satisfaction and effectiveness (Lee, Tseng, Liu & Liu, 2007; Lu & Chiou, 2010), including of course studies on key determinants of e-Learning effectiveness in distance education offerings (Ali & Ahmad, 2011). While some researchers are asking; what drives successful e-Learning? (Sun, Tsai, Finger, Chen, & Yeh, 2008) Others such as Ozkan and Koseler, (2009) are modeling the factors in determining e-Learning effectiveness namely: system quality, service quality, content quality, learner's perspective, instructors' attitude, and supportive issues as critical determinants of the effectiveness of e-Learning systems. Some of the studies have pushed for the inclusion of computer literacy and teaching methods as components of the determining factors of e-Learning success (Osman, Zakaria & Abdul Wahid, 2018).

In the Nigerian context, the Open and Distance Learning system is offered by the National Open University of Nigeria (NOUN). Like most distance learning programs is built on learning accessibility, flexibility, and adaptability (Jackson, 2016) and efficiently operated on a learning management system. However, since ODL environment offer opportunity for a more personalized form of learning, the interaction dynamics (interaction between students and the instructors, content, as well as with their contemporaries) and the different facets of motivation (autonomous

and controlled motivation) are also valuable elements that should be considered to provide a completely nuanced parameters for e-Learning success in a developing context. In addition, students' engagement with distance learning courses is an important success factor. Students' satisfaction and perceived learning may also be influenced by the frequency, consistency and their resilience in engaging with the learning activities within the environment (Souleles et al., 2021).

Over the years, researchers have advanced diverse arguments in favor of and against the distance learning model. For instance, Kearsley (2000) posited that if students are given instructions of equal quality, distance learning students do generally achieve at the same levels with their peers in traditional classrooms. In a later study, Zhang, Zhao, Zhou, and Nunamaker (2004) reported that in a distance learning environment where learner-centered activity and system interactivity are given prominence, the remote learners can outperform the traditional classroom learners. Also, stressing these points, Brownson and Harriman, (2000), as cited in Shahzad, 2017), reported that distance learning enrollees perform as well or even better than face-to-face classroom students. Similarly, Allen and Seaman (2010) postulated that student satisfaction in online learning remains undiminished when compared to face-to-face instruction. In the authors' study of the nuances of online education in the United States of America, Allen and Seaman (2013) reported that 77% of university managers rated the learning outcomes of online and distance learning to be the same, if not better when compared with the traditional mode of learning. Therefore, since the ultimate goal of distance learning is students' needs satisfaction and learning, ODL's benefits cannot be achieved if students are not satisfied with the system.

As Bervell and Umar (2017) observed, despite the growing use of LMS as a distance learning solution in different contexts.There are challenges that inhibit its critical factors of acceptance and usage. Nonetheless, this study argues that beyond acceptance and usage of the e-Learning technologies, in post-adoption evaluation, students' satisfaction with the entire system need to be investigated as a measure of the effectiveness of the system. As this might provide better understanding of the best performance factors and inform better policy decisions on the efficiency of the system.

1.2 Background of the study

Over the last two decades since the incursion of the internet into the developing world and Nigeria in particular, the proliferation of the world wide web has exerted tremendous influence on the adoption and use of web-based education (distance, and or e-learning). Web-based education is an off-shoot of the correspondence and distance learning model that served as a vehicle for educational delivery across different location with the teachers and the students remotely located. Researchers have propounded web-based technology in learning settings as the transformer of the education landscape that is providing learners with critical learning medium and experiences that were previously not possible (Kuo, Walker, Schroder, & Belland, 2014). The authors further asserted that web-based learning provided the learners more freedom to participate in the learning process through interaction with their course mates and the course materials. As a concept, web-based learning is synonymous with distance or e-Learning and online learning, the term depicts a method of learning mediated by electronic instructional contents delivered through the enablement of the internet. Web based learning is seen an evolving

pedagogical approach in education that serve as a flexible means for learners to gain essential knowledge (Ramayah et al., 2010; Parker, 2020) and contribute to the growth and development of their nations. In the context of this study we used open and distance learning synonymously to web-based education, and e-Learning.

Learning management system (LMS) which is synonymously referred to as web-based informaation technology management system provides the flexibility for developing, updating and maintaining distance learning courses (Ghazal et al., 2018). The LMS, online learning and e-Learning have evolved into critical pedgogical tools in education, training and the promotion of the instructional delivery process within and outside the higher education system.

As succintly captured by Ghazal et al. (2018), beyond fostering efficiency in teaching and learning, LMS is also used to advance knowledge sharing and codification in education and most distance learning system are grounded on an LMS (Mehrolia et al., 2021). Different brands of the LMS have evolved since the inception of the first LMS in the twilight of 21st century. Among many others, Moodle, Schoology, Frog, Sakai, Atutor, and Blackboard are among the most common LMSs utilized by institutions to maintain an online presence (Hamid & Rajamanickam, 2022). In the Malaysian context, there is growing trend of LMS adoption with all the Higher Education Institutions adopting different forms of the LMS. 58% use open sources platforms, 35% use premium platforms and about 16% developed bespoke form of LMS (Hamid & Rajamanickam, 2022). This development was triggered by the Malaysian government policy towards the realisation of Industrial Revolution 4.0. inline with the institutional organisational and strategic ICT mission and vision.

Basically, web-based, open and distance or e-Learning features include; distributing, tracking, and management of courses over the internet with interactive features such as chat rooms, discussion forums, polls quizzes and surveys that allow both the students and instructors to share and communicate asynchronous and synchronously (Islam & Azad, 2015). Sun et al. (2008) described distance e-Learning's characteristics as fulfiling the requirements for learning in the 21st century and this has made it the most sought-after mode of teaching and learning, from business to institute of higher education. Bouhnik and Marcus (2006) enumerated four key benefits of distance e-learning. As; offering learners the freedom to choose what to learn, notwithstanding their idiosynchracies. Providing learners with the leverage of timing given that it can happen synchronous or asynchronously. Affording learners the freedom to express thoughts and to ask questions without limitations in the distance e-Learning domain, as well as granting the learners the leverage to access their chosen courses,' subject matters and related materials. Furthermore, the ODL environment offer more significant potential for social and interpersonal communication than is possible through face-to-face interaction, or communication (such as; questioning, answering, discussing, debating, negotiating, etc.) that may occur over the internet between students and teachers and among students in an distance learning environment.

In sub-Saharan Africa, institutions are adopting and various forms of open and distance Learning environments ranging from free open source platforms to commercialized formats such as A-Tutor, Blackboard, Moodle, and Sakai to support teaching and learning (particularly in blended learning format) and facilitating institutional popularity (Mtebe & Raphael 2018; Venter, van Rensburg & Davis, 2012).

In Nigeria, The National Open University of Nigeria (NOUN) started its operation with the A-Tutor LMS and later migrated to the Moodle platform in 2003 as a content management system. However, Udosen and Innocent (2013) reported that NOUN have since switched to an integrated learning management system (iLMS) whose graphical interface is attached as Appendix F. The iLMS is a package of technologies which was introduced to support the system of the open university system, iLMS is a comprehensive platform that provide student and staff access to online discussion forums, the study materials, and feedback mechanism through enquiries and announcements. The iLMS, which is referred to as the NOUNiLearn was designed to function as e-Learning management of students and staff administration system. The NOUNiLearn portal technology was developed and implemented to enhance students learning experience through the provision of:

- A virtual classroom environment where students and facilitators are engaged in discussions.
- Serving as a means for students to ask and get answers to questions and enquiries regarding their study.
- Serving as a means for networking, collaboration, and communication between students, facilitators, academic staff and faculty members as well as
- Providing study tools and materials such as smart e-books, digitised video and audio materials for enhanced student learning experiences, assessment tools, access to assignments, quizzes and self-study.

Given these functions and features of the NOUNiLearn system, it is safe to harbor the same expectations that is placed on all distance learning systems some of which were succinctly captured by Sun et al. (2008) who posited that the distance e-

Learning environment expands the scope of interactions between students and instructors, and among students, it also removes the limitations of time and space using asynchronous, and synchronous learning tools.

Over the years, researchers (Olushola & Alaba, 2011) have opined that the NOUN was Nigeria's response to the critical issue of access to quality education in line with the efforts of countries in the developed contexts who are using education to curb the negative influence of poverty, inequality, hunger, and diseases. And the push towards the fourth industrial revolution (industry 4.0).

Since the establishment of the Open university in Nigeria in 1983 (portal.noun.edu.ng), The students' population grew from 32, 400 students to 57,759 students as of 2011, these students are spread across 75 study centers across the 36 states and the Federal Capital Territory Abuja in Nigeria. And this include individual centres located in correctional centres for inmates education (NOUN whed.net, 2011). Furthermore, 16 years after its resuscitation, (because it went moribund between 1984 to 2003) NOUN has a population of over 65,000 students, over 50 academic programs, 15 faculties, both graduate and undergraduate and two centres for life-long learning and academic certificate programs. Although NOUN's *modus operandi* is 90% online, the marginal face-to-face contacts at the study centres make it fit into the concept of a 'Blended learning institution'.

Against this background, it becomes imperative to consistently assess the role of an existing ODL environment (such as the NOUNiLearn system in Nigeria) with the aim of aligning its performance goals and objectives towards bridging the gap of real-world skills and providing access to quality education to this demographic

within the communities. Especially, from the holistic perspectives of the quality of the system, the academic transaction that takes place in the system, the motivation of the students, their disposition and attitudes, interest, experience and how the facilitators/instructors engage and satisfy their needs.

Perceived quality variables have been used to measure information system success across different contexts, DeLone and McLean (2003) proposed six dimensions of system success that included system quality, information quality use, user satisfaction, individual impact and organisational impact. They postulated that system quality and information quality affect the use and user satisfaction both individually and collectively, while use and user satisfaction influence an individual, which in the end, impacts on an organisation. As with the information systems, researchers have shown that in the educational domain, the quality of the instruction and the medium of delivery influences the students and the outcomes of the teaching and learning processes. Arguably the reason for the rising interests and studies, using quality antecedents in distance or e-Learning (DeLone & McLean, 2003). It has been reported that distance learning evaluation is one of the most studied topics in information literature (Mtebe & Raphael, 2018) which has led to the development of several models and tools in different settings, albeit in developed contexts.

Similarly, interaction in the distance learning context is an essential variable considered as a critical element to student learning and satisfaction across different contexts. Researchers such as Agudo-Peregrina et al. (2014), Poushneh and Vasquez-Parraga (2017) described interaction as the extent to which learners can participate in modifying the form and content of a mediated environment; they stressed that it is virtually mutual actions among instructors, students and learning contents. The relevance of interaction and engagement data on learner performance and academic

achievement in the mediated environment is still being explored (Agudo-Peregrina et al., 2014; Cerezo et al., 2016). Furthermore, (McLaren, 2010; Pérez-Pérez et al., 2019; Pozón-López et al., 2020) observed that, although there are arrays of literature on the leaner-instructor interaction, only a few relate it to learner satisfaction. In addition, one of the challenges of distance learning delivery is how to deliver instruction that is interaction driven.

Although many researchers have different classification of interaction, the common forms of interaction include; (i) student-student using forums, chats, workgroups. (ii) student-teacher interactions, in the form of teacher closeness, exchanges through texts and other electronic platforms, (iii) student - content interaction such as text contents, slides, video formats, podcasts, screencasts and many others. (iv) Student - system interaction through the system user interface and (v) self-interaction which refers to the self-regulation ability of each student as part of the self-directed learning processes (Arbaugh & Benbunan-Fich; 2007; Agudo-Peregrina et al., 2014). Also, researchers such as Bray et al. (2008); and Thurmond and Wambach (2004) have stressed the importance of various forms of interactions in fostering student satisfaction in distance learning. Principally, student-student interaction (SSI) and student-instructor interaction (SII) are considered most pertinent to student satisfaction in distance courses given that the student-content interaction has been documented as the weakest link in the ODL interaction chain (Xiao, 2017).

Previous studies (e.g. Kpolovies, 2016; Osang, 2012) have reported the rise in the adoption and implementation of distance learning globally and Nigeria in particular. (Alqurashi, 2019; Eom, Wen, & Ashill, 2009; Kuo et al., 2014; Kuo, 2010; McLaren, 2010; Robles, 2006; Sher, 2004). Nonetheless, these studies have very few

focused on the student perspectives (Yakubu & Dasuki, 2018; Mohammadi, 2015; Alqurashi, 2019; Eom et al., 2009; Kuo et al., 2014). These underscores the need for more research in that domain.Moreso that distance learning students are mostly adult learners, who are arguably seen as best suited for the distance learning model for their learning needs (Jimoh, 2013; Oluniyi, 2012). With these unique demographic, research is needed to properly understand these learning needs, and how these needs could be adequately catered to or met.

Motivation has featured prominently as a central and perennial issue in the field of human psychology studies in recent years, and this is not far-fetched because motivation is at the core of human biological, cognitive and social regulation (Ryan & Deci, 2000). Researchers have proposed theories that try to explain the concept of the human motivation of which Self-Determination Theory (SDT) is the most prominent. According to David (2014), motivation is categorised into two main types; intrinsic and extrinsic motivation. Extrinsic motivation is the tendency for a person to do a task or activity mainly because doing such a task will yield reward or benefit upon completion. In contrast, intrinsic motivation is characterised by doing something purely because of enjoyment, fun or satisfaction with it.

Comparative studies (e.g., Kuvaas, Buch, Weibel, Dysvik, & Nerstad, 2017; Chen & Jang, 2010) on people who are intrinsically motivated (i.e. authentic motivation, self-controlled, or autonomously motivated) and people whose motivation were externally induced, indicate that intrinsically motivated people are more excited and confident. This study aimed to evaluate the impacts of both forms of motivation on student's satisfaction and perceived learning in NOUNiLearn environment.

Over the past few decades, researchers have used contingency variables to provide more explanatory powers and better understanding of the relationships in technology adoption, acceptance and e-Learning studies (Fleming, Becker, & Newton, 2017; González-Gómez, Guardiola, Martín Rodríguez, & Montero Alonso, 2012; Leong, Ibrahim, Dalvi-Esfahani, Shahbazi, & Nilashi, 2018; Lu & Chiou, 2010; Ramírez-Correa, Arenas-Gaitán, & Rondán-Cataluña, 2015;; Tan & Ooi, 2018) in which these variables include age, gender, job or employment status, internet or computer experience, cultural background, and many more. While some the results show a significant influence of those variables on the relationships between the predictor variables and dependent variables (Lu & Chiou, 2010; Venkatesh et al., 2003), others reported no significant influence on the relationships (Marks et al., 2005; Wang et al., 2009).

Among the array of factors that influences students' satisfaction and learning in the distance and e-Learning environment is the User characteristics which we captured as personality factors (Yunusa & Umar, 2021) this focuses on individual students and instructor characteristics such as competence, autonomy, persistence, engagement, personal innovativeness and the instructor's responsiveness and feedback within the learning environment (Souleles et al.2022, Taha, 2014).

However, the researchers suggested serious consideration for those contingent variables as they are of critical importance for improving variable performance within a model. Similarly, Venkatesh and Bala (2008) recommended the need to incorporate moderators that are rarely used or tested in e-Learning research. consequently, the present study seeks to improve the explanatory power of the proposed integrated framework by using age, gender, employment status and e-Learning experience as moderators.

In ODL environments, learners' satisfaction is of great importance and reflects the effectiveness of the system (Naveh et al., 2010). Moreover, in the evaluation of the components of a learning system, learner's satisfaction plays a critical role (Martin-Rodriguez et al., 2015).

Theo (2010) asserts that an essential pre-requisite for a successful distance learning domain is that the students feel satisfied with the overall learning process. The emergence of the distance learning environments have significantly impacted on the teaching styles, Singh and Hardaker (2014) noted the roles of the teaching methods or pedagogy as the critical factors that must be considered by the management of every distance learning environment. Given that the changing roles of academics from deliverers of contents to instructional designers and facilitators have a far-reaching effect on the perceptions of the learners and the overall success of the system. Naveh and Pliskin (2010) described the roles of the tutor in the distance learning environment based on the course staff responsiveness which reinforces the importance of the responses the students get in the environment to their questions and inquiries especially when doing homework, or preparing for tests, whether via forums or the internet.

Conversely, Martens, Bastiens and Kirschner (2007) affirmed that student perception is a critical aspect that determines their satisfaction with the distance learning courses. students' positive attitude and expectations about the curricular goals can reflect student's perception about distance learning courses. Consequently, students consider the regularity of contacts with their instructors/facilitators and how prompt they respond and offer supports when needed as an essential aspect that influences their positive perceptions of the learning process.

The National Open University of Nigeria (NOUN) was established on 22nd July 1983 through an act of the parliament. Although its operation was short-lived because it was suspended on 25th April 1984, and further resuscitated in 2002. NOUN was established as a response to the socio-economic and developmental challenges of providing access to a rising population in need of higher education, especially university education (Osam & Ekpo, 2009; Oladejo & Onyeagbako, 2017).

Also, NOUN serve as an avenue for continuous professional development (CPD) training for workers in order to scale up their capacity and improve their productivity.Moreso that the workers' needs are apparently beyond the realm of conventional universities as the system mostly runs full-time programs that are not suited to their needs. Therefore, in tandem with the open universities system such as the Open University UK, the Indira Gandhi NOU India, the Allama Iqbal OU Pakistan, NOUN was adopted to accommodate the workers' needs for education that offers them flexibility, adaptability, and autonomy. However, statistics show that NOUN is a far cry from reaching its full potentials (CNANU, 2012; Jimoh, 2013), due to developmental challenges. Literature have also reported other inhibitions that included students' lack of access to e-Learning facilities, insufficient computers, inadequate internet facilities, high cost of software and erratic power supply as significant issues (Aboderin, 2015; Ajegbomogun et al., 2017) bedeviling the efficient operations of the distance e-Learning system.

The establishment of NOUN has diminished the limitations poised by traditional classroom learning by onboarding other aspects of the learners into the learning process. Although, providing students with the opportunity to learn does not necessarily guarantee successful learning (Cheng, 2012) The need to assure quality improvement of the distance learning environment is of critical importance and

should be of concern to the stakeholders (Ozkan & Koseler, 2009). Research efforts are emerging that addresses perceived quality in sub-Saharan Africa (Ajoye & Nwagwu, 2014; Yakubu, & Dasuki, 2018; Mtebe & Raphael, 2018; Fianu, Blewett, Ampong, & Ofori, 2018). However, there seems to be a paucity of studies focused on the perceived quality, interaction, and motivation and associated factors in the specific context of e-Learning environment in Nigeria.

Distance learning share some similarities with the traditional learning settings, there are significantly different aspects in which the learning experiences differ, and not much of these differences and the relevant factors of distance learning effectiveness have been identified. Therefore, it is imperative to examine how different aspects of an distance learning experience affect student satisfaction with the course or program and whether their satisfaction with the learning experience leads to positive learning outcome or learning expectation (s) based on the students' self-report.

1.3 Statement of the problem

The problem of an unfulfilled need for education contributed to the implementation of distance education program in Nigeria (Jimoh 2013). Even though much expectation for it to bridge the gap between demand for higher education and supply still exist, the Open and Distance Learning (ODL) is seen as a viable alternative for increasing educational access. Also, despite the growing acceptance and patronage of the distance learning model there is still limited information as to why students abandon distance learning after the initial experience (Arbaugh & Duray, 2002; Asoodar, Vaezi, & Izanloo, 2016). Attrition and low completion rates have remained major concerns for the system (Ohioze et al., 2013). In the same vein,

Arbaugh and Durray (2002); Wu, Tsai, Chen and Wu, (2006) noted the inadequacy of information as to why learners stop their distance learning after their initial experience. However, Khalil and Ebner (2014) reported that most learners drop out of distance learning due to lack of interactivity. Noteworthily, Eom and Ashill (2016) stressed that the potentials of distance learning and the concerns about its effectiveness are a universal phenomenon. The authors blamed some of the concerns on the lack of discipline and poor educational experience of the learners. While, Nwabufo, Umoru, and Olukotun, (2012) alluded to these issues of the students' fixation with the face-to-face mode of learning and lack of necessary skills to use the distance learning platform which tend to affect their attitude towards distance learning mode.

In a preliminary investigation carried out by the researcher to identify and confirm the positions canvassed in the reviewed literature, the director in one of the study centers in Nigeria confirmed in a personal communication that more than 65% of the students who registered in various programs of the open university are not actively involved with their learning on the system. This lends credence to the dropout issue in the system. Furthermore, some of the students that anonymously shared their experiences with the researcher also expressed frustration with some of the operations of the system especially the issue of poor internet connectivity which always inhibits access to the e-Learning environment. However, these reports can only pass as anecdotes which are subjective. Therefore, to provide empirical evidence, a study to assess students' perception of the effectiveness of the system is required. Hence, the present study sought to understand the effectiveness of the system through a proposed integrated framework as theoretical foundation comprising the information system success model of DeLone and McLean (2003)

used to explain and predict user's satisfaction and behaviour towards technology and as a measure of information success. The self-determination theory was to understand the students' motivation towards the distance learning system (Ryan & Deci,2017), the interaction dynamics based on Moore (1993) as a critical factor in distance learning and to understand the challenges posed by lack of interaction in the distance learning environment (Parker, 2020) , as well as the user characteristics in terms of students attitude to distance learning and the instructor attitude and response to individual and collective students' needs within the distance learning environment.

Over the last decade and a half since the inception of NOUN, several researchers (Aboderin, 2015; Ajegbomogun et al., 2017; Edem, Udosen & Innocent., 2013; Osam & Ekpo, 2009) have examined the NOUN system from disparate contexts and perspectives. Whereas the studies focused on instructional delivery and students' experiences, the promises, performance and challenges of the system (Okonkwo, 2012; Ohioze et al., 2013) and challenges in developing instructional course materials (Reju & Jita, 2018).And others examined the entire programs in open and distance learning, with NOUN as the case study (Jimoh, 2013). Oladejo and Onyeagbako (2017) evaluated the impact of different learner demographics on their academic performance. Suggesting the authors focus on the essential aspects of the system, but limited in addressing the effectiveness of the system from the perspective of student satisfaction and learning experiences. These knowledge could provide essential insights and a deeper perspectives on the success of the system. Therefore, a study that focused on the effectiveness of the system is required.

Against this background, this study adopts the concept of open and distance learning or e-Learning (ODL) based on the transmission medium, from the perspectives of how knowledge is distributed or shared across the learning space

using the electronic medium. This operational definition in the context of the study was derived from McLaren (2010) and the National Center for Supercomputing Applications (NCSA, 2000), in which the authors described e-Learning as the acquisition and use of knowledge distributed and facilitated principally by electronic means. Distributed knowledge can take the form of courses, modules, and other learning contents. Furthermore, e-Learning may incorporate synchronous or asynchronous access and may be distributed geographically with a varied limit of time (NCSA, 2000).

1.4 Purpose of the Study

The purpose of this study is to examine the students' satisfaction with the National Open University of Nigeria e-Learning environment (NOUNiLearn) and their perceived learning as well as to gain insights into the effectiveness of the system. Furthermore, the study seeks to understand the extent to which the exogenous variables (perceived quality, student-student interaction, student-instructor interaction, student-content interaction, autonomous motivation, controlled motivation, instructor factor, student factor) correlate with student satisfaction and whether satisfaction is positively related and influences perceived learning. The study proposed a conceptual framework built on relevant theories,models and principles drawn from the review of literature in order to gain better understanding of student satisfaction and their learning with the ODL (NOUNiLearn) system.

1.5 Objectives of the study

Specifically, the objectives of this study are to:

1. determine the relationships between students' perceived quality, interaction, motivation, user characteristics and their satisfaction in NOUNiLearn environment
2. determine the relationships between students' perceived quality, interaction, motivation, user characteristics and their perceived learning in NOUNiLearn environment.
3. determine the relationship between students' motivation (autonomous and controlled) satisfaction, and their perceived learning in the NOUNiLearn environment.
4. determine the relationship between user characteristics and students' satisfaction and learning within the distance learning environment
5. determine the relationship between students' satisfaction and learning within the distance learning environment.
6. ascertain the moderating effects of age, gender, e-Learning experience and employment status have on the relationships between perceived quality, interaction, motivation, user characteristics and satisfaction in the NOUNiLearn environment.
7. ascertain the moderating effects of age, gender, e-Learning experience and employment status have on the relationships between perceived quality, interaction, motivation, user characteristics and perceived learning in the NOUNiLearn environment.

1.6 Research Questions

The following research questions will guide the study:

1. Are there significant relationships between perceived quality, (i) students' satisfaction and (ii) perceived learning in the NOUNiLearn environment?

    a. Are there significant relationships between system, content and service quality on students' satisfaction in the NOUNiLearn environment?

    b. Are there significant relationships between system, content and service quality on students' perceived learning in the NOUNiLearn environment?

2. Are there significant relationships between students' interactions, (i) satisfaction and (ii) perceived learning in the NOUNiLearn environment?

    a. Are there significant relationships between student-student, student-instructor, and student-content interactions and their satisfaction in NOUNiLearn environment?

    b. Are there significant relationships between student-student, student-instructor, and student-content interactions and their perceived learning in NOUNiLearn environment?

3. Are there significant relationships between students' motivation, satisfaction and their perceived learning in the NOUNiLearn environment?

    a. Are there significant relationships between students' autonomous and controlled motivations and their satisfaction in NOUNiLearn environment?

b. Are there significant relationships between students' autonomous and controlled motivations and their perceived learning in NOUNiLearn environment?

4. Are there significant relationships between user characteristics, students' satisfaction and their perceived learning in the NOUNiLearn environment?

   a. Are there significant relationships between students' and instructors' characteristics and their satisfaction in NOUNiLearn environment?

   b. Are there significant relationships between students' and instructors' characteristics and their perceived learning in NOUNiLearn environment?

5. Is there significant relationship between students' satisfaction and their perceived learning within the NOUNiLearn environment?

6. How do the age, gender, e-Learning experience and employment status moderate the effects of perceived quality, interaction, motivation, and user characteristics towards students' satisfaction?

   a. How do students' age, gender, e-Learning experience and employment status moderate the effects of perceived quality towards satisfaction within the NOUNiLearn environment?

   b. How do students' age, gender, e-Learning experience and employment status moderate the effects of interactions towards satisfaction within the NOUNiLearn environment?

c. How do students' age, gender, e-Learning experience and employment status moderate the effects of motivation towards satisfaction within the NOUNiLearn environment?

d. How do students' age, gender, e-Learning experience and employment status moderate the effects of user characteristics towards satisfaction within the NOUNiLearn environment?

7. How do the age, gender, e-Learning experience and employment status moderate the effects of perceived quality factors, interactions, motivation, and user characteristics towards students' perceived learning?

a. How do students' age, gender, e-Learning experience and employment status moderate the effects of perceived quality towards perceived learning within the NOUNiLearn environment?

b. How do students' age, gender, e-Learning experience and employment status moderate the effects of their interaction and learning in NOUNiLearn environment?

c. How do students' age, gender, e-Learning experience and employment status moderate the effects of motivation and learning in NOUNiLearn environment?

d. How do students' age, gender, e-Learning experience and employment status moderate the effects of user characteristics and learning in NOUNiLearn environment?