Use of Massive Open Online Course for digital skills development by undergraduates in selected universities in Ibadan, Nigeria

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Abstract

Rationale of Study – The rationale of this study is to examine the use, performance expectancy, effort expectancy, social influence, facilitating conditions, and internet accessibility/availability of the use of MOOC for digital skills development by undergraduates in selected universities in Ibadan, Nigeria.

Methodology – This study adopted a descriptive survey research design. This research targets 378 of the 21764 undergraduate students in private and public universities in Ibadan Metropolis, Oyo state. Undergraduates are suitable targets for the adoption of MOOC because they are potential early adopters of information technologies and have diverse educational needs.

Findings – A substantial portion of respondents (77.8%) utilised MOOC, with 72% enrolling and 60.8% completing their enrolled courses. Additionally, most agreed that MOOC surpass traditional classrooms (mean=3.24, SD=0.728) in clarity, while most students reported receiving adequate support during challenges. Except for IA/A, all the UTAUT variables significantly predicted undergraduate use of MOOC in the universities in Ibadan, Nigeria.

Implications – The findings of this study suggest that MOOC is growing in acceptance and utilisation among students, thus indicating an embrace of digital learning methods in education. These results highlight the further exploration into the factors influencing MOOC adoption, touching more profound students' motivations and barriers that enhance course completion rates.

Originality – This study stands out due to its comprehensive assessment of various factors influencing MOOC adoption and utilisation among students, offering a holistic view of their experiences and perceptions.

Keywords

Massive Open Online Course, MOOC, digital skills development, undergraduates, Nigeria

1 Introduction

Massive open online course (MOOC) is a free web-based distance learning program designed for many geographically dispersed students. The concept of massive open online courses (MOOC) is based on the principles of Self-Regulated Learning (SRL) theory combined with Collaborative Learning (Kizilcec et al., 2017; Thammi, 2020). The design of these courses considers a large number of participants, content access from anywhere by users with an internet connection, and openness. It offers a complete course module and experience without cost (Openup Ed, 2015). It is expedient for any potential participant in a MOOC to possess the necessary digital tools and technologies as well as skills required for complete and active participation. The most crucial digital skill that MOOCMOOC offers is the ability to use modern digital technologies to create, connect, disparate, and disseminate human and artifactual knowledge (McAuley et al., 2010). Developing and expressing one's content/knowledge and expressing it through a coherent and cogent commentary or contribution using blog entries, videos, mind maps, or other techniques, otherwise known as digital content creation, is a necessary skill for 21st-century learners. According to Freiman et al. (2017), MOOC's flexibility, content diversity and online tutorials ensure that they are gaining exponential recognition as a tool for keeping up to date with the latest 21st-century digital skills.

There are growing changes in global learning and educational lifestyles due to advancements in information technologies. Subsequently, information technology has led to tremendous and significant transformations and changes in teaching methods and content delivery (Jung & Lee, 2018). Digital skills have become crucial in today's education and society generally. Students use platforms like Massive Open Online Courses (MOOC) to access the necessary skills they need, thus bridging the gap between the demands of traditional education and digital (Ghobrini, 2021). Many studies have highlighted the discrepancies between the digital skills of university undergraduates and the skills they require to be employed, and the studies have emphasised the need for better alignment between education and industry needs (Gergen & Rego, 2014).

 MOOC is an Open Educational Resource (OER) that has emerged to offer opportunities for diverse digital skill development (Webb, 2015). MOOC can cater to scalable learning experiences and needs that permit self-regulated and collaborative learning environments (Kizilcec et al., 2017). However, lack of knowledge about required digital skills and limited access to necessary infrastructure can hinder the effectiveness of MOOCs in filling digital skill gaps (Edelsbrunner et al., 2022). The utilisation of MOOC

for digital skill development can be influenced by many factors, including performance expectancy, effort expectancy, social influence, and facilitating conditions, as described in the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003).

2 Statement of the problem

Several studies have investigated the use of MOOC to develop digital skills. Khalid et al. (2021) examined factors influencing the behavioural intention to use MOOCs, reporting significant influences in Thailand and Pakistan. Rivera and Ramirez (2015) explored MOOC' role in teacher training for digital skills development, while Calonge and Shah (2016) delved into filling graduates' skill gaps and their impact on employability. Edelsbrunner et al. (2022) detailed MOOC' efficacy in developing employees' digital skills. Other studies (Fianu et al., 2018; Tsabedze & Tella, 2020; Abderrahmane & Mebitil, 2022) discussed MOOC utilisation in higher education. However, despite the known advantages of MOOCs in fostering digital skills, no comprehensive study has investigated their use specifically among university undergraduates in the universities in Ibadan, Nigeria, which is the focus of this study.

3 Theoretical framework and review of empirical literature

3.1 Theoretical framework

The Unified Theory of Acceptance and Use of Technology guided this study. UTAUT presents four core constructs that serve as determinants of behavioural acceptance and usage behaviour of technology users: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). Performance expectancy refers to an individual's belief regarding the extent to which using a particular technology or system will help improve their performance or enhance their capabilities in achieving specific tasks or goals. It is a concept commonly utilised in the field of technology acceptance and adoption (Venkatesh et al., 2003; Davis et al., 1989). Effort Expectancy (EE) describes an individual's perception of the ease of adopting and utilising a specific technology or system. Performance Expectancy (PE) refers to an individual's belief or perception about how much a particular technology will help them achieve improved performance or enhanced outcomes in their tasks or endeavours. Another critical factor in technology adoption is social influence (SI), which refers to the degree to which an individual perceives that others (such as friends, family, colleagues, or influential individuals) expect, encourage, or endorse a specific technology.

Finally, facilitating conditions represent an individual's perception of the extent to which external factors, including organisational support, technical assistance, infrastructure, and resources, enable or hinder the use of technology. It encompasses the perceived availability of necessary tools, resources, and support systems that make it easier for individuals to adopt and use the technology effectively (Venkatesh et al., 2003; Davis et al., 1989). Digital skills diversity, ICT skill levels, and undergraduates' experience were deployed as external variables. These constructs encompass various abilities and competencies that enable individuals to navigate, use, and interact with digital devices, technologies, and platforms effectively. These skills are essential in the contemporary world, where information technology is central to all aspects of work, education, communication, and daily life. There also exists sufficient evidence that demographic factors relate to the adoption and use of information technologies (Prensky, 2001; Hargittai, 2002; Kayany & Yelsma, 2000; Warschauer & Matuchniak, 2010; Selwyn, 2004; DiMaggio et al., 2004; and, Hargittai and Walejko 2008).

3.2 MOOC and digital skills development – empirical review

Edelsbrunner (2022) investigated how employees' digital skills can be developed using a Massive Open Online Course (MOOC), the procedures involved, and its effects on employees' digital skills. The study combined design-based research and approach-oriented action research to describe the basics of their evaluation of existing European competence frameworks for digital skills and European projects that used MOOC, the development and design of the MOOC, the evaluation based on learning analytics insights and a questionnaire, as well as a reflection. The MOOC was offered as Open Educational Resources (OER) on the Austrian MOOC platform iMOOX.at from March (2021) to April (2021). A total of 2083 participants registered for the course, out of whom only 381 completed the course, and a total of 4765 accomplishment badges and 369 certificates were issued.

Ghobrini's (2021) study was designed as a reflective qualitative research design. It aimed to reveal how nondigitally fluent English foreign language university students in Algeria develop their digital skills using MOOC. The study concluded by providing an e-solution based on re-using MOOC and disseminating OERS to the noon-digitally fluent students to help them develop the necessary 21st-century digital skills. Calonge and Shah (2016), in their study titled "MOOC, Graduate Skills Gaps, and Employability: A Qualitative Systematic Review of the Literature", carried out a systematic literature review highlighting the use of MOOC as a tool for bridging the mismatch in graduate digital

skills. The study reviewed 16 reports and documents on the potential of MOOCs in bridging the digital skill gap. The literature review covered the following concepts: higher education and graduate skills gap, today's graduates and employability, and MOOC and graduate skills. A global perspective on MOOC and the digital skills gap was examined with nine articles from the United States, one from Australia, three from India, two from the United Kingdom, and one from France. The results of the review showed that the disruptive potentials of MOOCs in bridging the skill gap are being explored and used through collaborations by corporations, MOOC providers, and tertiary institutions.

Rivera and Ramirez (2015) researched using MOOC for digital skills development in teacher training. The study utilised a mixed methods approach for data collection and analysis. Data was collected from a randomly selected research sample of 50 trainees who were part of the Mi.compu mx program and had completed the course through a pre-test (a self-administered questionnaire) and a post-test to examine the self-evaluation that the participants possess on their digital skills before and after the course. The study's findings revealed that MOOC can potentially develop digital skills and solve information problems.

Stephen and Molara (2017) studied the present state of MOOC among Nigerian postgraduate students. A descriptive survey research design was adopted for the study, and a purposive random sampling technique was adopted to select three federal universities approved to run postgraduate programmes by the National University Commission in Southwest Nigeria. A self-structured questionnaire with a reliability coefficient 0.70 was used for data collection. The findings revealed that digital internet-enabled devices exist among Nigerian postgraduate students; however, their interest and involvement in MOOC are still shallow. In addition, the level of adoption of MOOC among Nigerian postgraduate students is still shallow. Furthermore, the few enrolled in MOOCs are for employment or job advancement.

Abderrahmane and Mebitil (2022) investigated students' and teachers' attitudes towards using MOOC for language learning and teaching; the study aimed to examine the factors that impact students' inclination and teachers' attitudes to using MOOC and to explore the symbiotic relationship between students' predilection and teachers' role in training them to use these online sources because teachers are the critical component of the learning process. The study adopted a descriptive research design and a questionnaire and interviews were used to collect data. Data was collected from 47 2nd year EFL

Didactics master students from Ibn Khaldoun University, Tiaret. The survey results indicated that EFL students and teachers have positive attitudes towards online learning courses; their readiness to use MOOCs is still moderately low. The results also revealed a correlation between MOOC adoption and Perceived Usefulness with Perceived Ease of Use. ICT competence, ICT preparedness, technological expertise, and ICT training directly impact users' attitudes.

Gordillo, López-Pernas, and Barra (2019) examined the effectiveness of MOOC in teacher training in safe ICT use. The study aimed to investigate the instructional effectiveness of MOOCs for training teachers in safe and responsible ICT use. The study was based on the fact that despite the efforts placed into teacher ICT training, there is still a wide gap between the digital competence of teachers and the one they require in developing students' digital competence.

3.3 Conceptual framework

The conceptual framework proposed for this study (see Figure 1) is adapted from the Unified Theory of Acceptance and Use of Technology (UTAUT). The conceptual framework for this research was developed with insight from relevant theories, literature, and empirical studies.
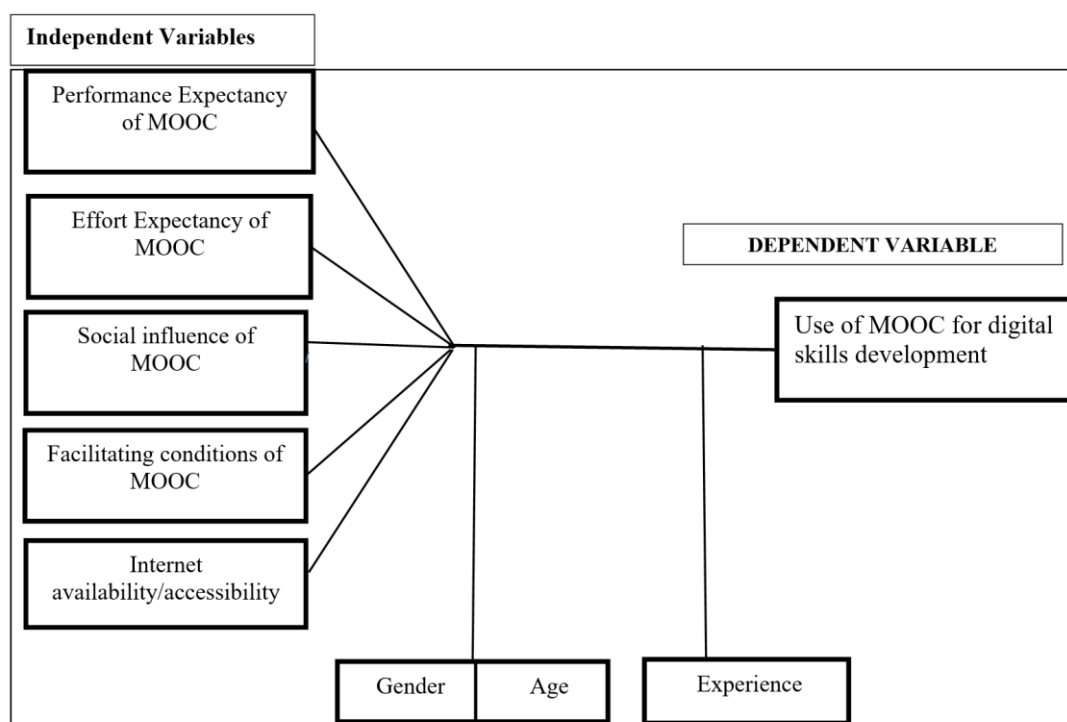

Figure 1: Conceptual Framework

Figure 1 shows the dependent variable, namely, the use of MOOC for digital skills development, and the UTAUT variables as independent variables. The assumptions in this framework suggest that 1) internet availability and accessibility, performance expectancy, social influence, facilitating conditions, and effort expectancy of MOOC, and 2) gender, age, and experience have a relationship with the use of MOOC for digital skills development.

4 Methodology

The research is targeted at three universities in the Metropolis were selected. The Three universities are the University of Ibadan, Lead City University, and Dominion University. The total population for this study is 21764 undergraduates. A descriptive survey research design was adopted, and a quantitative survey method was employed for data collection. An appropriate design and proper research method provide a cost-effective and efficient way to collect and analyse data on a large sample of people, allowing for the generalisation of results to a larger population. It is also appropriate for gathering information about the current status of a phenomenon, attitudes, opinions, or characteristics of a population. Using Karma's (2005) sampling scheme, a sample of 378 was determines. The proportional-to-size sampling (PPS) scheme was then used to determine the sample component from each institution. Table 1 shows the sample size for each institution.

Table 1: Proportionate-to-Population Sample Sizes for the Three Universities

S/N	Name of Institution	Number of Undergraduate students	Number of the sample proportion
1.	University of Ibadan	15479	268
2.	Lead City University, Ibadan	5985	103
3	Dominican University	300	6
Total		21764	377

A questionnaire, designed by the researcher was used to collect data for the study.

4.1 Validity and Reliability of Instrument

The questionnaire was pre-tested on 20 undergraduate students at the University of Ilorin, located in the Ilorin South LGA of Kwara State, Nigeria. For the reliability test, the Cronbach alpha reliability coefficient value was calculated from the pilot-administered questionnaire to determine the internal consistency of the related multiple questions used to measure the same variables. The internal consistency reliability of the research instrument was measured using Cronbach's alpha. Cronbach's alpha assesses

how well the items in a scale or measure correlate, indicating the degree to which the items measure the same underlying construct. The reliability coefficient, Cronbach's alpha, for each subscale was more significant than the recommended value of 0.7 (Table 3.3).

Table 2: Cronbach's Alpha Result for the constructs in the instrument used

	Constructs	No of Items	Cronbach's alpha
1	Performance Expectancy	5	0.734
2	Effort Expectancy	5	0.840
3	Social Influence	5	0.780
4	Facilitating Conditions	5	0.756

According to Hair, Black, Babin and Anderson (2010), the internal consistency of a questionnaire is regarded as an acceptable instrument when all values exceed 0.7. Hence, the reliability of the scales for this research is acceptable.

4.2 Administration of the questionnaire

The researcher personally administered the questionnaire to the students, assisted by two research assistants. The questionnaire was administered to respondents using two techniques: the first, through face-to-face administration and the second, through a web-based questionnaire developed using Google Forms and housed in a password-protected folder, the data from which was accessible only by the researcher. Two data collection techniques were used using the web-based questionnaire; the first involved collecting data from students who were available and willing to participate, and the second involved asking respondents to share the questionnaire link with their colleagues and friends in the selected universities. The Statistical Package for Social Science (SPSS) analysed the data. Simple regression was used based on the need for straightforward relationships between the UTAUT/availability and adoption variables to ease interpretability and avoid complications. The results were summarised in single tables for the sake of parsimony.

5 Results

5.1 Demographic characteristics of the university undergraduates in selected universities in Ibadan, Nigeria

The demographic characteristics of the respondents are presented in this section. The respondents' demographic data include their name of institution, age, gender, level, and digital skill category, and is presented in Table 3.

Table 3: Frequency distribution of respondents' demographic characteristics

Variables		Frequency	%
Name of Institution	University of Ibadan	268	70.9
	Lead City University	103	27.2
	Dominican University	7	1.9
Total		378	100.0
Level	100	32	8.5
	200	100	26.5
	300	143	37.8
	400	87	23.0
	500	16	4.2
	600	0	0.0
Total		378	100.0
Age	16-20	153	40.5
	21-25	172	45.5
	26-above	53	14.0
Total		378	100.0
Gender	Male	193	51.1
	Female	185	49.9
Total		378	100.0
Digital Skills Category	Beginner	96	25.4
	Intermediate	234	61.9
	Advanced	48	12.7
Total		378	100.0

Table 2 shows further that the majority of respondents were undergraduates from the University of Ibadan (70.9%), followed by Lead City (27.2%) and Dominican University (1.9%). The data analysed reported a higher percentage of 300-level respondents (37.8%), followed by undergraduates in the 200 level (26.5%), immediately followed by 400 level (23.0%), 100 level (8.5%), and lastly 500 level (4.2%). The results also indicated that most students fall between the ages of 21-25 (45.5%), 40.5% of respondents fall within the range of 16-20 years, and 14% of students fall within the range of 26+ years of age. There is a higher proportion of male respondents (51.1%) than female respondents (49.9%) in the selected universities. Further results showed a majority of respondents fall within the Intermediate digital skill category (61.9%), followed by the beginner digital skill category (25.4%), and lastly, the advanced digital skills category (12.7%), indicating that the majority of the respondents were average digital literates.

5.2 Use of MOOC for Digital Skill Development

Table 4 shows the frequency distribution of respondents' use of MOOC for digital skills development. The frequency distribution of the use of respondents' use of MOOCs shows that a higher proportion of the respondents utilise MOOCs (77.8%), 72% of

respondents indicated that they have enrolled for a MOOC on a MOOC platform, and 60.8% of respondents further revealed that they completed the class they enrolled for.

Table 4: Use of MOOC for digital skills development

Variable	Yes		No	
	Frequency	%	Frequency	%
Do you use MOOC	294	77.8	84	22.2
Have you enrolled in any MOOC classes such as Coursera, Udacity, or Udemy before or now?	272	72.0	106	28.0
Did you complete the enrolled courses in the MOOC class?	230	60.8	148	39.2
Have you ever enrolled in a course on digital skill development on any MOOC platform?	263	69.6	115	30.4
Were you able to perform a digital task after using a MOOC to learn a digital skill?	273	72.2	105	27.8

In addition, 69.6% of respondents enrolled in a course on digital skills on any MOOC platform, and 72.2% of respondents revealed that they could perform a digital skill after learning digital skills using MOOC.

5.3 Further analysis

The study relates to whether performance expectancy, effort expectancy, social influence, facilitating conditions, and internet accessibility/availability relate to MOOCs. The dimensions of the UTAUT variables were reduced while retaining as much of the original variability of the dimensions of each variable as possible. This way, noise in the data would be reduced, and the complexity of the datasets would be removed. We used Bartlet's Test of Sphericity (BTS) to test the probability that the correlation matrix has significant correlations among some of the variables in a dataset as a prerequisite for principal component analysis (PCA).

Table 5: Test of Sampling Adequacy and Sphericity

	BTS	P	KMO
Performance Expectancy	$\chi2 = 802.587$, DF=10	0.000	0.793
Effort Expectancy	$\chi2 = 973.137$, DF=10	0.000	0.787
Social Influence	$\chi2 = 959.382$, DF = 10	0.000	0.820
Facilitating Conditions	$\chi2 = 364.589$, DF =10	0.000	0.746
Internet Accessibility/Availability	$\chi2 = 137.060$, DF =10	0.000	0.688

Usually, the Kaiser Meyer Olkin (KMO) test is conducted when it is necessary to examine the strength of the partial correlations to know how the factors might explain each other. KMO values closer to 1.0 are ideal while those less than 0.5 are considered

unacceptable. Table 4 shows that all the variables have significant correlations with the other variables (p<0.05) and that the KMO values are higher than 0.5. Thus, the reduction of the variables for higher analysis is accepted. Table 6 shows the principal components for each of the six factors (please see Table 1 for the full dimensions of each factor).

Table 6: Principal components of the UTAUT variables

	Loadings	Initial Eigen Value	Mean	SD
Performance Expectancy				
MOOC can improve my current digital skills	0.750	61.678	3.20	0.763
Effort Expectancy				
My interactions with MOOC platforms are clear and understandable.	0.844	65.155	2.91	0.933
Social Influence				
The attitudes and opinions of essential people influenced my decision to use MOOC to develop digital skills.	0.857	66.046	2.54	1.102
Facilitating Conditions				
I have enough money to fund my use of MOOC for digital skills development	0.745	48.427	2.85	0.846

The five dimensions of PE, EE, SI, and FC were reduced to one principal component each. The five dimensions of internet accessibility and availability (IA/A) were reduced to one principal component (PC) each. These PCs are sets of uncorrelated variables that are linear combinations of the original variables, and they have been sorted in the order in which they explain the maximum variance in the system.

5.4 Regression Analysis of Use of MOOC, UTAUT, and Internet Availability/Accessibility Factors

We chose to go through the diagnostic processes to deploy multiple regression fully. Table 7 relates to the Model Summary of the regression analysis between adoption and UTAUT/accessibility variables, with R signifying the relationship between the dependent and the independent variables. Rs that are higher than 0.6 show a high relationship and higher predictability. R Square is the proportion of the dependent variable explained by the independent variables;

Table 7: Regression Analysis Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Performance Expectancy	0.376[a]	0.141	0.132	0.388
Effort Expectancy	0.540	0.292	0.284	0.352
Social Influence	0.359	0.129	0.120	0.391
Facilitating Conditions	0.387	0.150	0.140	0.386
Internet Accessibility/Availability	0.362	0.131	0.120	0.391

Table 8 presents the ANOVA statistics for the regression model. The significant value (P) shows the significance level, indicating whether or not the regression is statistically significant or just chance. The generally accepted standard for significance is p<0.05. The results of the regression in Table 9 are significant (p=0.000). A value for the F-ratio (F) to provide an efficient model should be greater than 1. The values in the table are more significant than one, which is adequate for further analysis.

Table 8: ANOVA of the Model

Model		Sum of Squares	Df	Mean Square	F	Sig.
Performance Expectancy	Regression	9.241	4	2.310	15.363	0.000b
	Residual	56.092	373	.150		
Effort Expectancy	Regression	19.070	4	4.767	38.437	0.000b
	Residual	46.264	373	0.124		
Social Influence	Regression	8.436	4	2.109	13.825	0.000b
	Residual	56.898	373	.153		
Facilitating Conditions	Regression	9.774	4	2.443	16.404	0.000b
	Residual	55.559	373	.149		
Internet Accessibility / Availability	Regression	8.584	5	1.717	11.254	0.000b
	Residual	56.749	372	.153		

Table 9 presents the statistical coefficients that can be used to explain the linear regression between the dependent variable and the independent variables. The results of the linear regression indicate that there is a significant influence of the independent variables (performance expectancy, effort expectancy, social influence, and facilitating conditions) on the dependent variable (Use of MOOC) (p<0.05). However, there is no significant influence of Internet Accessibility/Availability on using MOOC for digital skills development (p>0.05).

Table 9: Regression Coefficients of the Regression Between Use of MOOC, UTAUT, and IA/A

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
PE	(Constant)	1.618	0.090		17.925	.000
	MOOC can improve my current digital skills	-0.124	0.027	-0.226	-4.509	.000
EE	(Constant)	1.867	0.061		30.564	.000
	My interactions with MOOC platforms are clear and understandable.	-0.221	0.020	-0.496	-11.085	.000
SI	(Constant)	1.328	0.054		24.807	.000
	The attitudes and opinions of important people in my life influenced my decision to use MOOC to develop my digital skills.	-0.042	0.019	-0.110	-2.156	.032

FC	(Constant)	1.577	0.073		21.591	.000
	I have enough money to fund my use of MOOC for digital skills development	-0.124	0.025	-0.253	-5.066	.000
IA/A	(Constant)	1.111	0.148		7.526	.000
	Do you own a smartphone that you can use to access the Internet whenever you need to?	0.198	0.133	0.077	1.486	.138
	Do you have easy access to a computer laptop, desktop or table at home or school that you can use to access the Internet when you need to?	-0.063	0.043	-0.076	-1.469	.143

Table 10 presents the statistical coefficients that can be used to explain the linear regression between MOOC use and respondents' demographic characteristics.

Table 9: Regression Coefficients of the Regression of Demographic Characteristics and Use of MOOC

	Unstandardised Coefficients		Standardised Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.577	0.105		14.972	.000
Age	0.035	0.029	0.058	1.193	.233
Gender	0.015	0.041	0.018	0.364	.716
Digital skill category	-0.234	0.034	-0.340	-6.915	.000

The table indicates that digital skills significantly explain the use of MOOC (p<0.05), but there is no significant relationship between age and gender in the use of MOOC by the respondents (p>0.05).

6 Discussion of findings

This study focuses on the use of MOOC for digital skill development in the context of the rapidly evolving digital landscape in education. A substantial number (77.8%) of the respondents reported using MOOCs, indicating a growing awareness and interest in these online learning platforms. Moreover, the information on enrollment and course completion rates offers insights into how students actively engage with MOOC content, suggesting that these platforms are being explored and utilised effectively.

The study's foundation on the Unified Theory of Acceptance and Use of Technology (UTAUT) framework underscores the rigorous theoretical framework underpinning the research. UTAUT is a widely respected model for understanding technology adoption, making the study's findings more robust. Including factors like performance expectancy, effort expectancy, social influence, facilitating conditions, and internet accessibility/availability underscores the multidimensional nature of technology adoption,

making the analysis comprehensive. Principal Component Analysis (PCA) is a sophisticated statistical technique that enhances the research's analytical rigour. By reducing the dimensions of the UTAUT variables while retaining maximum explanatory power, the researchers have ensured that the noise in the data is minimised and the complexity of the datasets is appropriately managed. This approach enhances the clarity of the findings and simplifies the interpretation of results.

The regression analysis is a cornerstone of this study, revealing significant insights into the relationships between various factors and the use of MOOCs. The Model Summary table shows how much variation in the dependent variable (use of MOOC) is explained by the independent variables (performance expectancy, effort expectancy, social influence, facilitating conditions, and internet accessibility/availability). The R-square values offer insights into the strength of these relationships. ANOVA statistics in Table 9 provide information about the overall fit of the regression model. The significant p-values ($p < 0.05$) confirm that the model is not merely due to chance, emphasising the reliability of the findings. The F-ratio values higher than one reinforce that the model is efficient and suitable for further analysis.

The coefficients in Table 7 are critical in understanding the strength and direction of the relationships. Each coefficient indicates how much the dependent variable changes for a one-unit change in the independent variable, holding other variables constant. For instance, negative coefficients for factors like performance expectancy and facilitating conditions suggest that as these factors increase, the use of MOOC decreases. This counterintuitive result could lead to intriguing discussions about the nuanced nature of technology adoption. The exploration of the relationship between demographic characteristics and the use of MOOC highlights a nuanced picture. The significant influence of the digital skill category on MOOC usage is consistent with expectations, as students with higher digital skills might be more inclined and equipped to utilise online platforms effectively. The lack of significant influence from age and gender is an exciting finding, potentially indicating that MOOC adoption transcends traditional demographic boundaries.

The study reveals a substantial adoption of MOOC for digital skill development among university undergraduates in Ibadan, Nigeria, with factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions significantly influencing usage. In contrast, demographic factors like age and gender did not

significantly impact. This study offers valuable insights into the dynamic landscape of digital education in Nigeria, focusing on MOOC usage among university undergraduates. The rigorous statistical analyses, comprehensive UTAUT framework, and multifaceted approach to understanding technology adoption provide a solid foundation for interpreting the findings. The insights into the usage of MOOC among university undergraduates offer valuable guidance for shaping educational practices, support services, and policy decisions that are aimed at fostering digital skill development and maximising the benefits of online learning platforms within the Nigerian educational context. The negative coefficients for performance expectancy and facilitating conditions influencing a decrease in MOOC usage warrant further investigation and discussion. Stakeholders should delve deeper into these unexpected outcomes to understand the nuanced dynamics of technology adoption, which may uncover crucial insights for effective implementation strategies.

Recognising the influence of the digital skill category on MOOC usage, educational institutions and policymakers should tailor support services and educational practices to cater to diverse skill levels among students. Offering varied levels of assistance and guidance could encourage greater utilisation of online learning platforms. Also, policymakers should consider the significant impact of various factors on MOOC usage highlighted in the study while formulating policies related to digital skill development. This could involve initiatives aimed at improving internet accessibility, creating a conducive environment for learning, and fostering social support for students engaging with MOOCs. The lack of significant influence from age and gender suggests that MOOC adoption transcends traditional demographic boundaries. This finding calls for a broader, more inclusive approach to educational policies and interventions that cater to a diverse range of students based on factors beyond age and gender.

7 Conclusion

The study's exploration of MOOC usage among university undergraduates in Ibadan, Nigeria, provides robust insights into the multifaceted dynamics of digital skill development within an evolving educational landscape. The comprehensive analysis, grounded in the UTAUT framework, sheds light on significant factors influencing MOOC adoption while emphasising the need for nuanced approaches to technology integration and educational policy-making.

8 Implications for Research and Society

For research, this study paves the way for advancing methodologies and frameworks, exemplified by its rigorous utilisation of UTAUT and sophisticated statistical techniques in analysing MOOC adoption among university undergraduates. For society, the study's insights underscore the imperative for inclusive educational policies and practices that transcend traditional demographic boundaries, fostering equitable access to digital skill development opportunities among diverse student populations.

9 Recommendations

Based on the findings in this study, it is recommended that:

1. There is a need for further investigation into the unexpected negative coefficients for performance expectancy, and facilitating conditions affecting a decrease in MOOC usage is crucial.

2. Stakeholders should engage in in-depth discussions to unveil underlying intricacies influencing technology adoption, fostering insights for more effective implementation strategies.

3. Educational institutions and policymakers must tailor support services and policies to cater to students' diverse digital skill levels. Providing varied levels of assistance and guidance could significantly enhance the utilisation of online learning platforms.

4. Initiatives targeting improved internet accessibility, a conducive learning environment, and fostering social support for MOOC engagement should be prioritised in policy formulations.

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