

Individual innovativeness, self-efficacy and e-learning readiness of students of Yenagoa study centre, National Open University of Nigeria

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Abstract

Purpose – The purpose of this study is to explore the role individual innovativeness along with e-learning self-efficacy play in predicting the e-learning readiness of first- and second-year students of an open and distance education institutions in an African context.

Design/methodology/approach – Therefore, building on previous related research in this area, a quantitative approach was adopted to address the research questions and to establish whether a statistically significant relationship existed between individual innovativeness, e-learning self-efficacy, the independent variables; and e-learning readiness, the dependent variable. In total, 476 first- and second-years students of the university participated in the four-Likert-type scale survey. The research instrument which comprises 74 survey items was completed by 217 of the students. Statistical tools used for analysing data included both Pearson Product Moment Correlation coefficients and *t*-tests.

Findings – It was discovered that a strong positive and significant relationship was observed between individual innovativeness and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of the National Open University of Nigeria (NOUN); a statistically significant relationship was also found between e-learning self-efficacy scores and the e-learning readiness of the first- and second-year students of the Yenagoa Study Centre of NOUN; there was a statistically significant joint relationship between the three variables under investigation; findings equally revealed that male respondents had higher e-learning readiness than their female counterparts.

Research limitations/implications – Like every other study of this nature, this one also suffers some limitations. First, NOUN is a very large university with over half a million students spread across almost 78 study centres. This means that observation from just one study centre amounts to a very small sample size. This according to Schweighofer, Weitlaner, Ebner and Rothe (2019) jeopardises the generalisability and validity of study results. The authors also maintain that empirical data generated from surveys that usually rely participants' abilities to read and select responses without further interpretation by the researchers suffer from cognitive biases like social



desirability. To address the above limitations, detailed studies involving all studies centres of NOUN be undertaken and other qualitative and or mixed research methodologies be adopted in the future.

Practical implications – The implications for this study are that people who are innately innovative will willingly accept technology and by extension, learning in technology-rich environments like those found in like NOUN whose mode of study is blended learning inherently found in open and distance learning (ODL) institution. Therefore, this study is significant as it will provide relevant information to the management and administrators of NOUN, policymakers and regulatory institutions for the development, deployment and implementation of e-learning strategies. Findings will also benefit e-learning initiatives undertaken by similar institutions that adopt the ODL mode of education in Nigeria and other developing countries.

Originality/value – Even though, studies on the antecedents of e-learning readiness have been widely conducted across diverse contexts, studies exploring the associations between individual innovativeness, e-learning self-efficacy and e-learning readiness are relatively hard to come by. The above two variables as predicting the e-learning readiness in the study context are comparatively new. This study thus focuses on the relationships between the individual innovativeness levels, e-learning self-efficacy beliefs of students and their e-learning readiness which ultimately determines their ability to sustain studies in an ODL institution.

Keywords Open and distance education, Individual innovativeness, Technology-enhanced learning, e-learning learning readiness, e-learning self-efficacy, Innovations in education

Paper type Research paper

Introduction

Twenty-first century education has been inundated with seismic pedagogical shifts due in part to the rapid advances in technology witnessed in the last three decennia, especially as a result of the boom in information and communications technologies (ICTs) such as the Internet (Ditimi and Ayanda, 2013; Musaka, 2015; Yunusa *et al.*, 2019). Such shifts are the result of the use of the Internet and other digital technologies to enhance human learning. In fact, technology-enhanced learning (TEL) approaches have become widespread in the higher education subsector (Schweighofer *et al.*, 2019) and have further escalated since the emergence of the novel corona virus 2019 (COVID-19). The current rise in the rate of development and deployment of different TEL approaches, particularly electronic learning (e-learning) by several organisations, including tertiary institutions, is reinforced by the desire to solve authentic, teaching, learning and performance problems.

Despite the over 170 universities, 149 colleges of education and the over 300 polytechnics, colleges and specialised institutions (National Board for Technical Education, 2019; National Commission for Colleges of Education, 2019; Nigerian Universities Commission, 2019), Nigeria stills struggles to cater for the teeming needs for tertiary admissions. A recent report from the Nigerian Bureau of Statistics (NBS) revealed the Joint Admissions and Matriculations Board received a total number of 1,653,127 and 1,722,269 in 2018 and 2017 respectively (NBS, 2019). The same report further indicated that out of those thousands of admission seekers, only 549,763 and 566,719 got admitted into the universities in 2018 and 2017 respectively. This leaves a shortfall of over one million admission seekers. This has been the trend for the last decennia (Ekundayo and Ekundayo, 2009) and there seems to be no end in sight.

The National Open University of Nigeria (NOUN) was established to tackle the challenges of inadequate capacity within the Nigerian higher education sector by providing quality affordable tertiary education to majority of Nigerians through the open and distance learning (ODL) mode. As the only singly ODL mode government-owned institution, NOUN has deployed several technologies, tools and platforms to facilitate e-learning. NOUN offers over 50 programmes and 750 courses, thereby bringing quality education and an enriched learning experience to the doorsteps of nearly every Nigerian (Olowonisi, 2016). An agency report quoted the Vice Chancellor of the University as hinting that more than half a million students were currently enrolled at NOUN and that the university intends to further increase enrolments up to a million students (Omoike, 2020; Premium Times, 2018). However, the same report indicated that only 30% of those students were active across the 78 study centres of the University. Thus, the new challenge now is how to make those non-active students become active in the studies.

The integration of learning technologies into the educational arena may not necessarily mean that the intended end users, teachers and learners are really going to use them. But the benefits of electronic learning systems (ELS) can only be maximised when teachers and learners use such systems (Pituch and Lee, 2006). Equally, part of the issues surrounding the smooth take off and operations of ELS has been that of readiness in terms of the teachers, learners, organisations and the technology itself. For instance, electronic learning readiness (ELR) has been recognised as both a crucial factor influencing the uptake of e-learning in institutions and a critical component to successfully implement e-learning programmes in HEIs (Rohayani *et al.*, 2015).

Some of such studies indicate that Nigeria ranks 62 among nations in terms of institutional e-readiness which is way below that of South Africa and Egypt who ranked 39 and 57 respectively (Kyari *et al.*, 2018). In a related development, a study on e-readiness and educational development of some private universities in Nigeria revealed that, e-learning readiness of the students was low (Ditimi and Ayanda, 2013). This further underscores the necessity of seeking innovative solutions to expand e-learning adoption in the country (Kyari *et al.*, 2018).

Diverse factors interact in determining achievements in ELS and those aspects need to be considered to design efficient ELS (Nyagorme, 2014; Salloum *et al.*, 2019). For this reason, several studies have been conducted to identify potential causes of failure of e-learning adoption and possibly find solutions to the challenges. In fact, Lai (2008) maintains that, the success of the ELS hinges not only on the acceptance to use the technology but also on, among other factors, the user's technology readiness as well as their Internet self-efficacy. Yi *et al.* (2006) also confirmed that more two decennia of research has been directed at identifying salient perceptions of some other prominent technology attributes like innovation characteristics which impact on users' decisions to accept technology.

Whereas numerous studies have been undertaken to investigate the e-learning readiness in HEIs globally and in Nigeria, including NOUN, most of the studies only focused on the organisational or institutional level of ELR and typically dwelled on the aspects of technological and human resource readiness. Less is reported on the learner aspects of ELR. Likewise, there has been little or no attempt to associate students' individual innovativeness and e-learning self-efficacy with e-learning readiness in ODL education research. Yi *et al.* (2006) admits that only relatively few studies examined the potential impacts of users' individual innovativeness on perceived decisions to accept or use technology. It is the intention of this study to bridge this knowledge gap by investigating those relationships among these variables at the Yenagoa Study Centre of NOUN with a view to broadening the scope of the study to include all students of NOUN.

Thus, to harness the full potential of e-learning as an educational strategy to increase broader access to tertiary education in Nigeria, to augment classroom instruction and to eventually intensify students' learning outcomes in ODL institutions like NOUN, it is of great significance that we investigate the role individual innovativeness and self-efficacy, particularly role technology (e-learning) self-efficacy play towards learners' adoption of e-learning at NOUN.

Literature review

E-learning readiness

For learning institutions to successfully integrate and realise the benefit of technology as a learning aid and teaching tool, it requires not only physical infrastructure and technical expertise but also some level of psychological readiness is required (Ouma *et al.*, 2013). The authors insist that learners must also be "e-ready" so that a coherent achievable strategy tailored to meet their needs may be implemented. It is true because learners' readiness in

online learning environments (OLEs) is vital for them to be able follow through the learning process quite easily and properly (Rahardjo, 2018). Additionally, institutions need to evaluate their e-learning readiness levels (Adiyarta *et al.*, 2018). This is because readiness of learners to actively engage in e-learning and the availability of an enabling OLE are both essential for the success of e-learning programmes and courses (Obi *et al.*, 2018).

It is stated that, conceptualising ELR is crucial because it delineates the parameters of its applicability in a study as well as provides a clear framework for a research study (Oketch *et al.*, 2014) in any given context. For instance, Borotis and Poullymenakou (2004) defined ELR as the “mental or physical preparedness of an organization for some e-learning experience or action” (p. 1622). Likewise, Parlakkılıç (2015) referred to online learning style readiness as: “users’ online learning style readiness defined as the readiness of the learner or trainee in terms of time commitment to e-learning, discipline and interest in e-learning and the perception of the status of qualifications obtained via e-learning” (p. 60).

Again, ELR includes learners’ ability to acclimatise to technical challenge, adjust to collaborative training and either for asynchronous and/ or synchronous self-paced study (Schreurs *et al.*, 2008). Therefore, in this study context, e-learning readiness is the preparedness of the students of the Yenagoa Study Centre of the National Open University of Nigeria, to fully explore and exploit the learning opportunities provided by ICT and its related learning technologies, and ultimately to maximally draw the attendant benefits in terms of students’ academic achievements, reduced dropout rates, social connectivism and for lifelong learning.

Individual innovativeness and innovativeness theory

Gilbert (2007) described innovativeness as encompassing “the concepts of newness in systems, processes, products and services, behavioural change, environmental adaptation, and learning and knowledge development; all of which occurs in context over time” (p. 3). Similarly, Rogers (1995) defined innovativeness as the degree to which an individual adopts new ideas relatively earlier than others within a system – in this case – with an e-learning environment. Again, Çelik (2013) regard innovativeness as an umbrella concept that can mean risk-taking, openness to experiences, creativeness and though leadership and that individuals have different experiences with and orientations towards innovativeness. These unique individual differences in orientations towards innovativeness are what is referred to as individual innovativeness. It is almost a consistent character trait of an individual that reflects the person’s underlying nature when introduced to an innovation (Yi *et al.*, 2006).

According to Agarwal *et al.* (1998), first introduced in 1998, the construct of Personal Innovativeness in the Domain of Information Technology was designed to measure “the willingness of an individual to try out any new information technology” (Agarwal *et al.*, 1998). Furthermore, Hurt *et al.* (1977) considered it as a normally distributed, underlying personality construct that could be construed as a readiness to change. Readiness to change includes being able to adopt, adapt and survive new learning environments like ELS. Also, individual innovativeness is viewed as a significant aspect in developing positive attitudes towards the new technology use (Ayub *et al.*, 2017). New technology in this case can mean e-learning.

The Individual Innovativeness Theory propounded by Rogers (1995) proposes that individuals tend to react differently to changes that depended on certain traits or predispositions. It focuses on the idea of being adoptive and adaptive to changes, by willing to take risks unlike most others (Bautista *et al.*, 2018). These characteristics make those individuals to accept innovations earlier than others, as they are more or less open to change, and are willing to take more or less risk (Adigüzel, 2012; Coklar, 2012; Gürkan and Demiralay, 2016; Martins, 2018; Rogers, 1995; Yilmaz and Bayraktar, 2014). Furthermore, the theory suggests that, “some individuals are more innovative than others and for this reason will

adopt an innovation earlier than the majority of the group” (Martins, 2018). It also means that such individuals have different degrees of innovations’ adaptations (Coklar, 2012; Gürkan and Demiralay, 2016). Martins (2018) maintains that individual innovativeness theory has proven to be a useful tool in developing near- and long-term strategic plans geared towards improving technology integration in schools, particularly in higher educational institutions. Thus, this research tries to explore the relationships between the five individual innovativeness categories of first- and second-years students of the Yenagoa Study Centre of NOUN and their perceived e-learning readiness.

E-learning self-efficacy and self-efficacy theory

A review of the extant literature led some researchers to the conclusion that learning theories like – behaviourism, social constructivism, social learning theory, social exclusion and social connectivism, self-determination, self-efficacy and cognitivism readily offers a deeper understanding of the workings of virtual learning environments (VLEs), including teachers, learners and course contents (Bawa, 2016; Drumm, 2019). These learning theories are indeed frequently used to conceptualise, model and even proselytise the application of digital technologies in education (Drumm, 2019). Furthermore, most of these sociological theories explicate learner behaviours in electronic learning contexts as potential predictors and possible precursors of problems and solutions relating to VLEs (Bawa, 2016).

Equally, theories on motivation are essential to investigating e-learning readiness of students. This assertion is supported by Bawa (2016) who opine that theories on motivation that deal with self-determination and self-efficacy were relevant to examining learners within ELEs. Interestingly, one vital aspect of motivation is self-efficacy (Zimmerman and Kulikowich, 2016). Furthermore, Shea and Bidjerano (2010) posit that, for the fact that self-efficacy was crucial in elucidating active and successful learners especially in OLEs, the construct was essential to the development of a theoretical framework for electronic or technology mediated education where, in asynchronous learning situations, learner agency may be much more relevant. Compelling evidence from educational research suggests that student self-efficacy is an influential construct that significantly explicates differences in student learning outcomes (Shea and Bidjerano, 2010; Sadi and Uyar, 2013; Prior *et al.*, 2016) and actually makes positive contribution to learning outcomes (Sadi and Uyar, 2013; Yokoyama, 2019).

While the construct of self-efficacy has a relatively long history (Shea and Bidjerano, 2010). Nevertheless, the theory of self-efficacy reportedly originated from Social Cognitive theory hypothesised by Alberta Bandura (Frank, 2001; Shea and Bidjerano, 2010; Yokoyama, 2019). According to Bandura (1982a), an individual’s self-efficacy beliefs were closely related to his/her behaviours because they play a significant role in the formation of their attitudes. It might be understood as a crucial mechanism accounting for the interactive relationship between internal pressures and external stimuli that affect human behaviour (Lee and Mendlinger, 2011). It is that personal aspect of the individual that accounts for why he or she engages in a given task (Puzziferro, 2008).

Generally speaking, by relying on the above theory-driven assumptions Self-Efficacy Theory hypothesises a bidirectional influence between self-efficacy and learning outcomes (Olivier *et al.*, 2019). But because self-efficacy is an important determinant of learning success, it has now become an essential part of a successful e-learning experience (Prior *et al.*, 2016). The self-efficacy theory thus has particular significance to e-learning (Puzziferro, 2008). Therefore, this study focuses on the self-efficacy construct as it relates to a person’s belief in him/herself as possessing the capacity effectively adopt, use and apply e-learning technologies and efficient function in digital, online or e-learning environments.

Self-efficacy which is closely related to self-worth and self-esteem indicates an individual’s level of belief in his or herself concerning a particular situation or thing. It can also be likened

to one's self-confidence concerning his or her capacity to doing things and attending to particularly challenging situations in life. Bandura (1994) defined perceived self-efficacy "as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (p. 71). Likewise, it is viewed as an individual's confidence in his/her own competence (Christensen and Knezek, 2015) and normally corresponds to the degree of competence an individual perceives of him/herself (Frank, 2019).

Here in this study, the term self-efficacy is defined "as an individual's perceived believe in capabilities he/she possesses that empowers him/her to complete assignments or achieve goals he/she had set for him/herself".

Frank (2001) averred that situational individual self-efficacy results from potential attributions principal among which is previous performance experiences. It was further stated that previous performances and experiences significantly affect the development of an individual's self-efficacy (Schunk, 1995; Frank, 2001). From this perspective, the ability to effectively use ICT (hardware and software) infrastructure depended on the users' technology self-efficacy, because the lack thereof could constrain their inclination to adopt the technology (Mooij and Smeets, 2001).

Furthermore, self-efficacy is domain, context, content and task specific (Bandura, 1997; Hong *et al.*, 2019; Olivier *et al.*, 2019; Quintero, 2020; Taipjutorus *et al.*, 2012b; Kelly, 2017; Yokoyama, 2019). It is actually the personal determination of a person's own capacity to deal with certain tasks (Puzziferro, 2008; Taipjutorus *et al.*, 2012b). Equally, content-specific self-efficacy has been discovered to explicate variance in the link between prior capability (aptitude) and performance (Shea and Bidjerano, 2010). Thus, it is suggested that it was more analytical to use application-specific self-efficacy to explicate learning outcomes and sustained learning activities of students, particularly in e-learning environments (Chu and Tsai, 2009). Accordingly, scholars researching on the theory of self-efficacy emphasise that self-efficacy beliefs should be assessed in such a way that the beliefs correspond to the target performance and contexts or situation of interest (Joo *et al.*, 2000).

In light of the above, countless scholars have undertaken self-efficacy studies from several perspectives, contexts and or domains: academic self-efficacy (Joo *et al.*, 2000; Yokoyama, 2019). Technology self-efficacy, technology and communication self-efficacy, computer self-efficacy (Musaka, 2015; Nardi and Ranieri, 2019; Yildiz Durak, 2018) and other related concepts – online technology self-efficacy, Internet self-efficacy, web-based learning self-efficacy and online learning self-efficacy have been severally investigated (Chen, 2014; Hodges, 2008; Joo *et al.*, 2000; Lai, 2008; Chu and Tsai, 2009; Hong *et al.*, 2019; Taipjutorus *et al.*, 2012a, b; Zimmerman and Kulikowich, 2016). Lastly, studies on e-learning self-efficacy which is the focus of the current study were also undertaken by some scholars (Nygorm, 2014).

Musaka (2015) defines technology self-efficacy as "personal belief in one's ability to successfully use technology to increase learning outcomes". Yildiz Durak (2018) opined that technology self-efficacy was necessary for learners to effectively participate in an e-learning environment, that is, accessing lecture materials, using virtual instructional tools appropriately, interaction with teachers and peers, engaging in discussions as well as problem solving. In this light, Yildiz Durak (2018) similarly indicated that a learner's technology and communication self-efficacy was related to his/her attitudes towards programming. Likewise, Zimmerman and Kulikowich (2016) referred to online learning self-efficacy "as an individual's perceptions of his or her abilities to successfully complete specific tasks required of online learners".

Similarly, Lee and Mendlinger (2011) assert that, to a large extent, online learning self-efficacy, which is a situation-specific form of efficacy, refers to a person's perception of his or her capabilities to use online learning systems like the Internet, computers and web-based

instructional materials and other instructional media. Likewise, online learning self-efficacy was denoted to as a learner's self-judgment about his/her abilities to complete an online programme and this is vital for their satisfaction with an online programme (Shen *et al.*, 2013). Based on the theoretical clarifications, it then suggests that, "e-learning self-efficacy" is the belief individuals have in the capabilities they possess that empowers them to successfully undertake studies using e-learning technologies, persist in their studies and ultimately achieve better learning outcomes. This particular situational and context-specific self-efficacy forms the crux of this investigation.

Hypotheses development

The link between individual innovativeness and e-learning readiness has been investigated in previous studies. For example, Kilicer *et al.* (2018) averred that past scholarly works have revealed that relationships exist between technology and innovativeness within educational contexts, particularly when it comes to adoption of educational technologies. Again, in their study relating to workers, Hendarman and Cantner (2018) referred to individual innovativeness as the demonstrated worker behaviours directed at engaging innovative activities at the workplace. Similarly, in this study, learners' individual innovativeness relates to demonstrable learner's behaviours that is directed at engaging in innovative learning activities, including being actively involved in online learning environments. Furthermore, Campbell and Ma (2015 as cited by Salloum *et al.*, 2019) discovered that acceptance of e-resources such as eBooks was influenced by technology innovativeness and exposure to e-learning systems. They opine that innovativeness was a possible significant determinant of intent to use – in this case – e-learning adoption.

It is further argued that individual innovativeness potentially contributes to increase a person's technology readiness which again is a predictor of e-learning readiness (Lai, 2008). For example, in their study of IT-based innovations in the healthcare sector, Park and Kim (2010) assumed that individual innovativeness directly determines actual IT adoption behaviours of healthcare practitioners. Their study indeed confirmed that individual innovativeness was critical to understanding IT adoption behaviours of individuals. According to Lai (2008), the innovativeness dimension of the overall technology readiness concept refers to "the extent to which a person believes that he or she is a thought leader, and at the forefront of trying out new technology-based products/services" (p. 19). Additionally, higher levels of individual innovativeness predicted the acceptance and use of e-learning platforms (Kilicer *et al.*, 2018). Based on the foregoing, the following hypothesis is proposed for testing in this study:

- H1.* There is no significant relationship between individual innovativeness and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN.

Contrary to being inclined towards individualistic tendencies, it has been asserted that individuals with high self-efficacies are said to be well-suited for e-learning environments because such persons are cooperative, accommodating, enthusiastic to share in social situations and are more than ready to tackle difficult tasks instead of avoiding them (Chen, 2014). Some scholars claim that such individuals also are more likely to persist in their efforts with virtually no apprehensiveness until they succeed, even when threatening tasks are performed (Bandura, 1982b, 1994; Kelly, 2017). Additionally, empirical evidence adduces that the higher or stronger an individual's perceived self-efficacy, the more active the person's coping efforts which equally creates impetus for learning (Bandura, 1977, 1982b; 1994; Bandura and Adams, 1977; Hodges, 2008; Lee and Mendlinger, 2011; Sadi and Uyar, 2013; Shen *et al.*, 2013). It also has the tendency to foster learners' confidence and autonomy which empowers them to better perform academically (Bai, 2017; Shea and Bidjerano, 2010; Shen *et al.*, 2013). Again, they are actually

more likely to be cognitively engaged in learning. It implies, those with high self-efficacy can persist through the rigours of the e-learning environment (Sadi and Uyar, 2013).

Consequently, it can be said that the effective use of an e-learning systems in tertiary institutions is not only influenced by the technology or even system design features but also by the user's ability to use the system effectively in a learning process especially in e-learning environments (Nyagorme, 2018). This is because those with higher self-efficacy tend to more dynamically explore e-learning systems, while those who are low in it seem to withdraw and probably concentrate on simply locating information (Joo *et al.*, 2000).

For this reason, it was necessary to explore the factors that impact on a person's perceived self-efficacy and apply the construct directly to e-learning instructional settings (Vilkas and McCabe, 2014). Likewise, Salomon's (as cited by Bandura, 1982b) study discovered that learners' high perceived self-was associated with heavy investment of cognitive effort and superior learning from instructional media. This reduces the attrition rate among online learners. On the contrary, people who are lacking in self-efficacy although they know what to do have a tendency to behave indecisively (Bandura, 1982b) as such persons are inclined to the idea that difficult tasks are beyond their competences and are also more likely to lose confidence in their capabilities (Bandura, 1977) and are less likely to achieve positive learning outcomes (Shen *et al.*, 2013). Hence, in the opinion of Taipjutorus *et al.* (2012b), e-learning courses ought to be designed to help students so that their self-efficacy is enhanced and sustained. Going by the theoretical underpinnings of the study, evidence abound in the literature, that among other antecedent factors, individual innovativeness and self-efficacy were critical to learner's surviving in e-learning environments and ultimately achieving their academic goals. Again, as earlier highlighted, since self-efficacy is task, context specific, it is argued that higher levels of self-efficacy in one domain or task may not automatically translate into another (Quintero, 2020). Accordingly, the following hypothesis is proposed:

H2. There is no significant relationship between the e-learning self-efficacy and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN.

An analysis of the extant literature reveals lots of studies on the adoption and diffusion of innovations (Aydin and Tasci, 2005). Incidentally, only few studies have examined the relationship between individual innovativeness and one's perceived self-efficacy (Çelik, 2013). Thus, like Çelik's (2013) study, this research also attempts to determine how learners' individual innovativeness correlates with their e-learning self-efficacy. Ayub *et al.* (2017) opined that previous studies have indeed found a link between self-efficacy, individual innovativeness and attitudes towards e-learning readiness.

Here in this study, the relationship among the three variables is symbolised in the path diagram in Figure 1.

The path diagram presupposes that learners with high self-efficacy possess high innovativeness as they are more open to new ideas and are more willing to undertake studies in innovative instructional media, experiment with new digital technologies to meet their learning needs. The model thus argues that individuals who are high innovators and possess high levels of e-learning self-efficacy will be able to adopt, adapt and utilise e-learning media and succeed in their academic endeavours at the Yenagoa Study Centre of the National Open University of Nigeria.

H3. There is no joint relationship between individual innovativeness, self-efficacy and the e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN.

Gender refers to either of the two sexes, male or female. However, unlike sex, gender does not only concern the biological differences between man and woman but encompasses the

psychological, social and cultural differences between the male and female sexes (Omoyibo *et al.*, 2010). The fact remains that men and women perceive technology differently in any given sociotechnical settings. Sometimes men prefer to adopt certain technologies faster than women and vice-versa. In fact, there is tendency for men to adopt technology earlier than females (Aldahdouh *et al.*, 2020). This could explain why men and women tend to adopt technology differently.

Incidentally, gender is considered as major intervening variable in most educational studies. Several studies reviewed by Okagbue *et al.* (2020) gender differences and that of age are frequently investigated studies on cognitive abilities. In fact, Ramírez-Correa *et al.* (2015) mentioned that the extant literature has often presented gender as a moderating variable of the Technology Acceptance Model, particularly within the context of e-learning. Such studies often support the idea that the gender has effect on the association towards the intent to use ICT as well as towards e-learning readiness (Naresh *et al.*, 2016). Also, gender differences are regarded as playing a significant role in e-learning (Ong and Lai, 2006).

However, empirical evidence from numerous studies that have been undertaken to find out if gender differences influence either the e-learning readiness of learners or their perceptions towards e-learning environments have yielded conflicting results. For instance, while a few studies on higher educational institutions found significant relationship between gender and the tendency to accept e-learning (Adams *et al.*, 2018; Formoso, 2018; González-Gómez *et al.*, 2012; Naresh *et al.*, 2016; Walia *et al.*, 2019). On the other hand, findings from several other studies show no significant association between gender and e-learning acceptance (Gay, 2018; Oketch *et al.*, 2014; Ramírez-Correa *et al.*, 2015; Rasouli *et al.*, 2016). To further authenticate either side of the argument, this study investigated the influence of gender on NOUN, Yenagoa Study Centre's first- and second-year students' perceptions of e-learning readiness.

H4. There is no significance difference in the e-learning readiness of male and female students of the Yenagoa Study Centre of NOUN.

Methods and design approaches

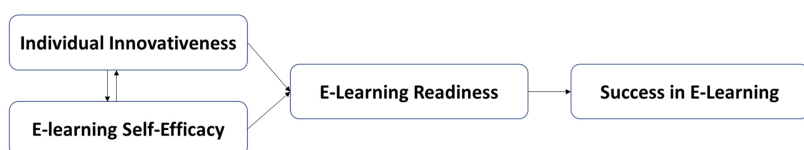
Research design

The research design of this study will be based on several other previous studies (see for example: Nyagorme, 2018; Obi *et al.*, 2018) by adopting a descriptive analytical research design with a cross-sectional survey method to understand the level of students' e-learning readiness of the students to participate effectively in an ELS. Another aspect of the survey was to investigate the relationship among the three main variables, individual innovativeness, self-efficacy and e-learning readiness.

Sampling frame and data collection methods

The population of the study consisted of 476 first- and second-year students currently enrolled for undergraduate studies at the Yenagoa Study Centre of NOUN. Out of that number, 227 which about 48% of the sampling frame was all first-year students while

Figure 1.
The path diagram of the relationship between individual innovativeness, self-efficacy and e-learning



remaining 249, that is, 52% of them were all second-year students of the above-mentioned study centre.

Data were collected through a hardcopy survey questionnaire that was distributed to all the students. The distribution and retrieval of questionnaires lasted for two months, from September to October 2019.

Instrumentation

The research instrument was designed through a methodological and rigorous process, examining and matching the extant literature on electronic learning and the theories on individual innovativeness and self-efficacy. Thus, like the works of many other scholars (Adiyarta *et al.*, 2018; Aydin and Tasci, 2005; Chen, 2014; Hashim and Tasir, 2014; Joo *et al.*, 2000; Nyagorme, 2014; Prior *et al.*, 2016; Taipjutorus *et al.*, 2012a; Zimmerman and Kulikowich, 2016) the research instrument for this study contains multi-item scales which were constructed by adapting items generated from the extant literature which were previously validated tools that were used to investigate the associations among individual innovativeness, e-learning self-efficacy and e-learning readiness. A total of 74 survey items spread across four sections: Section A – demographic data; Section B – questions on e-learning readiness; Section C – questions on individual innovativeness; and Section D – e-learning self-efficacy (ELSE) survey questions.

Section A contains 4 items that capture demographic data of the respondents including: gender, age range, year of study and self-reported previous use of e-learning systems (computers, e-mails, Web 2.0 tools, etc.). Section B consisted of 30 items to assess respondents' self-reported perceptions of their e-learning readiness from five factors: technological readiness, culture readiness, content readiness, attitude readiness and demographic characteristics. However, ELR measurement scales were adapted from measurement tools included: e-Learning Readiness Survey (e-LRS) (Aydin and Tasci, 2005; Hashim and Tasir, 2014). Section C contained all 20 items of the Individual Innovativeness Scale developed in 2013 by Hurt, Joseph and Cook. Section D dealt with e-learning self-efficacy. This section contained 20 survey items that were adapted from the following tools used in previous studies: the general self-efficacy survey (Schwarzer and Jerusalem, 1995), Self-Efficacy Formative Questionnaire (Gauger Erickson and Noonan, 2018), the online technologies self-efficacy scale (OTSES) (Miltiadou and Ho, 2000; Puzifferro, 2008), the learner Internet self-efficacy scale (Joo *et al.*, 2000), the web-based learning self-efficacy (WLSE) survey (Chen, 2014), the online learning self-efficacy scale (OLSES) (Taipjutorus *et al.*, 2012a; Shen *et al.*, 2013; Zimmerman and Kulikowich, 2016) and the ELSE (Nyagorme, 2014).

Data analysis

Statistical tools used for analysing the collected data in the study included both descriptive inferential statistical tools. In specific terms, research hypotheses one and two were analysed by employing Pearson Product Moment Correlation (PPMC). Research hypothesis (H3) was analysed using multiple regression statistics and *t*-test was adopted to test hypotheses four and five.

Results

Validity and reliability of instrument

The instrument was face-validated by the research supervisor and also by a measurement and evaluation (test) expert in one of the universities within the locality. This validation procedure was aimed at checking the content and overall format of the research instrument, including individual items, the wordings and statements used. Furthermore, a draft of the

instrument was pilot-tested for its reliability. The pilot test included 30 first- and second-year student of the Yenagoa Study Centre of NOUN who will not be in the final sample. This was done to remove any ambiguity and to take every necessary correction.

The reliability of the instrument was confirmed by using Pearson correlation coefficient using the IBM Statistical Package for the Social Sciences (SPSS) Base Version 22.0. The reliability coefficients obtained from the pilot study for the three subscales ranged from 0.765 to 0.809 (Table 1). This is a clear indication that the scales adapted for the study were found to be reliable in measuring e-learning readiness, individual innovativeness and e-learning self-efficacy of first- and second-year students of the Yenagoa Study Centre of NOUN.

Respondents data

For the about 476 questionnaires that were distributed, only 220 were retrieved which gives a recursive rate of 46.2%. Three of the questionnaires were returned empty leaving the researcher with 217 valid responses which were included in the analysis. The socio demographic information of the respondents is as shown in Table 2.

Hypothesis testing

H1. There is no significant relationship between individual innovativeness and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN

The analysis testing the above hypothesis is shown in Table 3.

Table 3 reveals that the correlation between individual innovativeness and e-learning readiness as 0.700. The observed *p*-value (sig) of 0.000 is less than the chosen alpha level of

| | | Coefficient of reliability |
|--------------------------------|---------------------------|----------------------------|
| Table 1. Reliability | E-learning readiness | 0.805 |
| | Individual innovativeness | 0.765 |
| | E-learning self-efficacy | 0.787 |

| Demographic | | Frequency | Percentage |
|---|----------------------|-----------|------------|
| Table 2. Sociodemographic data of respondents (<i>N</i> = 217) | <i>Gender</i> | | |
| | Male | 130 | 59.9 |
| | Female | 87 | 40.1 |
| | <i>Year of study</i> | | |
| | First-year students | 100 | 46.1 |
| | Second-year students | 117 | 53.9 |

| Test of significance of correlation of individual innovativeness and e-learning readiness | | | | <i>r</i> | <i>p</i> -value | Alpha level | Decision |
|---|--|----------|-----|----------|-----------------|-------------|----------|
| | | <i>N</i> | df | | | | |
| VAR001 (individual innovativeness) and VAR003 (e-learning readiness) | | 217 | 215 | 0.700 | 0.000 | 0.05 | Sig |

0.05, $r(215) = 0.000$, $p < 0.05$. Therefore, the null hypothesis of there is no significant relationship between individual innovativeness and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN is rejected. The implication is that, there is a significant relationship between individual the innovativeness and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN.

H2. There is no significant relationship between the self-efficacy and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN.

The correlation coefficient is shown in Table 4.

It can be discerned from Table 4, the observed probability value (p -value) (sig) is 0.000 which is less than the chosen alpha value of 0.05, $r(215) = 0.000$, $p < 0.05$. Therefore, the null hypothesis of there is no significant relationship between the self-efficacy and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN is rejected. The alternative hypothesis of there is significant relationship between the self-efficacy and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN is upheld.

H3. There is no joint relationship between individual innovativeness, self-efficacy and the e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN.

The F -statistics of multiple regression analysis of the joint relationship is shown in Table 5.

It can be deduced from Table 5 above that the observed p -value (sig) 0.000 is less than the chosen alpha level of 0.05, $F(2, 214) = 0.000$, $p < 0.05$. Therefore, the null hypothesis of there is no joint relationship between individual innovativeness, self-efficacy and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN is rejected. Conversely, the alternative hypothesis of there is a significant joint relationship between individual innovativeness, self-efficacy and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN is upheld.

H4. There is no significance difference in the e-learning readiness of male and female students of the Yenagoa Study Centre of NOUN.

The t -test analysis of the e-learning readiness of male and female students of the Study Centre is shown in Table 6.

| | N | df | r | p -value | Alpha level | Decision |
|--|-----|-----|-------|------------|-------------|----------|
| VAR002 (self-efficacy) and VAR003 (e-learning readiness) | 217 | 215 | 0.317 | 0.000 | 0.05 | Sig |

Table 4.
Test of significance of Pearson product moment Correlation of students' self-efficacy and e-learning readiness

| Model | Sum of squares | df | Mean sum of squares | F | p -value (sig.) | Alpha level | Decision |
|------------|----------------|-----|---------------------|---------|-------------------|-------------|----------|
| Regression | 5912.888 | 2 | 2956.444 | 118.801 | 0.000 | 0.05 | sig |
| Residual | 5325.554 | 214 | 24.886 | | | | |
| Total | 11238.442 | 216 | | | | | |

Table 5.
 F -statistics of multiple regression analysis of the joint relationship between individual innovativeness, self-efficacy and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN

Deducing from [Table 6](#), the observed p -value (sig.) of 0.000 is less than the chosen alpha level of 0.05, $t(215) = 0.000 < 0.05$. Since the observed alpha level, the null hypothesis of there is no significance difference in the e-learning readiness of male and female students of the Yenagoa Study Centre of NOUN is rejected. On the other hand, the alternative hypothesis of there is a significance difference in the e-learning readiness of male and female students of the Yenagoa Study Centre of NOUN is upheld. It implies that male students of the sample of the study are more e-learning ready than their female colleagues.

Discussion

This study sought to determine the e-learning readiness of first-and second-year students of the Yenagoa Study Centre of the National Open University of Nigeria. It also explored the relationships between individual innovativeness, self-efficacy and the e-learning readiness of the study context. Consequently, based on the finding from the data, the summary of the discussion is that:

- (1) Given the high correlation (0.700), it was established that there was a strong positive significant relationship between individual innovativeness and e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN. This was consistent with previous studies where individual innovativeness showed positive relationship with e-learning readiness ([Ayub *et al.*, 2017](#); [Kusumaningtyas, 2019](#); [Salloum *et al.*, 2019](#); [Yilmaz and Bayraktar, 2014](#)). The implication of this is that high levels of individual innovativeness predict intentions to accept new technologies, in this case, the willingness to accept e-learning. This position is in tandem with the works of [Rosen \(2005\)](#) who found individual innovativeness to be predicting technology acceptance within the domain of information technology and [Gürkan and Demiralay \(2016\)](#) whose study indicated that individual innovativeness levels of surgeons significantly determined lead users among surgeons with respect to their adoption of new surgical instruments. Personal innovativeness in the domain of information technology is a technology acceptance framework. It was shown that PIIT was statistically significant in predicting user intentions, and that it could be practically significant as well.
- (2) A statistically significant relationship also existed between e-learning self-efficacy scores and the e-learning readiness of the respondents. This confirms findings from other studies. For example, a study by [Nyagorme \(2018\)](#) asserted that self-efficacy critical in determining the degree of involvement in e-learning usage by ODL students, as an empirical study conducted by the author at the University of Cape Coast actually found perceived e-learning self-efficacy as key predictor to e-learning adoption. Similar results were obtained by other researchers who confirm that e-learning self-efficacy predicts students' tendency to be more determined to succeed in online courses ([Ayub *et al.*, 2017](#); [Zimmerman and Kulikowich, 2016](#)). A study of teachers by [Tweed \(2013\)](#) similarly confirmed significant association between self-efficacy and technology adoption in the classroom. It is an indication that respondents with stronger beliefs in their capabilities to learning in digital

Table 6.

T-test analysis of the e-learning readiness of male and female students of the Yenagoa study centre of NOUN

| Variable | <i>N</i> | \bar{x} | SD | DF | <i>T</i> | <i>p</i> -value (sig.) | Alpha level | Decision |
|----------|----------|-----------|-------|-----|----------|------------------------|-------------|----------|
| Male | 130 | 87.01 | 12.03 | 215 | 6.82 | 0.000 | 0.05 | sig |
| Female | 87 | 76.79 | 8.68 | | | | | |

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- environments and other electronic media have stronger tendencies to sustain learning at the National Open University of Nigeria.
- (3) Contrary to the hypothesis three: that there was not significant joint relationship between individual innovativeness, e-learning self-efficacy and the e-learning readiness of first- and second year students of the Yenagoa Study Centre of NOUN, there is indeed a statistically significant joint relationship between the three variables under investigation. This confirms results of previous research by [Ayub *et al.* \(2017\)](#) whose study also looked at self-efficacy and individual innovativeness. Results were also consistent with a similarly study by [Kusumaningtyas \(2019\)](#) which investigated the effect of computer self-efficacy, individual innovativeness and ICT mediated learning environment.
 - (4) The null hypothesis (H4) states there is no statistically significant difference between the gender of the respondents and their e-learning readiness. Whereas this position has been confirmed by a few studies which found that the gender of the respondents does not seem to display any effect to the e-learning readiness ([Gay, 2018](#); [Hashim and Tasir, 2014](#); [Tweed, 2013](#)), contrary to the null hypothesis, the current study found strong positive relationship between gender and e-learning readiness. These results are equally consistent with findings from several previous studies which found gender differences in the levels of e-learning readiness scores or technology acceptance among students of higher educational institutions ([Adams *et al.*, 2018](#); [Bana *et al.*, 2015](#); [Formoso, 2018](#); [González-Gómez *et al.*, 2012](#); [Nyagorme, 2018](#); [Ramírez-Correa *et al.*, 2015](#); [Walia *et al.*, 2019](#)). However, unlike the studies by [Adams *et al.* \(2018\)](#), [Formoso \(2018\)](#) which found female students to be possessing higher online learning readiness, results from this study showed that male students of the were more e-learning ready than their female colleagues. This is consistent with results from recent studies which indicated that male respondents were more comfortable with learning technologies and therefore were more likely to learn actively with learning management systems ([Arkorful, 2019](#); [Binyamin *et al.*, 2020](#); [Kanwal *et al.*, 2020](#); [Namirembe, 2020](#)).

Conclusion

E-learning as a technology-enhanced approach to education has become a central feature in the successful running of ODL educational mode. Similarly, e-learning readiness enhances the ability of learners in ODL institutions to persevere and complete their studies. Hence, to harness the full potential of electronic learning as an educational strategy to increase broader access to tertiary education in Nigeria, to augment classroom instruction and eventually intensify students' learning outcomes in distance learning institutions like the National Open University of Nigeria, it is imperative that we investigate the factors students perceive as significant in their adoption of ELS, as this helps in predicting the sustainability of e-learning programmes. Consequently, this study was aimed at determining the e-learning readiness of first- and second-year students of the Yenagoa Study Centre of NOUN. It specifically sought to explore the relationship between individual innovative and e-learning readiness, between self-efficacy and e-learning readiness, investigate if a joint association existed between individual innovativeness, e-learning self-efficacy and e-learning readiness, as well as to ascertain if gender differences and class differences had impact in the e-learning readiness of the respondents.

The results of the statistical analysis presented in this dissertation were built on five research questions and five corresponding null hypotheses formulated and presented in Chapters 1 and 4. The first two research questions were analysed using Pearson Product

Moment Correlation, the third was analysed with multiple regression while the remaining two research questions were analysed by adopting independent sample *t*-tests.

The total number of respondents in the study was 217, out of which 100 were first-year and 117 second-year students of the Yenagoa Study Centre of the National Open University of Nigeria. At the 95% confidence level, statistical tests confirm significant relationships between individual innovativeness and e-learning readiness. Same was observed between e-learning self-efficacy and e-learning readiness. It implies that individual innovativeness and e-learning self-efficacy were confirmed to be antecedents of e-learning readiness. Significant differences were also observed in the e-learning readiness of male and female respondents.

The conclusion of study is that, individual innovativeness and e-learning self-efficacy have a crucial role to play in determining an individual's willingness to use e-learning resources and to actively participate in virtual learning environment or even in ODL education such as the National Open University of Nigeria. Equally, the gender of respondents was discovered to have played a key role in their e-learning readiness as male students had higher e-learning readiness scores. Finally, the findings in this study largely support the extant literature.

Practical implications

The implications for this study are that, people who are innately innovative will willingly accept technology and by extension, learning in technology rich environments like that found in the National Open University whose mode of study is blended learning inherently found in ODL institution. Therefore, this study is significant as it will provide relevant information to the management and administrators of the National Open University of Nigeria, policymakers and regulatory institutions for the development, deployment and implementation of e-learning strategies. Findings and recommendations to be presented to NOUN will also benefit e-learning initiatives undertaken by similar institutions that adopt the ODL mode of education in Nigeria and other developing countries.

Limitation and future studies

Like every other study of this nature, this one also suffers some limitations. First, NOUN is a very large university with over half a million students spread across almost 78 study centres. This means that observation from just one study centre amounts to a very small sample size. This according to Schweighofer *et al.* (2019) jeopardises the generalisability and validity of study results. The authors also maintain that empirical data generated from surveys that usually rely participants' abilities to read and select responses without further interpretation by the researchers suffer from cognitive biases like social desirability. To address the above limitations, detailed studies involving all studies centres of NOUN be undertaken and other qualitative and or mixed research methodologies be adopted in the future.

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