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DIGITAL HUMANITIES | RESEARCH ARTICLE

Empirical investigation of e-learning opportunities and faculty engagement in Nigerian universities: moderating role of demographic characteristics

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Abstract: E-learning opportunities are increasingly gaining the attention of various institutions of higher learning in Nigeria, particularly during the COVID-19 pandemic that is making it difficult for institutions to open for physical operations. The current literature reveals that Nigerian universities' e-learning opportunities and faculty engagement have not been sufficiently researched. Thus, this study explores the effect of e-learning opportunities on faculty engagement in Nigerian universities and the moderating role of demographic characteristics of faculty members. Using multiple sampling techniques, five hundred (500) faculty members were surveyed

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PUBLIC INTEREST STATEMENT

There has been a paradigm shift in the learning environment as facilitated by technological advancement. The widespread technology adoption in every sector of the economy, including institutions of higher learning, has completely changed the narratives of learning. The study becomes necessary in Nigeria because the existing studies as established in the literature do not reflect an accurate picture of the significant influence of e-learning platforms and opportunities on faculty engagement in Nigerian universities.

E-learning opportunities and platforms need to be harnessed and leveraged by faculty members of Nigerian Universities for teaching/interaction engagement, research, collaboration engagement, and some statutory job responsibilities. It is believed that the adoption of e-learning platforms will enhance faculty engagement that will culminate in the overall performance of the universities. This study, therefore, provided empirical insight into how the e-learning opportunities can be leveraged for improved faculty engagement. An effort was also made to examine the moderating role of demographic characteristics on the relationship between e-learning opportunities and faculty engagement. Indeed, this study has provided insights into how the faculty members in Nigerian universities can leverage e-learning opportunities and platforms to drive teaching, research collaboration engagements and enhanced administrative roles.

across various colleges of eight (8) private universities in Nigeria. Four hundred and thirty-one (431) copies of the questionnaire representing an 86.2% response rate, were analysed with Smart PLS 3.0. The results show that demographic character-istics of faculty moderates the relationships between e-learning opportunities and faculty engagement within the context of private universities in Nigeria. The study presumes that faculty members of various universities in Nigeria should leverage e-learning opportunities to be more engaged in teaching quality, research outputs, community impact and administrative roles assigned to faculty members. This study contributes scientifically to the strategic human resource management practices and Human resource information system (HRIS) within the educational sector.

Subjects: Education - Social Sciences; Social Psychology; Work & Organizational Psychology; Higher Education Management; Studyof Higher Education; Teaching & Learning

Keywords: Academic; administrative roles; digital databases; e-learning; faculty engagement; teaching and research engagements

1. Introduction

The narratives in learning platforms in the twenty-first century are constantly changing. Some of the changes are facilitated by the widespread adoption of technology in developed and developing countries. Every sector of the economy uses technology to improve operational efficiencies and deliveries, and the educational sector is no exception. The educational sector, particularly institutions of higher learning, uses technology to provide quality learning opportunities for individuals who require university education within or outside of the country where the university is located. In Nigeria, for example, the outbreak of the COVID-19 pandemic in 2019 was one of the factors that facilitated the paradigm shift from traditional learning to blended learning and teaching in Nigeria (Bedford et al., 2020; Mahmood et al., 2020). However, prior to the outbreak of the COVID-19 pandemic, many universities around the world were working remotely using various e-learning plat-forms. The faculty-student engagement in teaching, mentoring, research endeavours, and commu-nity impact initiatives were not seriously affected in the developed economies where they have invested in e-learning operations. However, the COVID-19 pandemic compelled universities in Nigeria and other developing nations to embrace blended learning and teaching (Kandel et al., 2020)

In Nigeria, the lockdown forced many universities lecturers to work remotely. Students' engage-ment via various e-learning platforms gained attention during the pandemic. The level at which universities lectures in Nigeria now explore e-learning platforms for teaching, research, community impact and administrative responsibilities has changed the narrative of conventional learning and teaching in Nigeria. This has introduced students to a new learning environment that requires different skill sets to succeed. The utilisation of technology by universities to engage both students and faculty members through the delivery of information embedded in educational materials to different learners across the six geo-political zones in Nigeria is a welcomed development. E-learning platforms have contributed immensely to the effectiveness of learning and teaching in Nigeria. Many universities in Nigeria now subscribe to blended learning, which has greatly helped enrich faculty students' interactions, administration of quizzes and assignments on different e-learning platforms, official meetings, progress reports, and online presentations. The investment in digital facilities and the shift to blended learning dramatically changed Nigeria's educational system's learning and teaching approaches (Falola et al., 2022).

Previous studies have indicated that e-learning has a significant impact on student performance. For example, Arvidsson and Delfanti (2019) emphasised the role of digital media and student academic engagement, whereas Alexander et al. (2016) investigated how digital literacy can

improve student performance. Creighton (2018) examined how the e-learning environment influences students' learning outcomes. Furthermore, Redmond et al. (2018) explored the interrelatedness between the e-learning engagement framework and students' motivation to read. Potter and McDougall (2017) analysed the connections between e-learning, reading culture, and skill development. On the other hand, Reyna and Meier (2018) studied the impact of information technology on the university education system. In a related study, some researchers investigated academic staff work engagement and its impact on institutional performance (Falola et al., 2022; Power, 2020).

Moreover, Falola et al. (2018a) investigated the relationships and the resultant effect of job engagement strategies and performance. Similarly, Cain et al. (2018) also stated that employee engagement helps to strengthen service-profit chains. Other authors investigated the connectivity between employee engagement and job satisfaction (Adeniji et al., 2016; Colbert et al., 2016; Creighton, 2018; Kanik et al., 2018; Ogbonnaya et al., 2017; Osborne & Hammoud, 2017). Some researchers also examined the association between job engagement, learning culture, and organisational survival in multigenerational workplaces (Blattner & Walter, 2015; H. O Falola et al., 2018b), while Eldor and Harpaz (2016) and Falola et al. (2021) investigated the relationship between engagement, learning culture, sustainable work performance, and organisational survival. The effects of faculty stress on the performance of public universities lecturers were investigated by Osibanjo et al. (2016). Given the preceding, the vast majority of existing research has concentrated on the relationship between e-learning and university student performance. Moreover, previous studies have concentrated on engagement strategies and faculty performance. None of these studies examined the impact of e-learning platforms on academic staff teaching, research, administrative roles of faculty, and partnership/collaboration engagements in the Nigerian context. This implies a research gap in Nigerian universities regarding e-learning platforms and faculty engagement.

Furthermore, this current study does not only examine the influence of e-learning platforms on faculty engagement, but the study also explores the moderating role of faculty demographic characteristics on the relationships between e-learning opportunities and faculty engagement in Nigerian private universities. This study is motivated by the need for a better understanding of how faculty demographic characteristics moderate the relationships between e-learning opportunities and faculty teaching, research, administrative roles, and collaboration engagements in Nigerian universities, especially during the COVID-19 pandemic.

To that end, the general aim of this research is to examine the impact of e-learning opportunities on faculty engagement and the moderating role of faculty demographic characteristics in Nigerian private universities. The significance of the study stems from its specific objectives of this study. These include examining the effect of e-learning opportunities (virtual learning, access to digital databases, online short courses, and webinar learning platforms) on faculty (teaching, research, administrative, and collaboration) engagements, exploring the moderating role of faculty demographic characteristics in the relationship between faculty engagement and faculty demographic characteristics. The study is divided into five sections: introduction, literature review on the subject, methodology, discussion of the findings, conclusion, recommendations, limitations, and recommendations for further studies.

2. Literature review

2.1. Virtual learning platforms and faculty engagement

Virtual learning platforms are becoming popular as a result of the ongoing COVID-19 pandemic, which led to a lockdown to curtail the further spread. Schools and other public places were on lockdown, but there were still laptops, computers and internet connections to learn and acquire knowledge and skills. Virtual learning platforms are online learning that provides faculty and students with a digital solution to enhance their learning experience (Power, 2020). Most virtual

learning platforms are established to advance knowledge of a particular skill or ultimately learn new ones. Some of these popular platforms are: Udemy, Coursera, Tutorroom, Rcampus virtual learning platforms (Santiago et al., 2020)

For example, Coursera is a learning platform in partnership with over 200 top universities globally to make different subjects available online. Organisations like google and Institutions like Duke University, Penn, and Stanford offer courses online through the Cousera platform. Cousera is made available free for students but may require a certain fee if the certificate is needed after completion. Tutorroom virtual learning platform is known for the quality virtual classroom with unique features such as audio and video messaging and a learning management system that helps in class scheduling and the creation of students' accounts. Udemy virtual learning is another platform that adds an average of 800 new courses every month. Power (2020) explains that Udemy is a little more expensive than other platforms. According to Power (2020), this platform allows prospective students to read up on former students' reviews to help them make an informed decision.

Researchers have established that faculty approval and acceptance of virtual learning platforms are crucial to its success (Dhilla, 2017; Power, 2020). Virtual teaching experiences from the faculty member's perspective were explored to get the support of the faculty in online learning (Dhilla, 2017; Santiago et al., 2020). It was discovered that virtual teaching presents faculty with intellectual challenges and technological skill advancements (Tobarra et al., 2020). They can learn and research well in the process of preparing for lectures (Dhilla, 2017). Although studies reveal some faculty members find it difficult in accepting their new roles due to workload issues. Hence the need for faculty motivation and reward to fully achieve their teaching and research engagements. On the other hand, Santiago et al. (2020) opine that virtual learning platforms involve the institutional set-up of learning management moodle to support learning. This leads to faculty engagement in collaborative activities with other institutions, students, and colleagues.

3. Digital databases and faculty engagement

Digital databases are organised forms of information collected and stored in a computer-readable form. Digital databases are also made available on different search engines. According to Usman and Abass (2019), a digital database is an electronic resource organised for easy retrieval anywhere without any obstacles. Ngessa (2018) posited that most of the information in the databases is accessible without a subscription fee, while others require a subscription fee to access. Online databases commonly subscribed to include EIR, EBSCOHOST, JSTOR, AGORA, MEDLINE, HINARI and OARE (Ngessa, 2018). The World Health Organization (WHO) provides free access to OARE, HINARI, FutureLearn, AGORA, EIR, Google Digital Garage and Directory of Open Access Journal (DOAJ) databases to research centres and higher institutions of learning, especially in developing countries, to support their learning, research, and teaching engagement. Akinola, Shorunke, Ajayi, Odefadehan and Ibikunle (2018) and Usman and Abass (2019) discussed that the availability of digital databases enhances quality information faculty learning, and teaching and research engagements.

4. Online short programs and faculty engagement

Online short programs are learning that takes place on the internet. Online programs are one of the prevalent forms of distance education in today's academic environment. Distance learning has long been in existence and has different types, such as correspondence courses, telecourses, video conferencing, virtual tutoring, short online programs and mobile learning. Online programs have become popular due to COVID-19, which has led to schools being shut down across the world. According to Kim et al. (2018), over 1.2 billion children globally are not in the classroom. This gave rise to learning online, where teaching is done digitally and remotely. The short online program has been used to advance the students' skill set in a given field and has been a great opportunity to acquire more knowledge in the chosen field of interest. Although Dhull and Arora (2019) posited that learning online comes with challenges, including students deciding on the extent to which

they get engaged and pay attention in the course of the lectures (Dhull & Arora, 2019; Kim et al., 2018). This is quite different from the traditional classes, where students are kept in a place that is free from distraction, and they have to tag along with the faculty.

Ogueyungbo et al. (2019) believed that specific forms of faculty interaction could help overcome the challenge and reduce the perceived distance felt by the online students during the program. Power (2020) supported this assertion and posited that these forms of interaction by the faculty help build their research and learning engagement. Faculty members need adequate research to enable them to produce a podcast for their students, create a voice thread, post videos, and lead discussions that connect students to common themes to fully engage the students and achieve their attention.

5. Webinar learning platforms and faculty engagement

A webinar is a lecture, workshop, presentation, and seminar transmitted through the web with the use of video conferencing software. Webinar learning platforms have gained popularity, especially now that COVID-19 has forced so many institutions into an online environment. A distinctive feature of the webinar platform is its interactive element. This allows faculty to build a personal relationship with their students and delve deeper into the topics at hand. This learning platform gives the opportunity to give, receive and discuss information (Dhull & Arora, 2019). The faculty can share their lectures with the students, and the students could also share documents, audio, and applications with their classmates. Webinar learning platforms offer live streaming options, recording options the ability to broadcast it via YouTube and other video services.

Webinar software features support multiple lectures, live chat for students, calendar scheduling and invites, prerecord video options, video file sharing, and chat filters. These connect the faculty and students with social accounts, screen share, and conference options for viewers to listen in live and live capture to save lectures (Dhull & Arora, 2019). The provision of webinar learning platforms by the institution of higher learning improves faculty learning and teaching processes and understanding of the learning patterns. This helps institutions in reaching the goal of improving student learning, facilitating study options, and supporting outstanding research (Iroaganachi & Izuagbe, 2018). Iroaganachi (2016) reported that faculty research engagement is influenced by factors such as the nature of the organisation, individual attributes, available infrastructure, webinar learning platforms, and technological innovations.

6. Materials and methods

6.1. Procedure

This study investigates the influence of e-learning opportunities and faculty engagement in Nigerian universities using demographic characteristics as moderating variable. This study designed a cross-sectional survey approach to collect data on faculty members of some selected private universities in Nigeria.

7. Population

The study population comprises all private universities in Southwest Nigeria, which account for thirty-four private universities out of seventy-nine approved private universities in Nigeria. Meanwhile, out of the thirty-four private universities in Southwest Nigeria, only 8 representing 24.5%, were purposively selected. The choice of the selected private universities was based on the appreciable technology adoption, scientific innovations and quality service delivery. The selected universities have about three thousand three hundred faculty members across all levels, excluding graduate assistants.

Byrne's (2001) table chart was used to determine the sample size, which accounted for 500 at a margin error of 0.05. Proportional Affixation Criterion (PAC) was used the determination the copies of the questionnaire administered to each university. This indicates that the universities sample in each stratum is proportional to the relative weight of the study population, as depicted in Table 1.

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Table 1. Breakdown of selected universities			
Name of the Selected Universities	Faculty Population	Sample size	Copies of Questionnaire Returned
University A	371	57	51
University B	484	74	65
University C	344	53	49
University D	369	57	46
University E	502	76	62
University F	332	51	45
University G	383	59	47
University H	473	73	66
TOTAL	3,258	500	431

The selected universities are privately owned by faith-based organisations. The universities operate on a collegial level and run programmes across many colleges, which include the college of management and social sciences, college of engineering, college of science and technology, college of art and humanities, college of law, college of medical sciences, and college of education. It is also important to note that these universities offer both first degree and postgraduate programmes in different disciplines.

8. Sampling techniques

This study employed purposeful, stratified, and simple random sampling techniques. Purposive sampling was used because the survey was limited to faculty members from the selected private universities, excluding graduate assistants. The selected universities operate on a collegial level. The colleges include the college of management and social sciences, college of engineering, college of science and technology, college of art and humanities, college of law, college of medical sciences, and college of education. These colleges have faculty of different cadres and diversities. To this end, the stratified sampling method was also used. All faculty members in each stratum were given an equal chance of being chosen.

9. Data collection

Data were collected from the respondents by adapting the existing structured questionnaire designed in a 5-point Likert scale format. Copies of the questionnaire were administered with the help of two (2) research assistants. It is equally important to note that the following categories of faculty members were excluded: Graduate assistants, visiting lecturers, and adjunct lectures from other universities.

10. Measurement

E-learning opportunities were measured with carefully selected constructs from the literature, which include virtual learning platforms, online short courses, digital databases and webinar learning platforms. On the other hand, faculty engagement was also measured with four constructs: academic, administrative engagement, collaborative partnership engagement, teaching, and research engagement. The respondents' age, ranks, work experience and gender were included in the measure. They were used as the moderating variables. It is also important to note that five Likert scales ranging from 1-to 5 were used in the design of the questionnaire.

11. Ethical consideration

Research ethical issues were considered, and all respondents were offered to stay anonymous. In the same way, the respondents were also assured that all the information provided would be treated with topmost confidentiality. Meanwhile, the respondents obtained oral consent because

this type of research does not require signed consent from the participants; rather, implied consent is considered sufficient. At the same time, all the respondents were invulnerable adults who agreed to fill the copies of the questionnaire administered to them without any form of coercion or compulsion.

12. Measurement model

The study used both the composite reliability and Cronbach's alpha techniques to examine the reliability of the instrument. Table 2 shows that data were normally distributed, and the scale reliabilities were above the recommended thresholds of >0.80 for composite reliability and >0.70 for Cronbach's alpha; thus, internal consistency is established. The convergent validity of the instrument was investigated, and the results show that each of the scale's indicators strongly correlates with other indicators as a single construct. The average variance extracted estimate (AVE) was used to validate the constructs, and all AVE values exceeded the 0.5 thresholds, indicating that the constructs were cross-loaded. This means convergent validity has been established. The researchers also investigated common method bias (CMB), which was confirmed using the variance inflation factor (VIF). As shown in Table 2, all the VIF values for each item variable measurement are less than the 3.3 thresholds.

Table 3 depicts the heterotrait-monotrait (HTMT) ratio of correlations method was used to assess the discriminant validity. As Table 3 indicates, the average heterotrait-heteromethod correlation is relative to the average monotrait-heteromethod correlation. All the values are less than the critical value of HTMT 0.85, as Henseler, Ringle, and Sarstedt (2015) recommended.

13. Predictive relevance

The Q2 values were used to determine the PLS-SEM predictive relevance of the measurement constructs and data points of indicators. It is indeed worth noting that all the specific indicators' Q2 values (ranging from 0.374 to 0.449) were higher than zero. This suggests that the PLS path model can predict the constructs' outcomes. The F square was used to calculate the effect size. This is crucial for understanding the variance of each exogenous variable in the model. Effect sizes of 0.02 are considered small, 0.15 are considered medium, and 0.35 and higher are considered large. For the specific constructs, the f-squares are 0.512, 0.534, and 0.604, respectively. This means that all of the constructs' sample effects are greater than 0.35.

14. Results

14.1. Demographic characteristics statistics

The study considered 431 copies of the questionnaire usable for the analysis. The outcomes from the demographic profile of the faculty members that participated in the survey show that out of the 431 total respondents, the gender distribution shows that 302(70%) were male while 129(30%) were female. This indicates that the private universities in Nigeria are dominated by male faculty. The finding also revealed that in terms of ranks, 99(22.9%) of the respondents were in their professorial cadres, 148(34.3%) were in senior lecturer-ship rank, while 185(42.9%) were in Lecturer 1 and below. This suggests that most of the faculty in the selected private university are experienced. The demographic statistic also shows the age group of the faculty members that participated in the study. Out of 431 total respondents, 90(20.9%) were less than 30 years, 102 (23.7%) were between 31–40 years, 151(35.0%) were within the age group of 41–50, while 88 (20.4) were 50 years and above. This implies that most of the faculty members were within the economically active population. Similarly, regarding work experience, it was discovered that 174 (40.4%) have less than ten years of teaching experience, 101(23.4%) had between 10–20 years of teaching experience, 98(22.7%) had between 21–30 years teaching experience while 58(13.5%) had over 30 years teaching experience.

E-learning opportunities were measured with four constructs: virtual learning platforms, digital databases, online short courses and webinar learning platforms, while faculty engagement was

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Table 2. Properties of the final measurement model						
	Loading	**Outer Weights**	**VIF**	**Compose Reliability**	**AVE**	**Cronbach's Alpha**
Variables & Constructs	≥ 0.5		≤ 3.3	≥ 0.8	≥0.5	> 0.7
Virtual Learning Platform (VirLeaPla)				0.874	0.637	0.809
VirLeaPla1	0.894	0.457	1.228			
VirLeaPla2	0.737	0.370	1.568			
VirLeaPla3	0.812	0.366	1.732			
VirLeaPla4	0.736	0.278	1.495			
Digital Data Bases (DigDatBas)				0.850	0.587	0.768
DigDatBas1	0.794	0.320	1.476			
DigDatBas2	0.787	0.357	1.626			
DigDatBas3	0.709	0.488	1.418			
DigDatBas4	0.773	0.387	1.550			
Online Short Courses (OnlShoCou)				0.883	0.656	0.824
OnlShoCou1	0.885	0.388	2.627			
OnlShoCou2	0.834	0.360	1.978			
OnlShoCou3	0.789	0.434	1.548			
OnlShoCou4	0.722	0.401	1.677			
Webinar Learning Platform (WebLeaPla)				0.830	0.620	0.799
WebLeaPla1	0.743	0.453	1.373			
WebLeaPla2	0.764	0.596	1.328			
WebLeaPla3	0.849	0.555	1.356			
Academic Administration Engagement (AcaAdmEng)				0.778	0.539	0.772
AcaAdmEng1	0.715	0.361	1.206			
AcaAdmEng2	0.769	0.366	1.221			
AcaAdmEng3	0.716	0.324	1.121			
Collaborative Partnership Engagement (ColParEng)				0.820	0.577	0.724
ColParEng1	0.715	0.333	1.362			
ColParEng2	0.871	0.411	1.624			
ColParEng3	0.678	0.387	1.227			
Teaching Engagement (TeaEng)				0.804	0.577	0.735
TeaEng1	0.775	0.324	1.232			
TeaEng2	0.752	0.332	1.241			
TeaEng3	0.753	0.327	1.267			
Research Engagement (ResEng)				0.843	0.641	0.721
ResEng1	0.785	0.317	1.286			
ResEng2	0.812	0.318	1.534			
ResEng3	0.806	0.241	1.550			
Demographic Characteristics				0.850	0.683	0.768
Age	0.851	0.336	2.143			
Work Experience	0.790	0.382	2.837			
Ranks	0.852	0.375	2.951			
Gender	0.811	0.321	2.652			

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Table 3. Discriminant validity				
	Demographic Characteristics	**E-Learning Opportunities**	**Faculty Engagement**	**Moderating Effect**
Demographic Characteristics				
E-Learning Opportunities	0.681 [0.607;0.769]			
Faculty Engagement	0.769 [0.738;0.843]	0.763 [0.736;8.432]		
Moderating Effect	0.734 [0.612;0.723]	0.655 [0.629;0.730]	0.771 [0.685;0.839]	

Figure 1. PLS Bootstrapping Model with β and P values of e-learning opportunities, demographic characteristics, and faculty engagement.
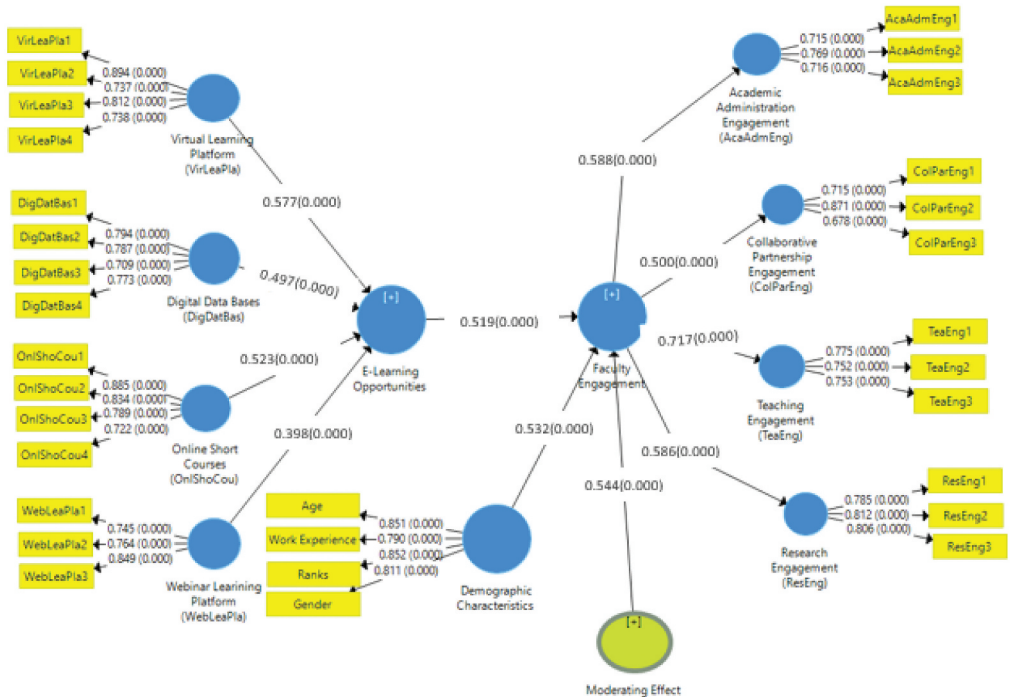
measured with research, teaching, academic, administrative responsibilities and collaborative/ partnership engagements. R-Square, i.e. the coefficient of determination, structural path co-efficient (B value), T-statistic value, and P-values are critical indicators of Smart Partial Least Square (PLS) used for the determination of the results, as shown in Figure 1.

14.2. Test of hypotheses results
The data was coded using SPSS version 26 software, and the analysis was performed using Smart Partial Least Squares (Smart PLS 3.0). For the purpose of the study, three hypotheses were tested. They are stated in an alternate form:

H_{o1}: e-learning opportunities (virtual learning, access to digital databases, online short courses, and webinar learning platforms) have a significant influence on faculty (teaching, research, administrative, and collaboration) engagements.

H_{o2}: Demographic characteristics of faculty have a significant influence on teaching, research, administrative, and collaboration engagements.

H_{o3}: Demographic characteristics of faculty moderates the relationships between e-learning opportunities and faculty engagement.

The algorithm and bootstrapping models are visible on the smart PLS. The path coefficient, r-square values, and significant values are calculated using an algorithm model, a structure of regressions expressed as weight vectors. In a related development, bootstrapping aids in the determination of significant coefficients and t-values testing. It's worth noting that Smart PLS's default bootstrapping is 500 subsamples, which makes obtaining significant results easier. Figure 1 depicts the structural model that encompasses all the hypotheses tested.

Figure 1 depicts the PLS algorithm model of e-learning opportunities that can be leveraged for enhanced job engagement with demographic characteristics of the faculty as moderating variable. The path depicts the degree of relationship between the three main variables. The R-square determines the level of variance between the variables. Bootstrapping helps in calculating path coefficients, outer loading, outer weights, and effect, p-values as depicted in Figure 1. This suggests that demographic characteristics of faculty members moderates the relationships between e-learning opportunities and faculty teaching, research, partnership and academic and administrative roles engagements. However, the path coefficient, standard deviation, t-statistics, and p-values are presented in Table 4.

Table 4 depicts the results of the study. The findings indicate a significant relationship between e-learning opportunities and faculty research, teaching, collaboration and administrative roles of faculty engagements ($\beta = 0.519$, T-value = 5.581 > 1.96, P-value = 0.000 < 0.05, and $R^2 = 0.269$).

Also, the proposed direct significant relationship between demographic characteristics of respondents and faculty engagement was also confirmed ($\beta = 0.532$, T-value = 31.294 > 1.96, P-value = 0.000 < 0.05, and $R^2 = 0.283$). It is also imperative to note that the demographic characteristics of the respondents were used as moderating variables. The findings revealed that age, experience, rank, and gender significantly influence the relationships between e-learning opportunities and faculty engagement.

15. Discussions

The study examined the level of relationships between e-learning opportunities and faculty engagement, particularly during the outbreak of the COVID-19 pandemic. The findings revealed that there is a significant relationship between e-learning opportunities (virtual learning platforms, access to digital databases, online short courses, and webinar learning platforms) and faculty engagement (research, teaching, collaboration, and administrative roles of faculty).

This implies that e-learning platforms have positively impacted faculty administrative roles during the COVID-19 lockdown in Nigeria. Faculty administrative roles engagement in this context

Table 4. Inner model results							
Variables	**Path Co-efficient**	**Standard Deviation**	**T Statistics**	**P Values**	**R^2**	**F^2**	**Q2**
E-learning → Faculty Engagement	0.519	0.093	5.581	0.000	0.269	0.512	0.374
Demographic Characteristics → Faculty Engagement	0.532	0.017	31.294	0.000	0.283	0.653	0.435
Moderating effect → Faculty Engagement	0.544	0.084	6.476	0.000	0.296	0.601	0.449

refers to the running of the administrative activities required of the academic staff. These administrative activities include level advising, approvals, committee membership, deanship, hodship, and directorship. For example, universities in Nigeria have been using the zoom platform for meetings on how to move universities forward. This finding corroborates the findings of Przybylski and Weinstein (2012), who posited that technology influences conversations quality, particularly when it becomes practically impossible to have a face-to-face meeting. The study's findings also align with the similar submission of Campbell and Kwak (2011). They noted that technology facilitates meeting patterns of administrative engagement. The finding also validates the submission of Subramanian (2018) and Misra et al. (2014). They posited that e-learning opportunities influence the quality of interaction, particularly during COVID-19 lockdown. This implies that the quality of information via e-learning platforms enhances the quality of information dissemination to faculty members and students of the university communities.

It can also be noted that e-learning opportunities, to some extent, increase the quality of collaboration and partnership during the COVID-19 lockdown. One of the core responsibilities of faculty members of any university is to collaborate and partner with others for more quality research in providing solutions to socio-economic issues. The finding also suggests that up-to-date information on e-learning platforms can be leveraged for quality collaborations and partnerships with industries. This finding supports the submission of Creed-Dikeogu (2015), Shandler (2014), and Parton and Fleming (2007). They believed that e-learning enhances collaborative partnerships. Carlisle and Hughes (2013), Cutajar and Bezzina (2013), and Chapman et al. (2014) had similar findings. During the COVID-19 lockdown, e-learning platforms played a significant role in the level of teaching engagement of faculty members. The information accessed on various e-learning platforms was leveraged to enrich the lecture content given to the students. Since teaching is one of the core responsibilities of faculty of universities, e-learning platforms such as virtual learning, digital databases, and webinars, among others, can be leveraged for improved pedagogical practices and teaching engagement.

Meanwhile, e-learning platforms can also be used to disseminate and share useful information that will broaden the students' horizons on a subject matter. This finding validates similar empirical findings of Akbar (2016),and Rossing et al. (2012). They found out that e-learning platforms facilitate comprehensive teaching strategies that reshape the future of teaching practices in institutions of higher learning. Also, the finding validates the similar submission of Laurillard (2013), who noted that e-learning platforms help rethink university teaching engagement.

Since the study established s significant relationship between e-learning opportunities and research engagement. There is no doubt that the state of the heart research and research productivity published in high index journals remains sine-qua-non for faculty promotion and universities ranking. The influence of e-learning platforms on research engagement cannot be overemphasised. This implies that faculty members could leverage digital databases, webinar training, and virtual conferences to access information that could improve their research engagement. This finding validates the findings of H. O Falola et al. (2018b) and Borg (2010), who noted that the research effectiveness of the faculty of universities is a function of institutional support. The institutional support in this context is the access to various subscribed digital databases the virtual conference supports, among others.

Besides, the demographic characteristics of respondents also moderate the relationships between e-learning opportunities (virtual learning platforms, access to digital databases, online short courses, and webinar learning platforms) and faculty engagement (research, teaching, collaboration and administrative roles of faculty). This implies that the wealth of experience that the faculty members have gathered over the years in teaching methodologies, research activities, collaborations and some

administrative roles is very critical to their level of engagement. The ranks, age and gender also play significant roles in the discharge of faculty responsibilities and engagement.

16. Conclusion

The significant relationships between e-learning opportunities and faculty engagement found in this study among selected universities in Nigeria have important implications for the universities' management and other stakeholders in the education industry, particularly during the lockdown necessitated by the COVID-19 pandemic. COVID-19 threatened the conventional practice of universities; e-learning opportunities and platforms were indeed a big relief that prevented a total shutdown of universities activities in Nigeria. Therefore, investing in technology that will drive teaching, research and collaborative partnership, and other core areas of the university system by the management will be a good step in the right direction. The availability of e-learning facilities will help the universities to get the best out of the faculty members. Their teaching quality will be enhanced because they have access to the materials needed to prepare their lecture slides or notes. The delivery of the lecture materials will also be made easy, and students will, at any point in time, have access to the materials. This will enhance the universities ranking. Another reason why universities in Nigeria need to invest in e-learning is that access to credible and reliable scientific digital databases would enrich the faculty's knowledge of any research that is of interest to them. Access to the latest publications will help faculty members to know the trending research topics; this will guide their research endeavour. Opportunities for attending conferences could also help in driving quality research that will provide solutions to identified research problems. Also, efforts must be intensified by the management of universities to provide adequate training that will help the faculty members to maximise the e-learning opportunities to enrich their job engagements.

17. Limitations and suggestions for further studies

This study extends the understanding of how e-learning opportunities and platforms relate to faculty engagement in Nigerian universities. However, it is important to point out some of the limitations and research gaps for future studies. Only eight out of thirty-four private universities in Southwest Nigeria participated in the survey. This implies that the study though achieved the set objective but is limited in scope considering the number of other private and public universities in Nigeria. To this end, future studies may broaden the scope of the study to include private universities in the other five geo-political zones in Nigeria.

Also, this study relied on self-reported data for all variables that are susceptible to measurement bias. It's possible that study participants exaggerated or blown out of proportion e-learning opportunities and platforms. As a result, a longitudinal design that incorporates secondary data will solve this problem.

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