

Assessing the Barriers to Online Learning in the Built Environment Post-graduate Programmes

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Abstract

The rapid and ongoing advancement of technology, hardware, and software has significantly impacted and enhanced online learning and education. Universities globally are investing huge sums of money in online courses and degree programs. Some of the universities are offering these programs at all levels of study, ranging from bachelor's to doctoral degrees. Nonetheless, despite the swift expansion, growth and adoption of online learning, there is a lack of understanding of the unique challenges faced by students in these disciplines. Consequently, this research aims to identify barriers to online learning in the built environment programme. A quantitative research approach was adopted, which informed the use of questionnaire survey administered to 115 postgraduate students from the departments Quantity Surveying, Architecture, Building, and Engineering. Descriptive statistics, including the calculation of mean and standard deviation, was used to analyze the collected data. Findings show that the most commonly agreed upon barriers include lack of time to study, financial constraints, and resistance to change. This study offers a valuable contribution by identifying these key factors; however, further research can explore the drivers to online learning among undergraduate students and professionals undertaking continuing education.

Keywords: Barriers, Online, learning, Education

1. Introduction

Technological developments have encroached upon university/higher education and gradually shaping and changing how learners engage with content, course facilitators, and classmates, especially in online learning environments (Gillett-Swan, 2017). Online learning is defined as the deployment of technological tools to deliver learning content and promote interactive and collaborative learning regardless of geographical distance from the classroom (Cheng, 2012; Wu *et al.*, 2012). Rapid technological changes, along with hardware and software advancements, have propelled online education (Cook and Sonnenberg, 2014). The rapid growth of Information and Communication Technologies (ICTs) in the recent decades has reshaped the forms of teaching and learning in higher education (Sife, Lwoga, & Sanga, 2007). Although many forms of ICT innovations have been employed for educational purposes including “computers, the Internet, broadcasting technologies (radio and television), and telephony”. Efforts have been made to identify drivers and barriers to online learning globally (Alshwiah, 2021; Parmley, 2022). Through advancements in communications and digital devices, online education has been evolved with the potential to scale education, making it more affordable and accessible. Statistics indicate that between 0.7 to 52.1% of enrolled individuals complete online learning courses (Jordan, 2015). While there are many barriers to learning, these can become more pronounced in online setting (Parmley, 2022). Authors have reported on drivers and barriers to online learning in computer science, nursing education during the COVID-19

pandemic, and English education in Wuhan (Wen *et al.*, 2021; Zou, Ping, Li, 2021; Talbert, 2020; Achebo *et al.*, 2019). Little to no research exists in the literature identifying barriers to online learning in the built environment. Therefore, this study examines these barriers to online learning in built environment programmes.

2. Literature Review

2.1. Overview of Online Learning

Online learning has emerged as a pivotal mode of education, offering flexibility and accessibility to a diverse student population. It enables learners to engage with course materials asynchronously, accommodating various schedules and commitments (Dhawan, 2020). The digital environment fosters self-paced learning, enhancing students' self-regulation and time management skills (Broadbent, 2021). However, the efficacy of online learning is contingent upon learners' digital literacy, motivation, and the availability of institutional support systems (Rapanta *et al.*, 2021).

2.2. Barriers to Online Learning

Despite its advantages, online learning presents several challenges that can impede student success. These barriers can be categorized into technological, institutional, and learner-related factors as shown in Table 1.

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Table 1: Barriers to Online learning

Parmley (2022)	Alshwiah (2021)	Gawish, and Main (2021)	Srichanyachon (2014)	Ndzibah, Agbejule, Lotchi (2014).
1 Lack of confidence.	1 Financial problem.	1 Lack of access to learning materials.	1 Decreased live, face-to-face interaction between students and instructors.	1 Learning-teaching process.
2 Self-doubt and difficulty adapting to change.	2 Poor skills.	2 Fear of failure.	2 Lack of Internet connection.	2 Participation and attention.
3 Fear of failure.	3 Lack of resources.	3 Lack of purpose.	3 Lack of money.	3 Inadequate online learning environments.
4 Lack of goals and purpose.	4 Lack of time to study.	4 Language barriers.	4 Connection problems.	4 Lack of Technical infrastructures.
5 Lack of Technical Skills.	5 Poor quality content.	5 Low self-esteem.	5 Lack of technical skills.	5 Time management.
6 Trainer Incompetence.	6 Irrelevant course material.	6 Boredom.	6 Impairments.	6 Language barriers.
7 Noisy environments.	7 Connection problems			
8 Not paying attention.	8 Lack of technical support.			
9 Lack of internet	9 Limited feedback.			
10 Lack of resources.	10 Information overload.			
11 Disability	11 Lack of student/teacher interaction.			
12 Poverty	12 Registration issues.			
13 Lack of financial stability.	13 Time management.			
14 computers.	14 Resistance to change.			

Technological Barriers: Limited access to reliable internet connectivity, inadequate digital infrastructure, and insufficient technical support are prevalent issues, particularly in developing countries (Mairal-Llebot et al., 2024). Students often face difficulties in accessing necessary hardware and software, which hampers their ability to participate effectively in online courses (Maina, 2015).

Institutional Barriers: The rapid transition to online learning has exposed gaps in institutional readiness, including the lack of comprehensive training for educators, inadequate online pedagogical strategies, and insufficient support services for students (Mosier et al., 2024). These shortcomings can lead to suboptimal learning experiences and outcomes.

Learner-Related Barriers: Students may encounter

challenges such as decreased motivation, feelings of isolation, and difficulties in self-regulation within the online learning environment (Tandon et al., 2022). The absence of face-to-face interaction can exacerbate these issues, leading to reduced engagement and academic performance.

2.3. Barriers Specific to Built Environment Education

Built environment programs, including architecture, construction management, and quantity surveying, have unique educational requirements that pose additional challenges in the online learning context. These disciplines often rely on studio-based learning, hands-on experiences, and collaborative projects, which are difficult to replicate virtually (Asfour & Alkharoubi, 2023). A study by Altıntaş Kaptan *et al.* (2021) highlighted that architecture students

encountered significant obstacles in synchronous online learning, such as reduced interaction with instructors and peers, limited feedback on design work, and challenges in maintaining motivation. Similarly, Tandon et al. (2022) identified that the absence of physical studio environments impeded the development of critical design skills and peer learning opportunities. Furthermore, in the Nigerian context, Maina (2015) reported that the effective use of Computer-Aided Design (CAD) and Building Information Modeling (BIM) tools in architecture education is hindered by inadequate infrastructure, limited access to technology, and insufficient training. These factors contribute to a gap between academic instruction and industry requirements.

The COVID-19 pandemic has further exacerbated these challenges, necessitating a reevaluation of pedagogical approaches in built environment education. There is a pressing need for blended learning models that integrate online and face-to-face instruction to accommodate the practical components of these programs effectively (Asfour & Alkharoubi, 2023).

The literature reveals that while online learning offers flexibility and accessibility, it is often hindered by various challenges categorized as technological, institutional, and learner-related. These barriers include poor internet access, lack of digital infrastructure, inadequate support systems, and diminished student motivation. Although these challenges have been widely studied across disciplines like healthcare and computer science, limited attention has been given to how they affect built environment education programs that typically rely on hands-on, collaborative, and studio-based learning.

This study addresses that gap by examining the specific barriers faced by students in built environment programs within the Nigerian context. Given the practical and design-oriented nature of these

3. Research Methodology

A quantitative research approach was adopted for this study because it is a successful method for achieving objectivity and quantifiability (Fellows and Liu, 2015). Furthermore, the lack of understanding of the unique challenges faced by students necessitated a wider coverage of students' perceptions of the unique barriers to their online learning. That is, the nature of barriers being studied is better suited for quantitative method which requires objective measurement rather than exploratory. A similar study (Qifu, 2013) has used quantitative approach. A questionnaire administered manually was used to collect data. Several barriers were identified from literature, synthesized and used as variables in designing the questionnaire, which was administered using stratified sampling technique to postgraduate students of built environment programmes in Ahmadu Bello University (ABU) Zaria. The postgraduate students considered are from Quantity Surveying, Architecture, Building and Civil Engineering departments. A total of 375 postgraduate students were identified from the various departments' registers, and a sample size of 270 was computed using the formula by Yamane (1967). Data was analysed using descriptive statistics through the Statistical Package for the Social Sciences (SPSS) version 20.

4. Findings and Discussion

This section presents the results of the analysis, starting from the demographic information to the descriptive results of the barriers to online learning as responded by the students. Table 2 shows that of the 270 questionnaires were distributed, only 115 were retrieved, and 155 were not retrieved, 42.59% and 57.41%, respectively. Survey results with return rates lower than 30% may be considered biased, unreliable, and of little significance. However, the number of questionnaires completed and returned for this research is 42.59%, and so it is considered adequate for analysis.

Table 2: Response Rate

Item	Frequency	Percentage (%)
Not Retrieved	155	57.41%
Retrieved	115	42.59%
Distributed	270	100.00%

Source: Field Survey (2023)

disciplines, the shift to online learning presents unique challenges that have not been adequately explored in existing literature. By focusing on this under-researched area, the study provides insights that can inform more targeted pedagogical and institutional strategies for improving online learning in technical and design-intensive fields

Table 3 presents the demographic information of the respondents, showing the degree category, program of study, profession, and their years of online experience. In terms of degree category, 76.5% of the respondents are master 's students, while 23.5% are PhD students. Of the respondents , 33% are registered in the Quantity Surveying department, 20.8% in Architecture, 18.3% in Building, and 27.8% in the Civil Engineering department. Regarding years of online experience,

18.26% of the respondents have 1- 5 years , 20% have 6- 10 years , 22.6% have 11-15 years, and 39% have 16- 20 years of online experience.

and support these learners financially by providing scholarships and/or installment payments .

Table 3: Demographic Information

Respondent Information	Frequency	Percentage (%)
<u>Degree Category</u>		
MSc	88	76.52
PhD	27	23.48
<u>Programme of Study</u>		
Quantity Surveying	38	33.04
Architecture	24	20.87
Building	21	18.26
Civil Engineering	32	27.83
Years of Oline Experience	Frequency	Percentage (%)
1-5 years	21	18.26%
6-10 years	23	20.00%
11-15 years	26	22.61%
16-20 years	45	39.13%
TOTAL	115	100.00%

Source: Field Survey (2023)

Table 4 (see Appendix 1) presents the results of the analysis from SPSS, showing the ranked barriers to online learning within the built environment. "Lack of time to study, financial problems , and resistance to change" are the top three ranked barriers to online learning, with mean scores of 3.71, 3.68, and 3.66, respectively. The least ranked barriers to online learning are an unproductive or noisy environment, registration issues, and information overload, with mean scores of 3.11, 3.04, and 2.97, respectively. These results contradict the works of Roslan and Halim (2021), who found that while all students owned at least one learning device, 22.5% of the students did not have a learning space at home. Additionally, 21.9% of students lacked Wi-Fi access, and 11.2% did not have mobile broadband coverage at home. Similarly, Muilenburg and Berge (2005) suggested that students' barriers to online learning include time interruptions, a lack of motivation to use technology, infrastructure issues, perceived skills, and technical and social skills. Results show that postgraduate students are more concerned with time management and financial issues than with technical constraints such as internet access and teachers' technical skills. However, these barriers to online learning will vary from one institution to another, depending on the level of advancement in technology. Hence, technologically advanced institutions may have overcome barriers like internet access, focusing on affordability and self-discipline as more pressing issues. While unproductive or noisy environments , registration issues, and information overload were ranked as the least impactful barriers, their presence indicates the diversity of these challenges . Institutions can adopt flexible learning approaches to accommodate more constrained learners

5. Conclusion and Further Research

Technological advancement has encroached upon universities and higher education, gradually shaping and changing how learners engage with content, course facilitators, and classmates , especially in online learning environments. However, while online learning has the potential to make education more accessible and affordable, many barriers still hinder its effectiveness. Therefore, this study assessed the barriers to online learning within built environment programs , identifying key barriers, including a lack of time to study, financial problems, and resistance to change. Although the findings did not align with some previous studies, it can be understood that these barriers to online learning are context-specific. That is, the level of technological advancement within institutions may play a key role in determining the nature of barriers hindering online learning.

To address these challenges, the study recommends the following:

- I. Institutions should introduce trainings on time and change management to enable students better manage their time and struggle less in transitioning to online learning.
- II. In addition, awareness campaigns, and the use of digital platforms can ease the transitioning.
- III. Scholarships or grants can be granted by institutions to lessen the financial burden on students.

Further studies can focus on context specific mitigating measures to the barriers hindering online learning. Particularly, focusing on

institutional policies, and technological tools.

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Appendix 1**Table 4:** Barriers to online learning.

BARRIERS	MEAN	STANDARD DEVIATION	RANK
Lack of time to study	3.71	0.934	1
Financial problems	3.68	0.923	2
Resistance to change	3.66	1.067	3
Lack of focus	3.47	1.029	4
Connection problems	3.45	0.957	5
Time management	3.42	1.221	6
Irrelevant course materials	3.41	0.954	7
Limited feedback	3.37	1.188	8
Lack of purpose	3.35	1.093	9
Low self-esteem	3.34	0.990	10
Fear of failure	3.33	0.989	11
Teachers' technical skills	3.33	1.024	12
Lack of access to internet	3.32	1.031	13
Boredom	3.30	0.955	14
Lack of student/teacher interaction	3.23	1.029	15
Impairment	3.20	1.070	16
Language barriers	3.16	1.031	17
Unproductive or noisy environment	3.11	1.058	18
Registration issues	3.04	1.150	19
Information overload	2.97	1.184	20