READINESS FOR MOOCs: LEARNERS' INEQUITY IN NIGERIA

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ABSTRACT

This research investigated readiness for Massive Open Online Courses (MOOCs) in Nigeria. MOOCs comprises cMOOCs and xMOOCs; but it was very quickly found that there is no platform based in Nigeria for the former, so the latter that is in the country is empirically examined in this work in great detail. Learners' readiness for xMOOCs, a variant of MOOCs, mode of teaching-leaning interaction by four categories of university students in Nigeria (Conventional, National Open University of Nigerian, Open Distance learners, and Postgraduate learners) was investigated for possible inequity; using comparative ex post facto research design. Disproportional stratified random sampling was employed to draw a sample of 1200 students for the study. Data were collected with a highly valid (0.721 to 0.891) and reliable (0.832 to 0.880) instrument, dubbed xMOOCs Readiness Indicators. Results demonstrated overwhelming preponderance of Postgraduates' incomparable superiority over other students across all the eight factors of readiness for xMOOCs (study skills, motivation, self-direction, computer skills, Internet skills, communication skills, self-efficacy, and ICT facilities ownership). There is inequity in Nigeria in terms of university students' readiness for xMOOCs. While xMOOCs can and should successfully be used for postgraduate programs in Nigeria as the learners are suitably ready for it; the three categories of undergraduate learners' readiness for xMOOCs demand radical improvement before this swiftly revolutionary educational approach can be adopted optimally fruitfully in the country.

KEYWORDS: MOOCs; xMOOCs; Readiness for xMOOCs; Factor of readiness; Postgraduate learners; Undergraduate learners; Inequity in Nigeria; NOUN; Open Distance learners; Study skills; Computer skills; Internet skills; Motivation.

INTRODUCTION

Never in the history of man, has the world become one global village than now that through information and communication technology (ICT), knowledge is commonly shared. Demand for the kind of education that adopts technology in swift spread of knowledge freely via e-learning and Open Educational Resources (OERs), self-paced, customized, and lifelong learning is much more now than ever before (Nafukho & Irby, 2015). The mode of education that tends to best meet this great demand is Massive Open Online Courses (MOOCs) (Mesquita & Peres, 2015; Ololube, Kpolovie & Makewa, 2015). MOOCs could be viewed both as an interesting evolution for development and a fundamental revolution for transformation of education to ensure radical improvement and dramatic enhancement of the existing conventional teaching-learning interaction into the very best that the human mind could imagine.

Eight indispensable or core factors and eight uncertain factors characterize Massive Open Online Courses (Hvam, 2015). While the first eight of sixteen factors listed herein are the core characteristics of MOOCs, the remaining eight factors are the irresolute, weak and indecisive characteristics of MOOCs. The sixteen characteristics are:

1. Completely online (done 100% online)
2. Totally free for everyone regardless of a person's present qualifications
3. Fundamentally based on Connectivism theory (Siemes, 2005) that learning is best done in self-administered social networks system
4. Delivered totally free of tuition fees
5. Relatively short in duration
6. Does not rely on central control for unilateral quality assurance
7. Anchored on self-serving principle
8. Entail mass education (an individual learner to several teaching)
9. Might be degree-awarding
10. May either be taken at any time or are time bound
11. May require interaction of learners through social media or not
12. May require asynchronous discussion forums
13. May involve handing-in of assignments
14. May depend on recorded video seminars/presentations or practical webinars delivered by professionals (teachers)
15. May be based on peer-to-peer assessments or self-learning/self-assessments

16. May be based on structured progression towards a predetermined learning outcomes.

While MOOCs that are absolutely characterized with the first to the eighth of the sixteen characteristics, are referred to purely as cMOOCs with the prefix 'c' denoting Connectivism because learning in this context is "distributed across a network of connections" consisting of "the ability to construct and traverse those networks" rather than what is being "transmitted as though it were some type of communication" (Downes, 2011). This sort of MOOCs, cMOOCs, is what the current researchers originally set out to investigate. Unfortunately, however, all the available literatures reviewed revealed that there is no single Massive Open Online Course (MOOC) that has been developed by any university in Nigeria or any group of Nigerians. In other parts of the globe, thousands of courses have been designed and offered by hundreds of universities in line with the core characteristics of MOOCs (MOOCs Directory, 2015). Only in 2016 alone, over 625 of such courses have been rolled out according to MOOC Course Report (2016). This unfortunate discovery made execution of this research in its original purpose impossible.

Consequently, the researchers had to compulsorily turn to investigate the type of MOOCs that are characterized mainly with the ninth to the sixteenth of the earlier outlined 16 characteristics that tend to blend or combine MOOCs loosely with key aspects of traditional teaching-learning experiences. This sort of MOOCs are more like mere extension of the conventional tertiary education system to incorporate aspects, particularly the weaker characteristics of MOOCs and therefore fall under what is commonly termed xMOOCs. The prefix 'x' denotes extension of the traditional education system to incorporate uncertain aspects or characteristics of MOOCs (Downes, 2013). The xMOOCs in Nigerian tertiary institutions are delivered in the form of Open Distance electronic-Learning (ODe-L) that is blended with face-to-face learning.

The xMOOCs in practice in Nigeria falls short of some of the core characteristics of MOOCs as the ODe-L or blended learning in Nigeria is not completely online (Ololube, Umunadi, & Kpolovie, 2014); not based on Connectivism principle; not totally free for everybody who wishes to learn; charge tuition fees; run for a long time (usually not less than the length of time that a similar program is done traditionally); is controlled by the National Universities Council or other similar regulatory bodies; are limited by predetermined progressive structure towards a limited defined learning outcome; and the

operability does not depend solely on mass education principles. The unsure or uncertain six characteristics of MOOCs are rather made certainly (one-sided) in the brand of xMOOCs operated in Nigeria. For instance, they are certainly degree-awarding; time bound (have specified starting and ending time); learners have asynchronous discussions with lecturers face-to-face; involve handing-in of assignments; and 'disaggregate students' (Starr-Glass, 2015) rather than guarantee students-to-students interaction via social media or network. In fact, the xMOOCs in Nigeria can rather be described correctly as Massive 'Closed Online' Courses (MCOCs), to borrow the term coined by Gaebel (2013), as the country chronically suffers epileptic power supply, and intermittent lack of internet cum intranet connectivity (Alamieyeseigha, & Kpolovie, 2013; Kpolovie, 2012; 2016). On this note, the xMOOCs pedagogies that are operational in Nigeria are subsequently used interchangeably with Open and Distance Learning (ODL) in this work.

The primary reason for adoption and praxis of xMOOCs, in spite of its challenges (Fournier, Kop, & Durand, 2014), tends to be granting of tertiary education access to additional persons than the conventional tertiary educational system can offer. The problem of access to higher education in third world countries, particularly Nigeria, is becoming more and more intractable (OECD, 2015; Kpolovie, 2013a; 2013b; 2013c). It is on record that in 2013 over 1.7 million eligible candidates requested for admission into the 129 universities in Nigeria but of this number only less than 500,000 (35 percent) candidates could be taken by all the universities put together (Asomba, 2014; Divine, 2014; Kpolovie, 2014). This phenomenon of picking very few out of many over the years has created momentous problem of access to higher education in Nigeria. In recent times, the Nigerian government has tried to solve this problem of access to higher education by giving approvals to private individuals and organizations to establish private universities and other higher educational institutions; but this has not still solved the problem. Over 50 private universities have been established so far to supplement the existing government owned universities but the problem is still there, getting significantly worse annually as the population of tertiary education aged youths dramatically increase (Kpolovie, 2012; 2014).

The Nigerian government not relenting in its effort to increase access to higher education established the National Open University of Nigeria (NOUN) to offer degree programs by Open and Distance Learning (Kpolovie & Obilor, 2013a; 2014). In the same vein, the government is giving approvals to existing institutions that are willing and have the required capacity to offer degree programs by Open and Distance learning. As at present, the National Open University of Nigeria (NOUN) is the only unimode university for learning via xMOOCs in the country. Also, six conventional universities have received approval to run Open and Distance learning programs as dual mode universities.

Open and Distance learning provides access to education for people who ordinarily could not have had access to conventional schools (Brown, Costello, Donlon, & Giolla-Mhichil (2016). Conventional schools including universities have very limited facilities and as a result can not admit beyond a given number of students. They can only admit the number of students they can cater for in terms of facilities and the teachers to teach the students. These institutions have a limited capacity both in material and human resources to handle a given number of students. The carrying capacity of an institution is determined sometimes by the number of facilities it has and the staff-student ratio. This capacity is too small and inadequate compared to the number of students seeking access to higher education (Kpolovie, 2014). The traditional approach to education of using conventional schools to offer educational programs is no longer adequate for our teaming population (Kpolovie, 2012). The solution is to use the xMOOCs process to reach even the unreached (Kpolovie, Iderima & Ololube, 2014).

The xMOOCs approach provides a viable alternative to the conventional approach to education (Kpolovie & Iderima, 2013). It uses technology to mediate the communication and interactions between staff and students and amongst students (Ololube, Umunadi, & Kpolovie, 2014; Ololube, Amaele, Kpolovie, & Egbezor, 2012). Malaysian Qualifications Agency (2011) defines xMOOCs as "the provision of flexible educational opportunities in terms of access and multiple modes of knowledge acquisition." While they used flexible to mean the availability of choices for educational endeavors anywhere, anytime and anyhow; access denotes opportunity made available to all, freeing people from the constraints of time and place. Multiple modes referred to the use of various delivery systems and learning resources. The xMOOCs process provides for flexibility in terms of when, where and how to study (Ololube, Kpolovie, Amanchukwu, & Briggs, 2013). The learner chooses when he wants to study, where he would like to study and how he or she would prefer to study. The xMOOCs actually provides opportunity to those who have problem of time due to either their work or family engagement to have access to

quality education (Ololube, Amaele, Kpolovie, Onyekwere & Elechi, 2012; Ololube, Emejuru, Kpolovie, Amaele, & Uzoka, 2012). Distance is no longer a limitation since xMOOCs has completely removed the issue of barrier posed by distance (Gaebel, 2013). The learner does not need to travel to a specific location called school to proceed with his or her education. The school has been brought to the learner to meet him or her at the learner's place of comfort and at the learner's time of convenience (Alamieyeseigha, & Kpolovie, 2013). The school is the one going to the learner not the learner going to school as the saying goes, 'if Muhammad does not go to the mountain, the mountain goes to Muhammad'. The school is brought to the learner by using multiple modes of delivery systems and resource materials (Lemoine, Yates & Richardson, 2015). The learner is provided with specially designed instructional materials and multimedia resources (Kpolovie & Obolor, 2015).

UNISA (2008) defines xMOOCs as a multi-dimensional concept aimed at bridging the time, geographical, economic, social, educational and communicational distance between student and institution, student and academics, student and courseware and student and peers. The xMOOCs focuses on removing barriers to access learning, flexibility of learning provision, student-centredness, supporting students and constructing learning programs with the expectation that students can succeed. The xMOOCs can be used to eliminate all the barriers to education. It is a tool that can be used effectively to achieve the popular slogan of education for all (Brown, Costello, Donlon, & Giolla-Mhichil (2016).

UNESCO (2002) states that xMOOCs reflects both the fact that all or most of the teaching is conducted by someone removed in time and space from the learner, and that the mission aims to include greater dimensions of openness and flexibility, whether in terms of access, curriculum or other elements of structure. The term Open and Distance learning that xMOOCs in Nigeria adopts can be seen as having two dimensions – Distance learning and Open learning. Distance learning could refer to the separation of the learner from the teacher in time and space. While Open learning refer to the flexibility in terms of access, curriculum and delivery systems.

UNICEF (2009) stated that xMOOCs is used frequently as an umbrella term that covers educational approaches that reach learners in places that are convenient or accessible to them, provide learning resources for them, or enable them to qualify without attending school or college in person, or open up new opportunities for keeping up to date no matter where or when they want to study. The xMOOCs educational approach can be seen as a range of educational approaches that takes education to the people at places and time convenient to them by delivering professionally developed learning resources for them to study (Brown, Costello, Donlon, & Giolla-Mhichil (2016).

To succeed in the alternative educational approach referred to as xMOOCs, all stakeholders in the education system, particularly the learners, need to show some level of readiness to engage in the process. The learner specifically, which is the focus of this study, will need to show a reasonable level of readiness to be able to and actually benefit maximally or at least optimally from the xMOOCs process. The learner needs to have the determination to succeed and discipline in order to take full advantage of this educational approach. The learner needs to be fully prepared to be able to succeed in xMOOCs without hindrance. In essence, the learner has a role to play to be successful in his learning. The obligatory preparation on the part of the learner for optimal success of xMOOCs chiefly include developing good study skills (Brooks, & Gibson, 2012; Kleinman, Wolf, & Frye, 2013); high positive motivation to learn (Kpolovie, Joe, & Okoto, 2014); and appropriate self-direction (Mackness, Mak, & Williams, 2010). Other skills that are of critical need are good computer skills; high Internet skills; and possession of the requisite ICT facilities; and premium self-efficacy (Seehorn, 2011; The Royal Society, 2012; Wilson, & Guzdial, 2012). Demonstration of excellent communication skills is equally necessary (Vivian, Falkner, & Falkner, 2014).

Readiness for learning is a holistic way of looking at the learners' preparedness to learn. Readiness embraces the interrelationships between skills and behaviors across domains of development and learning (UNICEF, 2012). These can be seen as minimum standards of what the learner should know and be able to do in order to be successful in his learning. Readiness for xMOOCs refers to the skills, abilities and attitudes that learners require to succeed in the learning experiences. It implies being prepared to succeed in xMOOCs, knowing that it is completely different from the traditional classroom system (Wilson, & Guzdial, 2010).

The readiness of learners for success in xMOOCs involves several factors. In this study we will look at the following factors: study skills, self-direction, self-efficacy, motivation, communication skills, computer skills, Internet skills and access to ICT facilities. This study focuses on the factors listed here to assess the readiness of learners for xMOOCs. These eight factors (Starr-Glass, 2015; Saade,

& Kira, 2009; Brooks, & Gibson, 2012; Onwe, 2013; Ololube, Kpolovie, & Makewa, 2015) will provide acceptable data to assess the level of readiness of the xMOOCs learners.

Self-direction in learning means that the learner takes the responsibility for his or her own learning. A learner taking responsibility for his or her own learning includes everything from identifying the learning need, to locating the appropriate resources and to self-evaluating one's progress (Mackness, Mak, & Williams, 2010). Self-directed learners show initiative, independence and persistence in learning. According to Kpolovie (2016), persistence is the "indomitable willpower, unshakable determination, irrepressible commitment, absolute dedication, relentless pursuit, continuous and ever-increasing confidence and resolute action in the direction of one's goal until it is exceptionally achieved." In providing insight into the key to success in xMOOCs, Western University of Health Sciences (n.d) stated that "in a Distance education programs, the capacity for self-directed learning is crucial."

Self-efficacy is a person's belief in his or her ability to execute a behavior. It is the individual's belief that he or she can successfully complete a particular task. It is a student's evaluation of his or her own ability to perform a given task (Seehorn, 2011). Saade and Kira (2009) stated that self-efficacy is a person's belief in his/her capability to perform specific tasks and it consists of three dimensions: Magnitude, Strength and Generality.

Distance learning transfers the encumbrance of motivation from the structure of the classroom onto the shoulder of the learner. The xMOOCs requires learners to be self-motivated because they are affected by other responsibilities, have no one to provide encouragement and guidance even in the face distractions and challenges (Kpolovie, Joe, & Okoto, 2014; Mackness, Mak, & Williams, 2010).

Bakkabulindi, Mulumba, Aluonzi, Oketch and Taibu (2010) did a study in Kampala with 43 xMOOCs learning Doctoral students and concluded that the students deserve to have equal encouragement, exposure and training with respect to the use of ICT, notwithstanding their gender and income differentials. Seehorn (2011), The Royal Society (2012), and Wilson and Guzdial (2012) emphasized the crucial role that mastery knowledge of ICT application plays in optimal learning in xMOOCs.

Hung, Chou, Chen and Own (2010) in their study in Taiwan on Learner readiness for xMOOCs found that gender made no statistical differences in the five dimensions of readiness that they measured. They also found that higher grade students showed greater readiness than lower grade students. They used a multidimensional instrument for the study. The instrument, which they called "Online Learning Readiness Scale (OLRS)", was made up of five dimensions: self-directed learning, motivation for learning, computer/ Internet self-efficacy, learner control, and online communication self-efficacy. They used a total of 1051 students for the study.

Kenny, Park, Neste-Kenny and Burton (2012) studied the readiness of Nursing educators and students for Mobile learning in Western Canadian College and found that both the educators and students have high self-efficacy with a score of 75 in a scale of 100. The high score obtained in the study indicates that both faculty and students were highly confident in their use of mobile technologies and prepared to engage in mobile learning. The study used a cross-sectional survey design involving 121 students and faculty.

Wang, Peng, Huang, Hou and Wang (2008) used adapted self-assessment questionnaires to investigate the relationships between some psychological factors like learning motivation, learning strategies, self-efficacy and attribution and the learning scores of 135 distance learners. The results show that there is a relationship between the psychological factors and learning scores of distance learners. Also, the results of the study showed that the subjects had a motivation mean score of 2.9 on a scale of 4 points and a self-efficacy mean score of 3.85 on a scale of 5 points while the learning strategy mean score was 3.58 on a 5-point scale.

Adkins and Bryant (2011) examined the relationship between student readiness and satisfaction in online learning with 1560 students from 5 institutions. They used the SmarterMeasure™ Learning Readiness Indicator to measure students' readiness. Satisfaction was measured using the Noel-Levitz Priorities Survey for Online Learners™. The SmarterMeasure™ Learning Readiness Indicator has 124 items. While the Noel-Levitz Priorities Survey for Online Learners™ has 26 standard items plus room for up to ten campus-defined items. Their findings showed that the mean score for technical knowledge was 43.93 on a scale of 100. The study found that there was a significant relationship between online student readiness and online student satisfaction.

The reviewed literature on readiness for xMOOCs learning showed that researchers have not found a common instrument to measure the readiness of learners. Most of the studies reviewed used few factors or dimensions of readiness in their investigations. Even

then, virtually all the works reviewed were done in climes other than Nigeria. No specific work in the field under investigation was carried out in Nigeria. Therefore a great knowledge gap does exist in the area of interest, students' readiness for xMOOCs in Nigeria. Worse still, it has since been observed that in Nigeria, no individual or group of individuals or university has developed and floated Massive Open Online Courses (MOOCs) and that forced the current researchers to change direction from studying MOOCs (specifically, cMOOCs) to xMOOCs. In order to arrive at much more useful result, the current researchers have chosen to investigate as much as eight factors or dimensions of students' readiness for xMOOCs in Nigeria with the hope of arriving at a better coverage of the concept of readiness for xMOOCs.

Readiness in any learning situation, whether traditional or xMOOCs, is needed for effective learning. The learner has to be ready to learn for learning to take place effectively. xMOOCs learning takes place with the learner and the teacher separated by time, distance and space. Technology is used to bridge the gap separating the learner from the teacher by allowing the learner and the teacher to interact using the technology. In recent times, there is the infiltration of modern technology in xMOOCs. This poses some challenges to both the learner to possess certain skills to participate effectively in and benefit maximally from the learning process. Without the due preparation and readiness skills, a learner may not be able to interact very effectively and actively with the content, tutors and other learners that learning by xMOOCs demands for optimal performance and prevent incidents of high rate of drop out. For instance, even in the advanced world, only 8,843 (4.21%) out of 210,000 students who enrolled for MOOCs in the University of London International Programs, completed their programs (Grainger, 2013). In Nigeria, a t-test comparison of the actual and expected outcomes of the National Open University of Nigeria, which is the only unimode xMOOCs in the country, was statistically significant at 0.01 alpha with a mean difference of 82100.20; standard deviation of 19473.60 and a t ratio of 4.216 to show a preponderance of empirical evidence that the actual outcome of the program is infinitesimally small when compared with the expected outcomes (Kpolovie & Obilor, 2015).

Learners come into the learning situation with different characteristics including their level of readiness which may have impact on learning. Lack of readiness on the part of the learner could have negative impact on the teaching and learning process. For xMOOCs learning, the lack of readiness of the learners may result in poor products

that will make people look at the program as low quality. Furthermore, if level of readiness of the xMOOCs learners is not known, it may not be possible to design most effective programs that will produce good results for them. There is therefore a great need to assess the level of readiness of xMOOCs learners in order to know their level of preparedness for the program. Starting an xMOOCs learning program without knowing the level of readiness of the learners is like building a house without foundation. Such programs are not likely to succeed.

RESEARCH QUESTIONS

There are four categories of university students in Nigeria. They are the Conventional students/learners; the National Open University of Nigeria (NOUN) students/learners; the Open Distance students/learners; and the Postgraduate students/learners. The first category (Conventional learners) are undergraduates who are pursuing their first degree programs in the traditional manner in conventional universities. The second category (NOUN learners) are undergraduates who pursuing their first degree programs in the National Open University of Nigeria that was established exclusively for delivery of xMOOCs. The Open Distance learners are undergraduates who are enrolled in xMOOCs programs that are delivered by traditional universities. The last category of university students refers to all Postgraduate students who are pursuing either Masters or PhD degree programs traditionally in Nigerian universities. In this investigation, eight research questions and corresponding eight null hypotheses were postulated to compare the four categories of learners for possible inequity with regards to each of the eight factors of readiness for xMOOCs.

Learners in the four categories of university education in Nigeria have what magnitude of:

1. Study skills for xMOOCs?
2. Motivation skills for xMOOCs?
3. Self-direction for xMOOCs?
4. Computer skills for xMOOCs?
5. Internet skills for xMOOCs?
6. Information and Communication Technology facilities readiness for xMOOCs?
7. Self-efficacy for xMOOCs?
8. Communication skills for xMOOCs?

HYPOTHESES

The investigation was guided by eight null hypotheses (Kpolovie, 2011a) postulated as follows.

There is no significant difference between university students in the four categories of tertiary institutions (Conventional, NOUN, Open Distance, and Postgradute) in Nigeria with respect to their:

1. Study skills readiness for xMOOCs
2. Motivation skills readiness for xMOOCs
3. Self-direction readiness for xMOOCs
4. Computer skills readiness for xMOOCs
5. Internet skills readiness xMOOCs
6. Information and Communications Technologies facilities readiness for xMOOCs
7. Self-efficacy skills readiness for xMOOCs
8. Communication skills readiness for xMOOCs

METHODOLOGY

Ex post facto research method was used in this study because it best allows for retrospective identification of probable cause-and-effect relations between the variables (types of university students and readiness for xMOOCs) under study through observation of existing conditions and inquisitively searching back historically for the plausible causal factors. Ex post facto research is a methodological approach for eliciting probable antecedents of events that have occurred already and which cannot be subjected to direct rigorous manipulation and control by the researcher (Kpolovie, 2010; 2016). The design takes groups that are already different naturally (conventional students, National Open University of Nigeria students, Open Distance students and Postgraduate students in this case), and retrospectively obtains and analyses data on some variables in the groups to determine whether they are causal factors for the difference in the groups. In some other cases, ex post facto study is used for retrospective examination or exploration of the effects of an event that occurred naturally on a subsequent outcome for plausible establishment of a causal link between them. In situations of this type, the independent variables have already occurred and the investigation begins with observation and analysis of a dependent variable in retrospect for its possible relationship to, and probable effects on the dependent variable. Group difference variables often investigated with ex post facto research are either categorical variables that cannot be manipulated such as types of students as in this case (Conventional, NOUN, Open Distance, and Postgraduate students). Ex post facto research is frequently conducted as a feasible alternative to seemingly unfeasible experimental research.

This investigation adopted causal-comparative ex post facto design. This research design is for discovery of possible causes of a phenomenon that is under investigation through empirical comparison of a group of subjects who possess the trait, attribute, construct, or characteristic of interest with a similar or comparable group of subjects who do not possess the trait. In this type of study, groups, differentiated in terms of an independent variable (types of university students), are compared on a given dependent variable (readiness for xMOOCs) for retrospective seeming causal link as the researcher only attempts to link some already existing effect or observation to some variable(s) as causative agents. The researchers investigated four existing groups that are very different with respect to the teaching-learning approaches adopted in their programs in order to elicit the factor or factors that are responsible for the difference between the groups. This was done by hypothesizing on the possible causes of the difference in line with currently existing theories of teaching-learning delivery (Malaysian Qualifications Agency, 2011; Mesquita, & Peres, 2015; Lemoine, Yates & Richardson, 2015) in the universities, collected antecedent or retrospective data on the hypothesized causes and subjected the data to suitable statistical analysis to show whether or not a significant difference exists in the postulated causal factor. In this way, the investigation is said to be an *effect-to-cause* kind of causal-comparative design.

Disproportional stratified random sampling was used in this study. Stratified sampling is a probability sampling technique used when the population is composed of a certain number of subgroups that may differ in the characteristics under investigation. Stratified random sampling is applied for obtaining a representative sample from a population that is segregated into several mutually exclusive subpopulations, called strata; and it randomly draws a specified number of subjects from each of the strata. In this way, the researcher is better able to study the differences that might exist between the various strata of the population. Stratification here was done on the basis of the four distinct categories of university students in Nigeria, namely Conventional learners; National Open University of Nigeria (NOUN) learners; Open Distance learners; and Postgraduate learners). The first category (Conventional learners) are undergraduates who are pursuing their degree programs in the traditional manner in conventional universities. The second category (NOUN learners) are undergraduates who are pursuing their programs in the National Open University of Nigeria that was established exclusively to delivery of xMOOCs. The third category, Open Distance learners, refers to undergraduates who are enrolled in xMOOCs programs that are delivered by traditional universities. The last category (Postgraduate learners) consists students who are pursuing either masters or doctor of philosophy degrees in the traditional universities in Nigeria.

Disproportional stratified random sampling is when equal numbers of subjects are taken from the various

strata in the total population to constitute the sample. Disproportional stratified random sampling is adopted whenever the research is primarily concerned with differences among the various strata (Kpolovie, 2011). Disproportional stratified random sampling is most appropriate for this study. Four samples of equal size (300 each) across the six geopolitical regions in Nigeria were drawn randomly, with the aid of Table of Random Numbers (Kpolovie, 2011), from each of the four strata or subpopulations for the study without consideration of the difference in sizes of the subpopulations. Thus, the total sample size drawn for this investigation is 1200 from a total population of 2,243,736 university students (1,794,989 undergraduates and 448,747 postgraduates) in Nigeria (NEEDS Assessment of Nigerian Universities, 2013; FRN National Population Commission, 2014; Federal Ministry of Education, 2014). The disproportional stratified randomsampling adopted for the study guaranteed best representation of the different subpopulations

(Conventional learners; NOUN learners; Open Distance learners; & Postgraduate learners) in the sample. It maximized the difference among strata means and minimized the within-stratum variances with respect to the major variables under investigation (readiness for xMOOCs). It provided adequate data for analyzing the various subpopulations; in addition to increasing the sample's economic efficiency by producing a truly representative sample with desired precision and accuracy at a lower cost in terms of time, money and effort.

Instrument for data collection of this investigation is a questionnaire of 80 items and eight subtests (10 items in each subtest). The instrument, called xMOOCs Readiness Indicators, was developed by the researchers in accordance with Classical Test Theory (Kpolovie, 2016; 2014). Cronbach coefficient alpha reliability and construct validity via subtest-total correlation evidence of each of the subtests are as tabulated.

Table 1: Reliability and Validity of each xMOOCs Readiness Indicators Subtest

Subtest	Cronbach coefficient alpha reliability (α)	Subtest-total correlation evidence of construct validity (r)
Study skills readiness for xMOOCs	0.862	0.721
Motivation skill readiness for xMOOCs	0.880	0.755
Self-direction skills readiness for xMOOCs	0.845	0.830
Computer skills readiness for xMOOCs	0.844	0.875
Internet skills readiness for xMOOCs	0.836	0.85
ICT facilities readiness for xMOOCs	0.843	0.843
Self-efficacy skills readiness for xMOOCs	0.870	0.89 1
Communication skills readiness for	0.832	0.722

Each item in the xMOOCs Readiness Indicators has four options – Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument is of the modified four-point Likert type variety which range from the highest to lowest and was scored 4 points, 3 points, 2 point and 1 point respectively for SA, A, D, and SD. The instrument was administered by the researchers and trained research assistants to the respondents to elicit the required information from them. In order to ensure efficiency, maximum return and high degree of objectivity, the respondents were instructed to completely answer all items in the instrument on the spot, after which the researchers or research assistants immediately collected the completed instrument from them.

While each research question was answered with the use of descriptive statistics (mean and standard deviation) and mean plot; every null hypothesis was tested with Analysis of Variance (ANOVA) and Post Hoc Multiple Comparisons for tenability at 0.05 level of significance. The statistical analysis was executed using IBM SPSS Version 22.

RESULTS

The means and standard deviations of each of the eight factors of readiness for xMOOCs (study skills, motivation skills, self-direction skills, computer skills, Internet skills, ownership of ICT facilities, self-efficacy skills, and communication skills) across the four strata of respondents (Conventional students = 1; NOUN students = 2; Open Distance students = 3; and Postgraduate students = 4) serve as sufficient answers to every of the research questions. The answers completely describe the constructs under investigation both in terms of measures of central tendency and of dispersion statistics of the sampled respondents. The number of cases, standard error, lower and upper bounds at 95% certainty, maximum and minimum data for each stratum and of the total students are also provided in the descriptive statistics presented in *Table 2*. For instance, the Research Question 1 (RQ1) that deals with the attribute, study skills readiness for xMOOCs, has 300 respondents from each of the four strata that make up the sample. The mean and

standard deviation for category 1 are 31.5967 and 4.22059; category 2 are 26.2567 and 8.39996; stratum 3 are 25.1833 and 8.99404; and group 4 are 35.7800 and 2.49111, respectively. The total number of respondents is 1200 which has a mean of 29.7042 and standard deviation of 7.87263. The Conventional students have 0.24368 standard error, 31.1171 lower bound, 32.0762 upper bound, 19.00 minimum and 40.00 maximum score. The second group (NOUN) has 0.48497 standard error, 25.3023 lower bound, 27.2111 upper bound, 10.00 minimum and 40.00 maximum

score. The Open Distance learners have 0.51927 standard error, 24.1614 lower bound, 26.2052 upper bound, 10.00 minimum and 40.oo maximum scores. The standard error for Postgraduates is 0.14382, lower bound is 35.4970, upper bound is 36.0630, minimum is 23.00 with a maximum score of 40.00. The total has 0.22726 standard error, 29.2583 lower bound, 30.1500 upper bound, 10.00 minimum and 40.00 maximum score. Similar descriptive explanations go for each of the remaining seven xMOOCs factors.

Table 2: Answers to the eight Research Questions (RQ)

Descriptives		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
STUDSKIL RQ 1	1.00	300	31.5967	4.22059	.24368	31.1171	32.0762	19.00	40.00
	2.00	300	26.2567	8.39996	.48497	25.3023	27.2111	10.00	40.00
	3.00	300	25.1833	8.99404	.51927	24.1614	26.2052	10.00	40.00
	4.00	300	35.7800	2.49111	.14382	35.4970	36.0630	23.00	40.00
	Total	1200	29.7042	7.87263	.22726	29.2583	30.1500	10.00	40.00
MOTIVAT RQ 2	1.00	300	28.1333	5.95487	.34380	27.4568	28.8099	10.00	40.00
	2.00	300	28.1333	5.95487	.34380	27.4568	28.8099	10.00	40.00
	3.00	300	29.1800	7.07681	.40858	28.3759	29.9841	10.00	40.00
	4.00	300	35.8067	2.48257	.14333	35.5246	36.0887	23.00	40.00
	Total	1200	30.3133	6.47779	.18700	29.9465	30.6802	10.00	40.00
SELFDIR RQ 3	1.00	300	26.3133	8.40659	.48535	25.3582	27.2685	10.00	40.00
	2.00	300	25.1033	8.95955	.51728	24.0854	26.1213	10.00	40.00
	3.00	300	24.2867	8.47411	.48925	23.3239	25.2495	10.00	40.00
	4.00	300	36.1467	2.63597	.15219	35.8472	36.4462	23.00	39.00
	Total	1200	27.9625	8.95254	.25844	27.4555	28.4695	10.00	40.00
COMPUSKIL RQ 4	1.00	300	28.1300	5.92538	.34210	27.4568	28.8032	10.00	40.00
	2.00	300	29.1833	7.09536	.40965	28.3772	29.9895	10.00	40.00
	3.00	300	28.6200	6.79973	.39258	27.8474	29.3926	10.00	40.00
	4.00	300	35.3333	2.88501	.16657	35.0055	35.6611	23.00	39.00
	Total	1200	30.3167	6.59173	.19029	29.9433	30.6900	10.00	40.00
INTESKIL RQ 5	1.00	300	24.1900	8.42201	.48625	23.2331	25.1469	10.00	40.00
	2.00	300	28.1333	5.95487	.34380	27.4568	28.8099	10.00	40.00
	3.00	300	26.5400	7.13382	.41187	25.7295	27.3505	10.00	40.00
	4.00	300	35.8067	2.42671	.14011	35.5309	36.0824	24.00	40.00
	Total	1200	28.6675	7.72420	.22298	28.2300	29.1050	10.00	40.00
ICTFACIL RQ 6	1.00	300	28.6633	6.81112	.39324	27.8895	29.4372	10.00	40.00
	2.00	300	26.2367	8.38221	.48395	25.2843	27.1890	10.00	40.00
	3.00	300	28.2833	7.74271	.44703	27.4036	29.1630	10.00	40.00
	4.00	300	35.5667	2.79253	.16123	35.2494	35.8839	23.00	40.00
	Total	1200	29.6875	7.63993	.22055	29.2548	30.1202	10.00	40.00
SELFCACY RQ 7	1.00	300	29.1700	7.09381	.40956	28.3640	29.9760	10.00	40.00
	2.00	300	28.7333	6.87555	.39696	27.9521	29.5145	10.00	40.00
	3.00	300	27.6667	7.52136	.43425	26.8121	28.5212	10.00	40.00
	4.00	300	34.9167	3.33569	.19259	34.5377	35.2957	23.00	40.00
	Total	1200	30.1217	7.01352	.20246	29.7244	30.5189	10.00	40.00
COMMUSKI RQ 8	1.00	300	27.1467	6.61344	.38183	26.3953	27.8981	10.00	40.00
	2.00	300	26.8867	6.96915	.40236	26.0948	27.6785	10.00	40.00
	3.00	300	27.5033	7.64142	.44118	26.6351	28.3715	10.00	40.00
	4.00	300	35.6033	2.84599	.16431	35.2800	35.9267	23.00	40.00
	Total	1200	29.2850	7.27779	.21009	28.8728	29.6972	10.00	40.00

Mean Plot that graphically illustrates the relative position of the means of the four categories of university students (symbolized: 1=Conventional; 2=NOUN; 3=Open Distance; and 4=Postgraduate learners) with respect to each of the eight research questions is presented. It must be reiterated that each of the research questions covers one of the eight factors of learners' readiness for xMOOCs.

For instance, the Mean Plot for answering Research Question 1 shows that the study skills readiness of Conventional university students has a high mean of 31.5967; NOUN learners has a low mean of 26.2567; Open Distance learners has a low mean of 25.1833; and Postgraduates has the highest mean of 35.7800. Similar descriptions are applicable to each of the other Mean Plots.
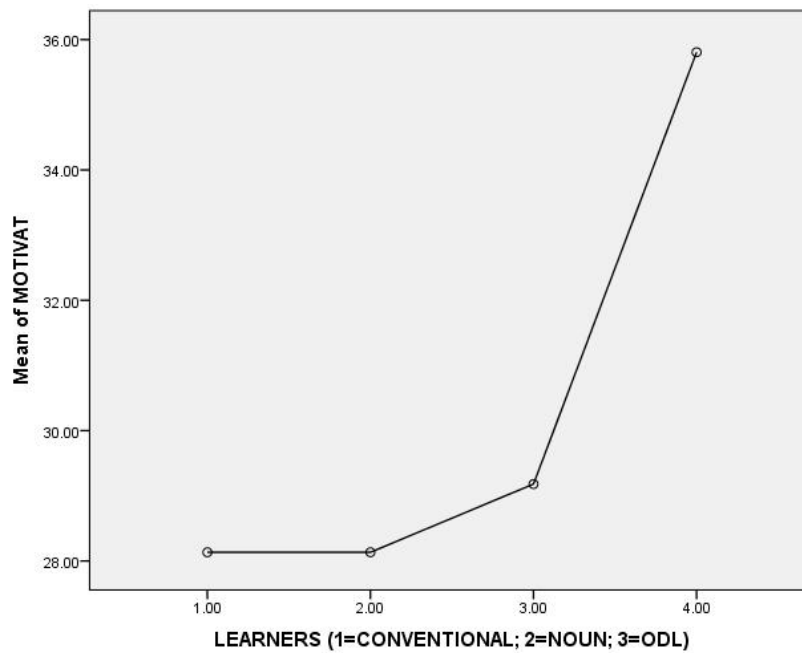
Mean Plot for answering Research Question 1
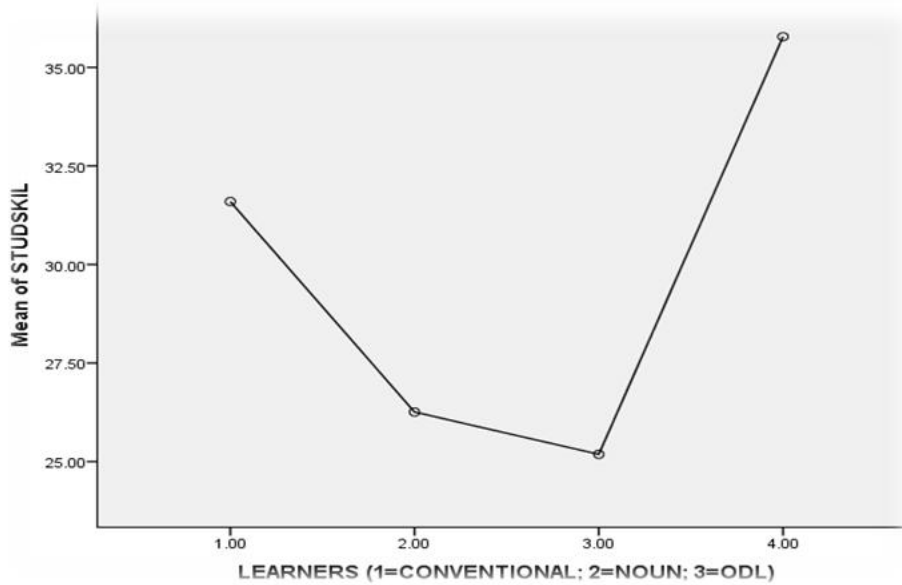
The Mean Plot for answering Research Question 2 has shown that the motivation skills readiness for xMOOCs of Conventional university students and the NOUN students have the lowest mean of 28.1333 each; Open Distance learners has a low mean of 29.1800; and the Postgraduate learners has the highest mean of 35.8067.
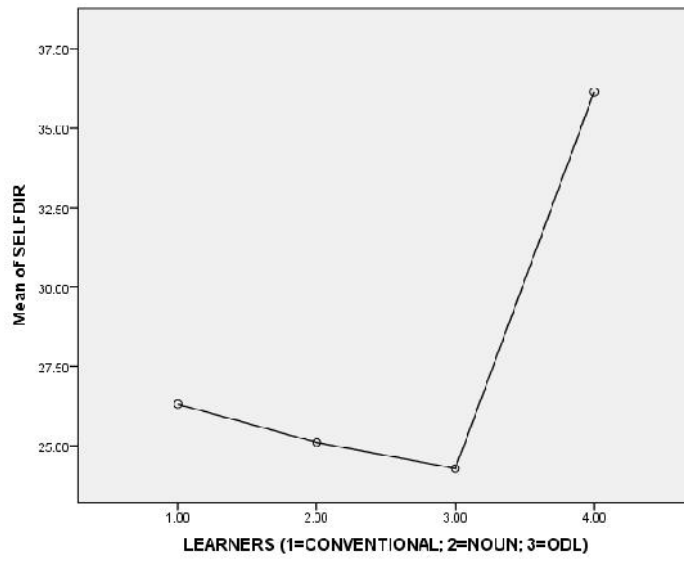
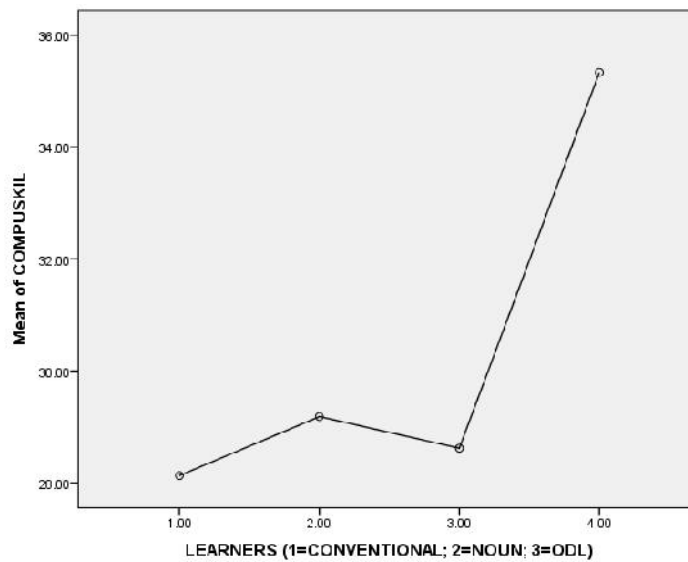**Mean Plot for answering Research Question 2**

Graphical answer to the third Research Question is presented in the third Mean Plot. It can be discerned from the said Mean Plot that the mean of self-direction skills readiness for xMOOCs of the Traditional learners is 26.3133, and that of the NOUN learners is 25.1033. In like manner, Open Distance students have a self-direction skills mean of 24.2867; and the Postgraduate learners have the highest mean of 36.1467 on this variable. Kindly apply this type of description to the remaining Mean Plots.
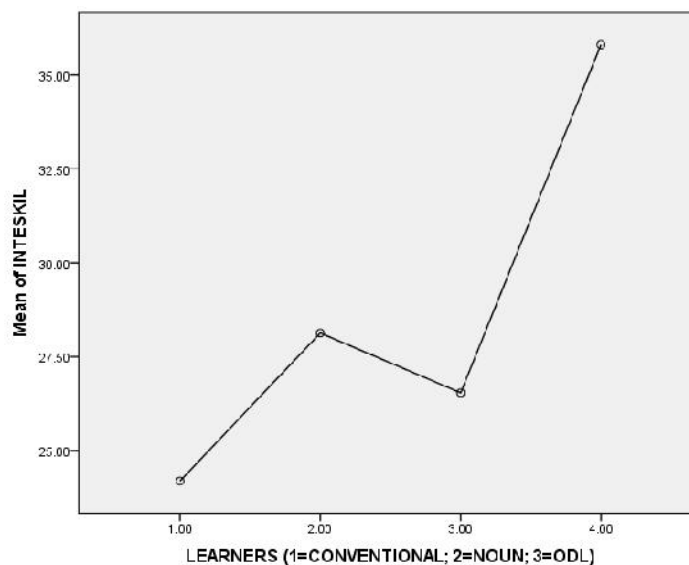
Mean Plot for answering Research Question 3
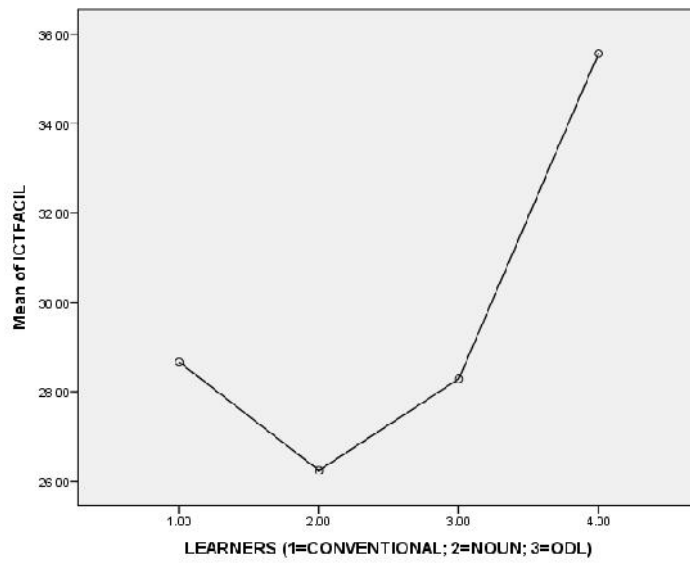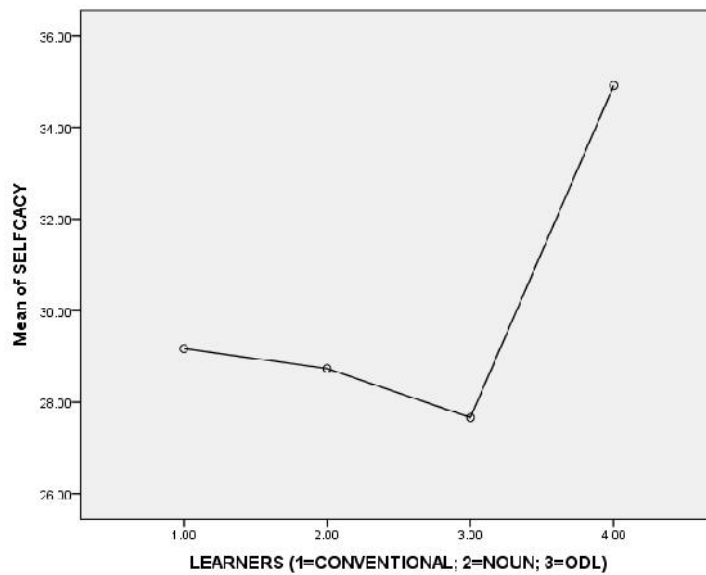

Mean Plot for answering Research Question 4

Mean Plot for answering Research Question 5

Mean Plot for answering Research Question 6

Mean Plot for answering Research Question 7

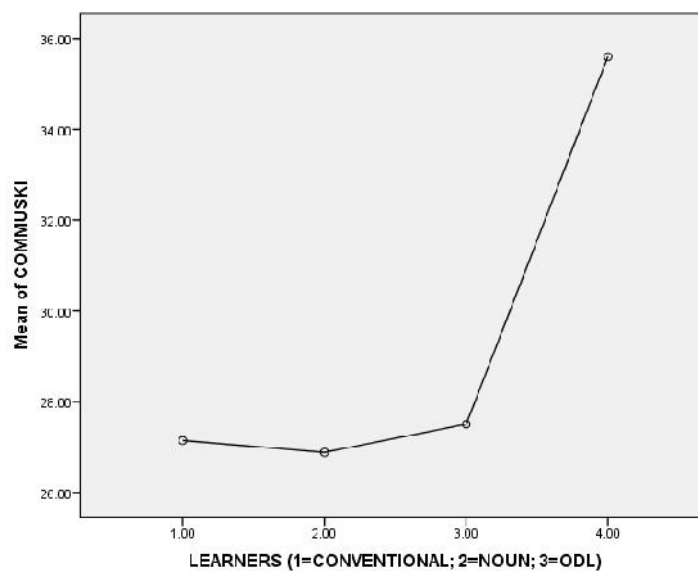## Mean Plot for answering Research Question 8

Table 3 has shown that with respect to Hypothesis 1 on university students' study skills, the between groups has 21846.149 sum of squares, 3 degrees of freedom, 7282.050 mean square, and F ratio of 166.000 with a probability of 0.000 (described hereafter as 0.001). The within groups of the students' study skills has 52465.830 sum of square, 1196 degrees of freedom, and 43.868 mean square. Since the probability of 0.001 is lower than the chosen alpha level of 0.05; the first null hypothesis of no significant difference in university students' study skills readiness for xMOOCs in Nigeria is rejected; F (3, 1196) = 166.000, $p < 0.05$. That is, a significant preponderance difference does exist between Conventional learners, NOUN learners, Open and Distance learners, and Postgraduate learners with respect to their study skills readiness for xMOOCs. The Scheffe Post Hoc Multiple Comparisons presented in *Table 4* on Hypothesis 1 has revealed that while Conventional learners' study skills readiness for xMOOCs is significantly better than the study skills readiness for xMOOCs of NOUN and Open and Distance learners; Postgraduate students have a study skills readiness for xMOOCs that is significantly better than that of Conventional university undergraduates. The NOUN students and Open and Distance learners do not differ significantly in their study skills readiness for xMOOCs.

It can also be discerned from *Table 3* that regarding the second null hypothesis, motivation skills readiness for xMOOCs of university students in Nigeria has between groups sum of squares of 12289.787, degrees of freedom (df) of 3, mean square of 4096.596, F ratio of 128.859, and 0.001 probability. The within groups sum of squares is 38022.400, df is 1196, mean square is 31.791. The second null hypothesis of "no significant difference between university students in the four categories of tertiary institutions (Conventional, NOUN, Open Distance, and Postgraduates) in Nigeria with respect to their motivation skills readiness for xMOOCs" is rejected; F (3, 11996) = 128.859, $p < 0.05$. Multiple comparisons post hoc Scheffe test that was done has shown in *Table 4* that only the Postgraduate learners category (4.00) has motivation skills for xMOOCs that is significantly better than all the other three categories of university students in Nigeria.

For null Hypothesis 3, the learners' self-direction has between groups sum of squares of 27416.076, 3 df, 9138.692 mean square, and 159.139 F. The within groups sum of squares is 68681.237, df is 1196, and mean square is 57.426. The probability (sig) of getting F ratio that is as high as 159.139 is 0.001 which is smaller than the

predetermined alpha of 0.05. Therefore, the third null hypothesis of no significant difference between the four categories of university students in Nigeria in terms of self-direction readiness for xMOOCs is rejected; F (3, 1196) = 159.139, $p < 0.05$. Scheffe Post Hoc Multiple Comparisons in *Table 4* has revealed that Conventional university undergraduates are significantly better than Open and Distance learners on the one hand; and that the Postgraduate students are significantly better than all the other three categories of learners with regards to their self-direction skills readiness for xMOOCs.

The ANOVA on the influence of computer skills readiness for xMOOCs (Ho: 4) has revealed that while between groups sum of squares is 10233.473, df is 3, mean square is 3411.158; within groups sum of squares is 41864.193, df is 1196, and mean square is 35.004. The computed F is 97.452, and the probability is 0.001. Since the probability of 0.001 is smaller than the chosen level of significance, 0.05; the forth null hypothesis is rejected; F (3, 1196) = 97.452, $p < 0.05$. Corroborating multiple comparisons with Scheffe in *Table 4* unveiled that while the first three categories of students (Conventional, NOUN, & Open Distance) do not differ significantly in their computer skills readiness for xMOOCs; the Postgraduate students are significantly better than all the other three categories of university students in Nigeria with regards to their computer skills readiness for xMOOCs.

Results in *Table 3* have equally unveiled that university students' Internet skills readiness for xMOOCs has between groups sum of squares of 22748.189, df of 3, mean square of 7582.730, on the one hand; and on the other, the within groups sum of squares is 48788.143, df is 1196, and mean square is 40.793. The computed F ratio and probability are 185.884 and 0.001, respectively. The probability of 0.001 is lower than the chosen alpha level of 0.05. Therefore, the fifth null hypothesis of no significant difference between the four categories of university students in Nigeria in terms of their Internet skills readiness for xMOOCs is rejected; F (3, 1196) = 185.884, $p < 0.05$. The rejection is in utmost favor of Postgraduate learners (mean = 35.8067) that is significantly better than NOUN (mean = 28.1333) which is in turn significantly better than Open and Distance learners (mean = 26.5400) that is itself significantly better than the Conventional learners in their Internet skills readiness for xMOOCs as shown by the pair-wise Multiple Comparisons Post Hoc, using Scheffe as shown in *Table 4*.

Analysis of Variance on the sixth null hypothesis, presented in *Table 3,* has divulged that ownership of ICT facilities by the four categories of tertiary education

students has between groups sum of squares of 14848.036, df of 3, and mean square of 4949.345. The within groups sum of squares is 55135.777, df is 1196, and mean square is 46.100. The calculated F is 107.361 with a 0.001 probability (sig). Since the computed probability of 0.001 is smaller than the predetermined 0.05 alpha, the sixth null hypothesis of "no significant difference between university students in the four categories of tertiary institutions (Conventional, NOUN, Open Distance, and Postgraduate) in Nigeria with respect to their ownership of Information Communication Technology facilities for xMOOCs" is rejected; F (3, 1196) = 107.361, p < 0.05. It can be discerned from *Table 4* Scheffe Multiple Comparisons Post Hoc analysis that the first category of students is significantly better than the second category; and that there is no significant difference between the first and third strata of students. Furthermore, the third category of students is also significantly better than the NOUN students in their ICT facilities ownership. Of greatest import, the *Table 4* has shown overwhelming preponderance that the Postgraduate students significantly own ICT facilities much more than each of the other three categories of university students in Nigeria.

It can effortlessly be determined from *Table 3* concerning Hypothesis 7, that the students' self-efficacy between groups sum of squares is 9555.657, df is 3, and mean square is 3186.219. The within groups sum of squares is 49422.580, df is 1196, and mean square is 41.323. The computed F ratio and probability are 77.081 and 0.001,

respectively. The null hypothesis of no significant difference between the four strata of students with regards to their self-efficacy readiness for xMOOCs is therefore rejected; F (3, 1196) = 77.081, p <0.05. As can be seen from *Table 4*, the rejection of the omnibus seventh null hypothesis is in favor of Postgraduates that is significantly better than each of the other three groups; and that category one (Conventional learners) is significantly better than the Open Distance learners. Groups two and three do not have statistical preponderance of difference in their self-efficacy skills readiness for xMOOCs in Nigeria.

Lastly, *Table 3* has indicated undoubtedly that the students' communication skills readiness for xMOOCs has between groups sum of squares of 16026.043, df of 3, and mean square of 5342.014; while the within groups sum of squares is 47480.487, df is 1196, and mean square is 39.699. The computed F is 134.562 with a probability of 0.001. The computed probability (0.001) is less than the predetermined alpha of 0.05. Therefore, the eighth omnibus null hypothesis of no significant difference between the four categories of university students in Nigeria is rejected; F (3, 1196) = 134.562, p < 0.05. Further analysis as presented in *Table 4* has demonstrated that while the Postgraduate students are significantly better than each of the other three strata of students in their communication skills readiness for xMOOCs, the first, second and third categories of students do not differ significantly in the attribute (communication skills readiness for xMOOCs) in Nigeria.

Table 3: ANOVA for testing each of the eight Null Hypotheses

ANOVA		Sum of Squares	df	Mean Square	F	Sig.
STUDSKIL Ho:1	Between Groups	21846.149	3	7282.050	166.000	.000
	Within Groups	52465.830	1196	43.868		
	Total	74311.979	1199			
MOTIVAT Ho:2	Between Groups	12289.787	3	4096.596	128.859	.000
	Within Groups	38022.400	1196	31.791		
	Total	50312.187	1199			
SELFDIR Ho:3	Between Groups	27416.076	3	9138.692	159.139	.000
	Within Groups	68681.237	1196	57.426		
	Total	96097.312	1199			
COMPUSKIL Ho:4	Between Groups	10233.473	3	3411.158	97.452	.000
	Within Groups	41864.193	1196	35.004		
	Total	52097.667	1199			
INTESKIL Ho:5	Between Groups	22748.189	3	7582.730	185.884	.000
	Within Groups	48788.143	1196	40.793		
	Total	71536.333	1199			
ICTFACIL Ho:6	Between Groups	14848.036	3	4949.345	107.361	.000
	Within Groups	55135.777	1196	46.100		
	Total	69983.813	1199			
SELFCACY Ho:7	Between Groups	9555.657	3	3185.219	77.081	.000
	Within Groups	49422.580	1196	41.323		
	Total	58978.237	1199			
COMMUSKI Ho:8	Between Groups	16026.043	3	5342.014	134.562	.000
	Within Groups	47480.487	1196	39.699		
	Total	63506.530	1199			

Table 4: Post Hoc Analysis for multiple pare wise comparisons with Scheffe

						95% Confidence Interval	
Dependent Variable	(I) LEARNERS (1=CONVENTIONAL ; 2=NOUN; 3=ODL)	(J) LEARNERS (1=CONVENTIONAL; 2=NOUN; 3=ODL)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
STUDSKIL Ho:1	1.00	2.00	5.34000*	.54079	.000	3.8261	6.8539
		3.00	6.41333*	.54079	.000	4.8994	7.9273
		4.00	-4.18333*	.54079	.000	-5.6973	-2.6694
	2.00	1.00	-5.34000*	.54079	.000	-6.8539	-3.8261
		3.00	1.07333	.54079	.269	-.4406	2.5873
		4.00	-9.52333*	.54079	.000	-11.0373	-8.0094
	3.00	1.00	-6.41333*	.54079	.000	-7.9273	-4.8994
		2.00	-1.07333	.54079	.269	-2.5873	.4406
		4.00	-10.59667*	.54079	.000	-12.1106	-9.0827
	4.00	1.00	4.18333*	.54079	.000	2.6694	5.6973
		2.00	9.52333*	.54079	.000	8.0094	11.0373
		3.00	10.59667*	.54079	.000	9.0827	12.1106
MOTIVAT Ho:2	1.00	2.00	.00000	.46037	1.000	-1.2888	1.2888
		3.00	-1.04667	.46037	.160	-2.3355	.2421
		4.00	-7.67333*	.46037	.000	-8.9621	-6.3845
	2.00	1.00	.00000	.46037	1.000	-1.2888	1.2888
		3.00	-1.04667	.46037	.160	-2.3355	.2421
		4.00	-7.67333*	.46037	.000	-8.9621	-6.3845
	3.00	1.00	1.04667	.46037	.160	-.2421	2.3355
		2.00	1.04667	.46037	.160	-.2421	2.3355
		4.00	-6.62667*	.46037	.000	-7.9155	-5.3379
	4.00	1.00	7.67333*	.46037	.000	6.3845	8.9621
		2.00	7.67333*	.46037	.000	6.3845	8.9621
		3.00	6.62667*	.46037	.000	5.3379	7.9155
SELFDIR Ho:3	1.00	2.00	1.21000	.61874	.282	-.5221	2.9421
		3.00	2.02667*	.61874	.014	.2945	3.7588
		4.00	-9.83333*	.61874	.000	-11.5655	-8.1012
	2.00	1.00	-1.21000	.61874	.282	-2.9421	.5221
		3.00	.81667	.61874	.628	-.9155	2.5488
		4.00	-11.04333*	.61874	.000	-12.7755	-9.3112
	3.00	1.00	-2.02667*	.61874	.014	-3.7588	-.2945
		2.00	-.81667	.61874	.628	-2.5488	.9155
		4.00	-11.86000*	.61874	.000	-13.5921	-10.1279
	4.00	1.00	9.83333*	.61874	.000	8.1012	11.5655
		2.00	11.04333*	.61874	.000	9.3112	12.7755
		3.00	11.86000*	.61874	.000	10.1279	13.5921
COMPUSKIL Ho:4	1.00	2.00	-1.05333	.48307	.191	-2.4057	.2990
		3.00	-.49000	.48307	.794	-1.8423	.8623
		4.00	-7.20333*	.48307	.000	-8.5557	-5.8510
	2.00	1.00	1.05333	.48307	.191	-.2990	2.4057
		3.00	.56333	.48307	.715	-.7890	1.9157
		4.00	-6.15000*	.48307	.000	-7.5023	-4.7977
	3.00	1.00	.49000	.48307	.794	-.8623	1.8423
		2.00	-.56333	.48307	.715	-1.9157	.7890
		4.00	-6.71333*	.48307	.000	-8.0657	-5.3610
	4.00	1.00	7.20333*	.48307	.000	5.8510	8.5557
		2.00	6.15000*	.48307	.000	4.7977	7.5023
		3.00	6.71333*	.48307	.000	5.3610	8.0657
INTESKIL Ho:5	1.00	2.00	-3.94333*	.52149	.000	-5.4032	-2.4834
		3.00	-2.35000*	.52149	.000	-3.8099	-.8901
		4.00	-11.61667*	.52149	.000	-13.0766	-10.1568
	2.00	1.00	3.94333*	.52149	.000	2.4834	5.4032
		3.00	1.59333*	.52149	.026	.1334	3.0532
		4.00	-7.67333*	.52149	.000	-9.1332	-6.2134
	3.00	1.00	2.35000*	.52149	.000	.8901	3.8099
		2.00	-1.59333*	.52149	.026	-3.0532	-.1334
		4.00	-9.26667*	.52149	.000	-10.7266	-7.8068
	4.00	1.00	11.61667*	.52149	.000	10.1568	13.0766
		2.00	7.67333*	.52149	.000	6.2134	9.1332
		3.00	9.26667*	.52149	.000	7.8068	10.7266
ICTFACIL Ho:6	1.00	2.00	2.42667*	.55438	.000	.8747	3.9786
		3.00	.38000	.55438	.925	-1.1720	1.9320
		4.00	-6.90333*	.55438	.000	-8.4553	-5.3514
	2.00	1.00	-2.42667*	.55438	.000	-3.9786	-.8747
		3.00	-2.04667*	.55438	.004	-3.5986	-.4947
		4.00	-9.33000*	.55438	.000	-10.8820	-7.7780
	3.00	1.00	-.38000	.55438	.925	-1.9320	1.1720
		2.00	2.04667*	.55438	.004	.4947	3.5986
		4.00	-7.28333*	.55438	.000	-8.8353	-5.7314
	4.00	1.00	6.90333*	.55438	.000	5.3514	8.4553
		2.00	9.33000*	.55438	.000	7.7780	10.8820
		3.00	7.28333*	.55438	.000	5.7314	8.8353

SELFCACY Ho:7	1.00	2.00	.43667	.52487	.875	-1.0327	1.9060
		3.00	1.50333*	.52487	.042	.0340	2.9727
		4.00	-5.74667*	.52487	.000	-7.2160	-4.2773
	2.00	1.00	-.43667	.52487	.875	-1.9060	1.0327
		3.00	1.06667	.52487	.248	-.4027	2.5360
		4.00	-6.18333*	.52487	.000	-7.6527	-4.7140
	3.00	1.00	-1.50333*	.52487	.042	-2.9727	-.0340
		2.00	-1.06667	.52487	.248	-2.5360	.4027
		4.00	-7.25000*	.52487	.000	-8.7194	-5.7806
	4.00	1.00	5.74667*	.52487	.000	4.2773	7.2160
		2.00	6.18333*	.52487	.000	4.7140	7.6527
		3.00	7.25000*	.52487	.000	5.7806	8.7194
COMMUSKI Ho:8	1.00	2.00	.26000	.51445	.968	-1.1802	1.7002
		3.00	-.35667	.51445	.923	-1.7969	1.0835
		4.00	-8.45667*	.51445	.000	-9.8969	-7.0165
	2.00	1.00	-.26000	.51445	.968	-1.7002	1.1802
		3.00	-.61667	.51445	.697	-2.0569	.8235
		4.00	-8.71667*	.51445	.000	-10.1569	-7.2765
	3.00	1.00	.35667	.51445	.923	-1.0835	1.7969
		2.00	.61667	.51445	.697	-.8235	2.0569
		4.00	-8.10000*	.51445	.000	-9.5402	-6.6598
	4.00	1.00	8.45667*	.51445	.000	7.0165	9.8969
		2.00	8.71667*	.51445	.000	7.2765	10.1569
		3.00	8.10000*	.51445	.000	6.6598	9.5402
*. The mean difference is significant at the 0.05 level.							

DISCUSSION

The xMOOCs approach to university education could be a viable alternative approach to education which aims to widen and increase accessibility to quality education. The existing traditional approach of face-to-face classroom education is very limited in its capacity to give access to ever growing prospective learners. The NOUN and the Open Distance learning approaches to university education tends to provide access to university education for people who could not have gotten university education if they relied solely on the traditional universities. However, to benefit optimally from xMOOCs approach to learning, the learners necessarily need to show high level of readiness in terms of their study skills, self-direction, self-efficacy, motivation, communication skills, computer skills, Internet skills and possession of ICT facilities (Hung, Chou, Chen, & Own, 2010; Kleinman, Wolf, & Frye, 2013; Nkuyubwatsi, 2015).

The findings of this investigation have conclusively shown that Postgraduate students significantly possess all the eight factors of readiness for xMOOCs to a much higher magnitude than the Conventional undergraduate students, the National Open University of Nigeria (NOUN) students, and the Open Distance learners in Nigeria. Therefore, xMOOCs approach to university education in Nigeria, for now, is most appropriate for Postgraduate academic programs than undergraduate programs. Adoption of xMOOCs is very strongly recommended for postgraduate programs in Nigeria as conclusively evidenced by the enormous data collected and analyzed in this study.

The undergraduate students in the NOUN that exclusively learn via the xMOOCs teaching-learning approach and the Open Distance students who are admitted by traditional universities to run academic programs that exclusively adopt xMOOCs teaching-learning procedures, pattern, and principles were expected to highly demonstrate possession of all the qualities or factors of readiness for xMOOCs as validly and reliably measured in this investigation in strict accordance with the relevant theories of learning by MOOCs, cMOOCs, and xMOOCs (Mackness, Mak, & Williams, 2010; MOOC Course Report, 2016; 2015; Saade, & Kira, 2009; Onwe, 2013; Mesquita, & Peres, 2015). They were supposed to have significant higher mean in each of the eight readiness for xMOOCs factors than all the other categories of university students as postulated in the requisite theories of MOOCs (cMOOCs and xMOOCs) (Downes, 2011; 2013; Ololube, Kpolovie, & Makewa, 2015; Brooks, & Gibson, 2012; Hung, Chou, Chen, & Own, 2010; Kpolovie, & Iderima, 3013; Lane, Caird, & Weller,2014; Starr-Glass, 2015; Wang, Peng, Huang, Hou, & Wang, 2008; Wilson, & Guzdial, 2010). Unfortunately, they rather got means lower than those by Postgraduates (who run the traditional face-to-face programs) on all the eight key characteristics of readiness for xMOOCs. Even the Conventional undergraduate students did exhibited significantly higher readiness for xMOOCs in study skills and ICT facility ownership than NOUN students; and significantly better in self-direction skills and self-efficacy skills than the Open Distance learners. These are doubtless indicators of lack of readiness for xMOOCs by the undergraduate students whose academic programs are run within the operability of xMOOCs. Drastic measures demand to be taken to correct this great anomaly if the xMOOCs approach has to be adopted for undergraduate programs in Nigeria. It is little wonder that Law graduates from the National Open

University of Nigeria were not readily admitted into the Nigerian Law School to eventually be licensed to practice the profession (Ololube, Agbor, & Kpolovie, 2016).

Not until the learners histrionically improve their readiness for xMOOCs to the peak, it will never be expected that xMOOCs praxis in Nigeria will thrive. When even the time that xMOOCs will flourish is not yet at sight, the possibility of MOOCs and cMOOCs to be effectively developed and delivered on the right platform in Nigeria tends to be beyond imagination. As Lane, Caird, and Weller (2014) posited, xMOOCs and cMOOCs assume the complete readiness and total preparedness of the learners to very actively engage in the learning process. Such preparation demands fairly complex skills that the learner must necessarily develop. Information literacy is a functional skill because in MOOCs, the relevant information or learning materials must be sought for, identified and mastered by the learner. Self-efficacy, self-direction, intrinsic motivation, self-discovery, knowledge-seeking motivation, and excellent study skills in digital literacy Kpolovie, & Iderima, 2013; Kpolovie, Iderima, & Ololube, 2014), reputation building online, and development of relationship networks among peers are indispensable ingredients that must characterize the learner. The ability and self-discipline to identify learning events that are relevant to one's needs are also necessary. Kpolovie (2010) asserted that "self-discipline is the ability to and the actual commitment to make oneself do what one should do, exactly how and when he/she should do it, irrespective of whether he/she feels like doing it or not." He added that in xMOOCs, every successful pursuit in knowledge discovery or creation is a direct product of self-discipline to curiously, patiently, persistently, dedicatedly, and objectively search for the truth, the whole truth, about a problem. It is certain by now that only the rare learner with sufficient natural unfolding of creative and intellectual capacities, as well as self-cultivation, and who is prepared at all times to engage in wide arrange of information around the topics offered can benefit meaningfully from MOOCs or any of its varieties.

Globally, Massive Open Online Courses (MOOCs) is characterized fundamentally with being floated solely online, without any formal entry requirement, no limit in participation, completely free of charge, and no awarding of credits. MOOCs could be floated either in the form of cMOOCs or xMOOCs (Alamieyeseigha, & Kpolovie, 2013). MOOCs in its core sense (cMOOCs) is like a number of attributes that are commonly investigated and employed in the developed world but have not been accorded any attention in Nigeria (Kpolovie, & Emekene, 2016). The

xMOOCs version violates the essential characteristics of MOOCs by injecting for-profit elements and series of restrictions; and it is the variant adopted by tertiary institutions in Nigeria that provide online courses. MOOCs either in the form of cMOOCs or xMOOCs or both have come to stay; and each nation simply has to embrace it just like the Internet (Gaebel, 2013). From 2008, MOOCs have being developing to provide more learning opportunities and improve the learning experiences. MOOCs are usually provided by universities in conjunction with private companies/individuals. Companies and consortia that are renowned in developing and delivering MOOCs chiefly include: Coursera Free Courses; edX Free Courses; Udemy; Udacity; and Futurelearn Free Courses. Others are ITunesU Free Courses; Stanford; UC Berkeley; MIT; Duke; Harvard; UCLA; Yale; and Carnegie Mellon Free Courses (BDPA Detroit Chapter, 2016; Class-Central, 2015). No Nigerian university has yet collaborated with any of these or other such bodies to provide dependable platform for development and delivery of MOOCs (cMOOCs or xMOOCs). This may be part of the reasons that the nation has in actual fact not got it right yet.

There is need for the floating of a sound MOOCs platform in Nigeria. In spite of the long overdue inexorable need for tertiary education institutions in Nigeria to build a globally competitive and very effective E-learning ecosystem in this part of the world; the E-learning industry in Nigeria has continued to virtually remain stagnant or very slowly crawl at its infancy over the years. No single educational institution or group of such institutions in Nigeria has developed a functional platform to float any Massive Open Online Courses (MOOCs) robustly in the form of cMOOCs and xMOOCs. Collaboration of Nigerian universities in this direction to successfully champion the development and delivery of reliable quality E-learning goals is highly recommended.

If xMOOCs for instance is to be rightly adopted at undergraduate educational level successfully in Nigeria, the students must first be encouraged to dramatically improve their study skills, motivational skills, self-direction skills, computer skills, Internet skills, ICT facilities ownership, self-efficacy skills, and communication skills readiness for xMOOCs to take full advantage of this evolutionary educational approach. The learners need to change their orientation of passive reception of knowledge as in the traditional system to active construction of knowledge. They must relentlessly endeavor to take full responsibility for their own learning. The learners need to be fully self-directed to take full advantage of the special opportunities that xMOOCs offers in their learning process.

There is a great need for the learners to regulate and take control of their learning as they enroll in xMOOCs.

The learners have to necessarily upgrade their communication skills. Constant interaction is required and essential to engage in xMOOCs. Therefore, the learner is required to acquire more skills to enable him interact effectively in a virtual community. Very good computer and Internet skills are inevitable qualities to effectively engaging in xMOOCs learning of the 21st century. Learners have to go beyond aspiration to actually possess adequate highly functional ICT facilities like computers, Tablets, dependable Internet connectivity, reliable power supply, and so on.

The assessment of the readiness of undergraduates for xMOOCs in Nigeria is of very crucial essence to the field of education, human learning, and Information and Communication Technology in this Knowledge Age of e-learning, e-curriculum, e-governance, e-library, e-commerce, e-banking, e-testing, e-crime, e-mail, and e-everything. The landmark findings of this study have provided very germane information for possible improvement of teaching and learning experiences. The outcome of this investigation could be applied to accelerate the quality of teaching and learning interactions to benefit all stakeholders in the education industry. The learners, the instructors/facilitators, instructional designers and the institutions providing the learning platform as well as the wider society have a lot to gain from this study.

The learner will profit from this study by having feedback on his/her level of preparedness for xMOOCs programs and in making of better data-based decisions that could improve his/her quality of learning. This information will help the learner to make adjustments in xMOOCs readiness areas that he or she is lacking and work harder to improve. The assessment information will help the learner to seek for guidance and counseling, and adopt proper steps to take to remedy observed deficiencies. It will give the learner the opportunity to approach the school authority for help or additional support where necessary.

The readiness for xMOOCs evaluation information provided by this study will assist instructors/facilitators to have a better understanding of their learners. It will provide them with the needed information to properly group the learners according to their readiness levels or create suitable mixed groupings; to better facilitate learning. The study will provide the instructors/facilitators with quality information that will help in providing better guidance to the learners.

Instructional designers depend on information about the learner to design effective instructional materials. In this regard, the assessment of the readiness of learners will provide the instructional designers with the relevant information for more qualitative instructional design. Instructional designers and curriculum developers can use this xMOOCs readiness appraisal information to design instruction that will better suite students' readiness level.

Tertiary education institutions that provide xMOOCs academic programs will benefit immensely from the findings of this investigation as the institutions will be in better position to decide the types of students to offer admissions to for purposes of reducing the probability of dropping out of the programs. This is because the assessment information derivable from xMOOCs Readiness Indicators, the instrument for data collection of this investigation, can be used by institutions to have a better knowledge of their students' readiness for xMOOCs. The information will assist the institutions to organize orientation programs that will help the students in their learning via better development of their readiness for xMOOCs. Information from this study will enable the institutions to launch other programs that will develop learners' skills in the eight factors of xMOOCs readiness.

CONCLUSION

In conclusion, this research investigated learners' readiness for xMOOCs, which is a variety of MOOCs mode of teaching-leaning interaction by four categories of university students in Nigeria (Conventional learners, National Open University of Nigerian [NOUN] learners, Open Distance learners, and Postgraduate learners) for possible identification of inequity, if it does exists. The study employed comparative ex post facto research design. Disproportional stratified random sampling was adopted to draw a sample of 1200 students for the study. Data were collected with an instrument, xMOOCs Readiness Indicators, developed by the researchers, and which has a high construct valid (0.721 to 0.891) and internal consistency reliability (0.832 to 0.880). Results majorly demonstrated overwhelming preponderance of Postgraduate learners' incomparable superiority over the other types of students across all the eight factors of readiness for xMOOCs. The eight factors of readiness for xMOOCs investigated are study-skills; self-direction skills; self-efficacy; Motivation; communication skills; computer skills; Internet skills; and ownership of ICT facilities. Other findings showed that while Conventional learners category is significantly better in study skills, self-direction skills and ICT facilities than

their counterparts (Open Distance and NOUN learners); and better than NOUN in self-efficacy; the Open Distance learners are significantly better than the Conventional learners in Internet skills; and higher than the NOUN students in ICT facilities. The NOUN category of undergraduates is higher significantly in Internet skills for xMOOCs than Open Distance learners and Conventional students. With respect to motivation, computer skills and communication skills readiness for xMOOCs, there is no significant inequity in Nigeria between the three categories of undergraduates as they all demonstrate poor readiness skills for xMOOCs in the three factors. It was very strongly recommended that xMOOCs can and should successful be used for postgraduate programs as the learners at this level are suitably ready for it. Great need exists for encouragement of the undergraduates to improve their readiness for xMOOCs, as leaning or education via xMOOCs seems to be a global trend that has come to stay.

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