The Moderating Effects of E-learning Experience and Employment Status on Students' Satisfaction and Perceived Learning within an e-Learning Environment

Abdullahi Abubakar Yunusa
Department of Curriculum Studies and Educational Technology,
Faculty of Education & Extension Services,
Usmanu Danfodiyo   University Sokoto, Nigeria &
Centre for Instructional Technology and Multimedia, Universiti Sains Malaysia,   11800
Minden, Pulau Penang, Malaysia
abdullahi.yunusa@udusok.edu.ng

Irfan Naufal Umar
Centre for Instructional Technology and Multimedia, Universiti Sains Malaysia,   11800
Minden, Pulau Penang, Malaysia
irfan@usm.my

Abstract

Students' satisfaction and perceived learning outcomes are critical determinants of the effectiveness of a learning system and provide the needed competitive edge at the end of the learning experience. While studies are bound that examined these factors within e-Learning systems in disparate contexts, there are few literatures that investigated the variability within the population based on the e-Learning experiences and the employment status of the students. Therefore, in this study, we developed an integrated model and utilized it to investigate the critical predictive factors (CPFs) that promote students' satisfaction and perceived learning outcome within an e-Learning environment in a developing context, specifically Nigeria. In addition, the study examined the moderating effects of e-Learning experience and employment status on students' satisfaction and perceived learning within the e-Learning system. 267 responses were received from a Google form shared link together with a physically administered questionnaire survey instrument and was analysed using the Partial Least Squares Structural Equation Modelling (PLS-SEM) multigroup analysis technique (MGA). From the 21 Paths evaluated, results show that e-Learning experience and the employment status of the students moderated 11 relationships within the model, thus, confirming the relevant hypotheses, while 10 hypotheses were not supported. The discernment made and the implication for theory and practice for the institutional management of the ODL system in Nigeria were discussed.

Keywords: *e-Learning, Distance Learning, Digital Technologies, Internet, Satisfaction, Perceived Learning*

Introduction

Technology and the internet have become intricately woven and intertwined into the fabrics of society, in particular, institutional managers within the educational sector have come to terms with the realities of technology as a major driver, catalyser, an accelerator and a multiplier of the opportunities within the different facets of the sector. However, these affordances are made

possible on account of the growth of the internet and internet technologies. Recognising these immense factors, institutions across the globe are investing in these technologies to multiply and scale-up access and provide opportunities for more citizens to advance their education, hone their skills, and contribute to national economic growth and development (Mtebe, 2020). In addition, the deployment of technology enhances the institutional reputation and increases its coverage, consequently attracting research interests and advancing knowledge and academic development.

These transformations in the distance education spectrum have evolved from paper based correspondence education to modern day electronic Learning (e-Learning) model(Dick, Akbulut, & Matta, 2020). Consequently, disparate pedagogical approaches have emerged, terms such as online learning, hybrid learning. blended learning, virtual learning, e-Learning have continued to dominate the education space. Recently, the Corona virus pandemic (COVID-19) challenge birthed the emergency remote learning model leading to the escalation in the application of e-Learning resources for learning (Aboagye et al., 2020).One common feature of the digital learning models is the centrality of digital technologies as the delivery medium and the eclipse of time, space, and location inhibitions. A situation Moore, (2013) described as the transactional distance which is characterized by the dialogue that happen between the learner and the instructor, or facilitator. A scenario that has significantly shifted the burden of learning on to the students. Researchers such as Moore, Dickson-Deane, & Galyen,(2011) have pointed out the inconsistencies in the conceptualizations of e-Learning.

These researchers argued that stake holders tend to conflate the diverse models in their definitions. In that respect, Tulinayo, Ssentume, and Najjuma, (2018) defined Digital Technologies as a broad range of tools, services and applications in the form of software and hardware that are used to facilitate services and activities through electronic medium. They are used for creating, storing, processing transmitting and displaying information. When deployed for educational/pedagogical purposes they are often referred to as e-Learning resources. Over the years, researchers have variously defined the concepts of e-Learning. For instance, Stefanovic, Nikolic, Drapsin et al., (2011) described e-Learning as learning via internet enabled by digital technology and it is a major phenomenon adopted by institutions to improve the teaching and learning process. In alignment, Hussein, Daoud, Alrabaiah, and Badawi, 2020); Binyamin, Rutter, and Smith, (2020) describes e-Learning as an all-encompassing concept that includes all forms of teaching and learning that occur partially or completely using digital technologies. In this study, we considered the Open and Distance Learning process at the National Open University of Nigeria (NOUN) as an e-Learning given that (90% of the delivery process is conducted online within the integrated learning management system called NOUNiLearn. (www.nounonline.net). Also, because e-Learning success can be measured through multiple perspective and tools (Serdyukov, 2020; Stefanovic et al., 2011;Authors, 2020), we considered students' satisfaction and perception of learning as appropriate measures of the NOUNiLearn system effectiveness. Customer satisfaction is a widely accepted measure of the acceptance of a product in business research and economics. In e-Learning and education by extension, it may be the reflection of the success of the learning experience. Hence, this study considers students' satisfaction and the perceptive fulfilment of their learning expectations as a plausible measure of the effectiveness of NOUNiLearn.

Many factors have been advanced as critical predictive factors of students' satisfaction with the e-Learning system; student factors, instructor factors, interaction factors, motivational factors, quality factors, learning environment, as well as the resources deployed for the learning experience

play important roles in students' satisfaction within the e-Learning system (Yunusa & Umar, 2021; Alhabeeb & Rowley, 2018)). Therefore, these factors must be considered to ensure successful learning process within the system (Stefanovic et al., 2011). The National Open University of Nigeria (NOUN) was established in the mode of the Open University UK, Allamal Iqbal Open University Pakistan and many others across the world. However, there is limited empirical evidence on students' perspectives of the effectiveness of the system measured through the lens of students' satisfaction and perceived learning based on their learning experiences. Therefore, this study is pertinent, moreover, as Serdyukov, (2020) asserted, though, e-Learning offers the benefits in terms of access, inclusiveness, and multiplying the spaces for learning, It also harbours some challenges to the students that affects them in different ways that leads to their withdrawal, dropout and poor learning motivation and outcomes (Carr, 2000 as cited in (Aboagye, Yawson, & Appiah, 2020). Serdyukov argues that the e-Learning environment tend to exert some influence on the learners cognitively, behaviourally, and learning expectations. Nonetheless, the need for career advancement, improved skills, and certification among others, has increased the support for online learning among adult citizens in different contexts (Bolliger & Halupa, 2018; Bolliger, & Martindale, 2004; Allen et al., 2016). Therefore, we considered it plausible to measure the effectiveness of the e-Learning platform from the perspectives of the learners' satisfaction with their learning experiences. The study is significant as it provides students' perspectives of the system that might help to improve critical sectors of the system, provide additional empirical grounding on the effectiveness of the e-Learning system in Nigeria and inform effective curriculum design and development within the e-Learning system in Nigerian context.
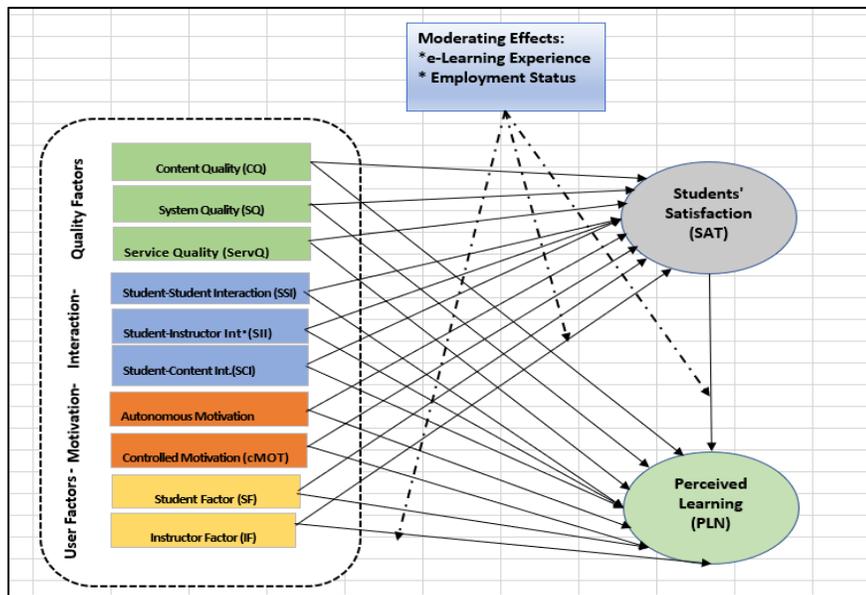

Figure 1. Conceptual Framework of the study

Hypotheses development

Based on review of literature, an integrated framework was conceived, and it comprised of the critical predictive factors (CPFs) of satisfaction and perceived learning (Yunusa & Umar, 2020). As conceptualized in Figure 1. The framework was developed from the quality factors of the DeLone & McLean Information System Success model (D&MISS) (DeLone & McLean,

2003), Theory of Transactional Distance (TTD) (M. G. Moore, 2013), Self-Determination Theory (SDT) (Deci & Ryan, 2015) and the User Characteristics factors (Ozkan & Koseler, 2009; Sun, Tsai, Finger, Chen, & Yeh, 2008) ; Sun et al., 2008). The framework was formed because a single model may not be sufficient to explain the phenomenon under investigation. Hence, since a nomological framework might lead us to the desired study outcome, it is considered plausible. Consequently, demographic variables (e-Learning experience and Employment Status were added to the fray since they improve the explanatory power within the model based on the recommendation by Venkatesh, Morris, & Davis, (2003).We draw on previous studies that adopted the use of integrated models to answer to pertinent e-learning questions and provide better understanding of various concepts such as behavioural intention and continuance intention to use of MOOCs (Zhou, 2016), examination of relationships among students self-determination, technology acceptance, and satisfaction to use MOOCs (Joo, So, & Kim, 2018), willingness to develop sport tourism (Lin, Chen, Tan, Lee, & Yang, 2018), university students level of satisfaction and readiness for e-learning (Topal, 2016), as well as measuring technology acceptance level of teachers (Koral Gümüşoğlu, 2017), studies that were predominantly in the context of developed countries.

The following hypotheses were formulated based on the research objectives.

E-learning Experience Moderating Effects

Researchers; Lu & Chiou, (2010); Yukselturk, (2009) reported conflicting outcomes in their study. While Lu & Chiou (2010) identified job status as a moderating factor in the linkage between system quality and satisfaction, Yukselturk, (2009) could not establish any significant moderating effect of age, gender, educational level and previous online experience on the students' satisfaction with online learning experience. Consequently, more research is required to better understand these phenomena, though, there are argument regarding the justification for including moderation analysis in model formation (Holland, Shore, & Cortina, 2017) . Nonetheless, we hypothesize that:

H1: (a, b, c, d, e, f, g, h, i, j): e-Learning experience moderates the effects of (CQ, SQ, SVQ, cMOT, aMOT, IF, SF, SSI, SII, SCI) on students' satisfaction (SAT) within the e-Learning environment.

H2: (a, b, c, d, e, f, g, h, i, j): e-Learning experience moderates the effects of (CQ, SQ, SVQ, cMOT, aMOT, IF, SF, SSI, SII, SCI) on students' perceived learning (PLN) within the e-Learning environment.

H3: e-Learning experience moderates the effect of students' satisfaction (SAT) with the e-Learning system on perceived learning outcome.

Employment Status Moderating Effects

Over the years, researchers have investigated the effects of demographic factors on e-Learning effectiveness in higher education at different contexts (Islam, Abdul Rahim, Liang, & Momtaz, 2011;).(Tarhini, Hone, & Liu, 2014b; Wang et al., 2009) results show that conflicts exist regarding the moderating effect factors within the system thus, warranting further research in that regard. Islam et al., 2011 reported significant moderating effects of age, program of study, and level of education on e-Learning effectiveness. Against this backdrop, we hypothesize that:

H4: (a, b, c, d, e, f, g, h, i, j): Employment Status moderates the effects of (CQ, SQ, SVQ, cMOT, aMOT, IF, SF, SSI, SII, SCI) on students' satisfaction within the e-Learning environment.

H5: (a, b, c, d, e, f, g, h, i, j): Employment Status moderates the effects of (CQ, SQ, SVQ, cMOT, aMOT, IF, SF, SSI, SII, SCI) on students' satisfaction within the e-Learning environment.

H6: e-Learning experience moderates the effect of students' satisfaction (SAT) with the e-Learning system on perceived learning outcome.

Purpose and Method

The study sought to answer the following research questions:

(i)   What are the critical predictive factors of e-Learning satisfaction and perceived learning within the e-Learning environment?

(ii)   How do e-Learning experience and Employment Status moderate students' satisfaction and perceived learning within the e-Learning environment?

The study adopted the quantitative research design approach (Clark & Creswell, 2015) A Google form online link was shared on the WhatsApp platforms of the target respondents and the questionnaire was physically administered to gather the data. The respondents are Bachelor of Education undergraduate students who had enrolled in the ODL e-Learning programme for at least four semesters. This category of students was targeted because they have used and garnered enough experience to report on their satisfaction and learning expectations of the system. Researchers have argued that students are better placed to define the effectiveness of the e-Learning environment because they are the target clientele and the most users of the system (Sher, 2009). The survey instrument included questions with items drawn from previous research instruments with established validity and internal consistency reliability. And based on quality factors, interaction, motivation as well as user characteristic factor items. The students are expected to respond to the five-point Likert scale statement (*ranging from 1-Strongly Disagree (SD) to Agree 5-Strongly (SA*) to reflect their perceptions with the e-Learning system predicated upon their prior learning experiences.

Findings and Discussion

Responses were gathered from 285 students whose age range between 18 to 55 years, 64% (n-171) are *male* and 36% (n-96 are *female*). Also,64.4%(n-172) are *employed* while 35.6% (n-95) are *not-employed.* Meanwhile, 85% (n-228) of the respondents have significant e-Learning experience. Consequently, 267 responses were found useable for analysis using the Partial Least Squares Structural Equation Modelling (PLS-SEM). PLS-SEM was chosen because it is widely accepted as a useful tool for investigating causal model relationships (regressions) and moderating effects. PLS-SEM is preferred for its relative advantages over first generation statistical analysis techniques especially been amenable to all kinds of data (normal and non-normal) (Ghasemy, Teeroovengadum, Becker, & Ringle, 2020; Sarstedt & Ringle, 2020). PLS-SEM can simultaneously test the plausibility of an entire collection of propositions of a causal theory, can model multiple independent variables (IVs) and multiple dependent variables (DVs)(Lowry & Gaskin, 2014).

The analysis was conducted using the SmartPLS version 3.2.8 (Ringle, Wende and Becker, 2015) after data cleaning and ensuring that basic statistical assumptions were met. As noted by Trochim, (2006) data analysis encompasses three fundamental steps viz: Data preparation, data description and Hypotheses testing. Thus, based on the recommendations by Hair, Sarstedt, & Ringle, (2019); Sarstedt, Ringle, & Hair, (2017) a two-step approach was followed to determine the convergent validity and the composite reliability indices as quality criteria, while the

discriminant validity and collinearity issues were also assessed followed by the structural model analysis to test for relationships. The results for the path coefficients and differences in terms of Employment status and e-Learning experience between the groups is presented in Tables 1 and 2.`

Table 1: Significant values for the moderating effects of e-Learning experience

Relationship	Beta value More experience -Less experience	t-value More experience -Less experience	p-value More experience vs Less experience
CQ →PLGN	0.697	3.053	0.001
CQ → SAT	-0.439	3.469	0.000
IF → PLGN	-0.284	0.970	0.167
IF →SAT	0.932	6.684	0.000
SAT → PLGN	-0.204	0.880	0.190
SCI → PLGN	0.399	2.374	0.010
SCI →SAT	0.037	0.264	0.396
SF →PLGN	0.735	4.168	0.000
SF →SAT	-0.334	2.673	0.004
SII → PLGN	0.275	1.418	0.079
SII → SAT	-0.286	2.715	0.004
SQ →PLGN	-0.563	3.241	0.001
SQ → SAT	0.366	3.492	0.000
SSI → PLGN	-0.269	1.223	0.112
SSI → SAT	-0.268	2.257	0.013
SVQ → PLGN	-0.234	0.986	0.163
SVQ → SAT	-0.038	0.320	0.375
aMOT →PLGN	-0.712	3.846	0.000
aMOT → SAT	-0.142	1.140	0.128
cMOT→PLGN	0.487	4.501	0.000
cMOT → SAT	-0.134	1.898	0.030

Key:CQ: content quality; SQ: system quality, SVQ:service quality, IF: instructor factor. SF: student factor, aMOT:autonomous motivation, cMOT: controlled motivation, SII:student-instructor interaction, SSI:student-student interaction; SCI: student-content interaction.

Table 1 shows the summary of the moderating effects (path coefficient differences) of e-Learning experience among the relationships within the model. There were significant moderating effects of e-Learning experience in 13 of the 21 linkages with six skewed towards the more experienced students thus, supporting the hypotheses in the following paths/linkages: (CQ→PLGN:β-diff=0.697,p<.005);(IF→SAT:β-diff=0.932,p<0.00);(SCI→PLGN:β-diff=0.399, p < 0.010); (SF→PLGN:β-dif= 0.0735; p<0.00); (SQ→SAT: β-diff=0.932, p< 0.00) and (cMOT→ PLGN: β-diff = 0.487; p < 0.00). On the other hand, the moderating effects of e-Learning experience was stronger among less experienced students in the following paths (CQ→SAT: β-diff= -0.286, p= 0.004); (SF→SAT: β-diff=-0.334,p=0.004); (SSI→SAT: β-diff=-0.268,p=0.13); (SII→SAT:β-diff=-0.286,p=0.004); (SQ→PLGN:β-diff=-0.563,p=0.00); (aMOT→PLGN: β-diff=-0.712, p=0.00); (cMOT→SAT: β-diff=-0.134,p=0.34).

These results suggest that in terms of motivation more experienced students appreciate the role of controlled motivation more importantly. Also, that low experienced students placed more importance on the contents than the technology. This may be ascribed to the maturity of more experienced students and longevity of system usage. It may be deduced that the more experienced students appreciate more the roles of the instructor, the efficiency of the technology, the quality of the materials and interaction with course mates as important factors in e-Learning environments.

Additionally, results align with the assertion by Stoel and Hye Lee (2003) regarding the significance of longevity of usage to increased appreciation of ease of use and positive attitude to technology. Therefore, more attention should be given to the new users of the system to help them in actualizing their expectations of the e-Learning environment. More studies are required to better understand the role of e-Learning experience in students' satisfaction.

Table 2: Results for the significant moderating effects of employment status

Relationships	Beta value diff Employed – Not Employed	t-value Employed vs Not Employed	p-value Employed vs Not Employed
CQ →PLGN	0.320	2.217	0.014
CQ → SAT	0.139	0.735	0.232
IF → PLGN	0.259	1.196	0.117
IF →SAT	-0.145	0.432	0.333
SAT → PLGN	-0.978	5.115	0.000
SCI → PLGN	-0.025	0.158	0.437
SCI →SAT	-0.453	2.089	0.020
SF →PLGN	-0.243	1.456	0.074
SF →SAT	1.120	4.554	0.000
SII → PLGN	-0.750	2.838	0.003
SII → SAT	1.127	2.569	0.006
SQ →PLGN	-0.102	0.572	0.284
SQ → SAT	-0.532	1.968	0.026
SSI → PLGN	0.279	1.603	0.056
SSI → SAT	-0.177	0.705	0.241
SVQ → PLGN	0.052	0.303	0.381
SVQ → SAT	-0.124	0.442	0.330
aMOT →PLGN	0.481	2.538	0.006
aMOT → SAT	-0.116	0.575	0.283
cMOT→PLGN	0.260	1.870	0.032
cMOT → SAT	-0.189	0.970	0.167

Key: CQ: content quality; SQ: system quality, SVQ: service quality, IF: instructor factor. SF: student factor, aMOT: autonomous motivation, cMOT: controlled motivation, SII: student-instructor interaction, SSI: student-student interaction; SCI: student-content interaction.

From Table 2: It can be seen that there were significant moderating effects of employment status with *the employed students* recording higher path coefficients in the paths: (CQ→PLGN: β-diff= 0.32, p= 0.014); (SF→SAT: β-diff= 1.120, p< 0.000); (SII→SAT: β-diff= 1.127, p= 0.006); aMOT→PLGN: β-diff= 0.481, p= 0.006); and cMOT→PLGN: β-diff= 0.260, p= 0.032).There were also significantly negative moderating effects of employment status in the paths: (SAT→PLGN: β-diff=-0.978, p< 0.000); (SCI→SAT: β-diff=-0.453, p=0.020); (SII→PLGN: β-diff=-0.750, p= 0.003); (SQ→SAT: β-diff=-0.532, p=0.026). These results suggest that the "Not employed students" had a more significant perception of the system within those relationships. And employment students failed to moderate students' perceived quality towards e-learning

satisfaction. The findings paralleled the study by Yuselturk (2009) but conflicted that by Lu and Chiou (2010) who reported job status as a moderating factor in interface friendliness and e-learning satisfaction. Based on the findings, it may be concluded that the universality of the e-Learning environment was emphasised in the study as a system that is open to diverse form of learners. Whether experienced, in-experienced, employed, or un-employed.

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