Issues and Trends in Learning Technologies *Volume 13, Number 1, Dec 2025*

Online Learning in the New Normal: University Students' perceptions, experiences and challenges in the post-COVID-19 Era

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Abstract

The educational sector emerged as one of the most profoundly disrupted domains during the COVID-19 pandemic, with higher education institutions particularly impacted. In Ghana, pre-pandemic education was predominantly characterised by in-person instruction, where teacher-led engagement formed the foundation of classroom learning. Despite commendable efforts by the Ghana Tertiary Education Commission (GTEC) and various tertiary institutions to pivot toward online learning, the transition revealed significant systemic and infrastructural challenges that continue to hinder the effective implementation of digital education. This study sought to examine university students' perceptions and experiences of online learning during the pandemic period. Adopting a cross-sectional survey design, data were collected from a purposive sample of 346 university students. Findings indicated that students encountered numerous challenges, including difficulty accessing online lessons, downloading course materials, and engaging meaningfully with lecturers who also faced technical barriers. The results underscore the extent to which the COVID-19 crisis disrupted academic operations and exposed deep-seated vulnerabilities in the digital preparedness of higher education institutions. In light of these findings, the study advocates for a strategic expansion of ICT infrastructure across tertiary institutions in Ghana. Such investments are critical not only for enhancing educational resilience in the face of future disruptions but also for accelerating national progress toward achieving Sustainable Development Goal 4, which emphasizes inclusive and equitable quality education for all.

Keywords: Academic communication; COVID-19; digital learning; Higher Education; online teaching; social media

Introduction

The COVID-19 pandemic has profoundly shifted global perspectives, impacted nearly every aspect of daily life and catalysed a pressing need for lasting changes in personal and professional domains. This transformative period is expected to bring far-reaching implications, particularly for governance, with tertiary education emerging as one of the most severely affected sectors. The disruptions in this sector call for a pragmatic, future-oriented approach to adaptation, underscoring the need for short-, medium-, and long-term reforms to avoid repeating past mistakes. Meeting these challenges requires collaboration from all educational stakeholders to develop sustainable solutions for the future (Anifowoshe, Aborode, Ayodele, Iretiayo, & David, 2020).

Aligned with Sustainable Development Goal (SDG) 4, which aims to "ensure equal access for all women and men to affordable and quality technical, vocational, and tertiary education, including university, by 2030," education is recognised as a fundamental human right and a cornerstone for progress across the 17 SDGs. As the United Nations (2020) asserts, education serves as "a global common good and a primary driver of progress" that underpins a just, equal, inclusive, and peaceful society. However, the COVID-19 pandemic has disrupted education on an unprecedented scale, impacting both learners and educators worldwide (Ebner et al., 2020).

The higher education sector was among the most severely impacted by the pandemic, with universities compelled to suspend in-person activities in response to the outbreak. To sustain academic continuity, institutions rapidly transitioned to online modes of instruction, aiming to preserve student engagement and access to learning (The World University Rankings, 2020). eLearning platforms assumed a central role, facilitating the remote delivery of educational content and institutional support (Subedi et al., 2020). Although this abrupt shift posed significant challenges, online education, distance learning, and continuing education proved to be indispensable in maintaining academic resilience both during and beyond the pandemic. For students and educators, the shift from traditional face-to-face learning to online platforms presented a vastly different experience, one they had to quickly adapt to with limited alternatives. This shift calls for an urgent need for flexible, resilient educational frameworks that can support both teaching and learning, even in times of crisis.

Pre-COVID-19 Teaching and Learning Methods

Before the COVID-19 pandemic, education in Ghana was predominantly characterised by face-to-face instruction, with teachers facilitating learning through in-person classroom

engagement. Traditional pedagogical approaches were firmly entrenched within the educational system, fostering a consistent and familiar environment for both students and faculty. Although elements of educational technology, such as student information management systems and library management systems, had been implemented for several years (Kopp et al., 2019; Leszczyński et al., 2018), the overall instructional model remained heavily reliant on physical classroom interactions. Academic boards and university administrators demonstrated limited urgency to pursue expansive technological innovations, as institutional priorities continued to emphasise conventional, classroom-based teaching. Moreover, while information and communication technology (ICT) tools were employed primarily for administrative functions, the broader adoption of educational technologies by faculty and students was hindered by various challenges, including resistance to change and limited digital literacy (Dintoe, 2019).

Problem Statement

The COVID-19 outbreak disrupted conventional education systems globally, and Ghana was no exception. It became imperative for academic boards, university administrators, and educational officials to seek alternatives to traditional physical classroom setups. The shift required educational institutions to adopt Learning Management Systems (LMS) and other online platforms to sustain instructional continuity, intensifying reliance on technological infrastructure. Institutions like the University of Ghana (UG), Kwame Nkrumah University of Science and Technology (KNUST), and University of Education Winneba (UEW) responded rapidly, implementing online education programs to comply with social distancing guidelines (Hatsu & Asamoah, 2020). Yet, the pandemic has exposed significant challenges, especially in a country where less than half of the population has mobile internet access, accentuating a profound digital divide that hinders the effective rollout of online education. Uneven distribution of information and communication technology (ICT) resources across different populations and areas has led to access inequalities, limiting online education success (Arthur-Nyarko & Kariuki, 2019; Lembani et al., 2019).

The rapid shift has placed immense pressure on faculty members to adapt to various instructional modalities, such as hybrid and blended courses, using platforms like Zoom™, Google Classroom™, and V-campus Moodle. However, issues such as limited internet access, network unreliability, data constraints, and the lack of active student participation present formidable obstacles. Despite recent initiatives by the Ghana Education Service and universities' efforts to transition to online education, these barriers have prompted some

educators and students to question the feasibility of sustaining online education. This shift, unanticipated and unprecedented, has underscored both the resilience and limitations of Ghana's higher education institutions in navigating the digital transition, revealing a critical need for addressing the challenges that impede the successful adoption of online education.

Rationale for the Study

The motivation for this study stems from the urgent need to assess and improve the digital learning framework in Ghana's higher education sector. This area gained importance following the disruptions caused by the COVID-19 pandemic. With face-to-face instruction heavily limited, institutions had to quickly shift to online platforms, revealing significant gaps in infrastructure, digital literacy, and student engagement. Many students still encounter difficulties accessing course materials, engaging meaningfully with faculty, and maintaining academic focus, often due to limited familiarity with digital technologies, which has negatively impacted their academic performance. Additionally, Ghana's tertiary institutions have struggled to keep up with global advancements in digital education, compromising efforts to provide equitable and high-quality learning, especially during periods of crisis. This study aims to explore students' perceptions and experiences of online learning to produce evidence-based insights for educational policymakers and stakeholders. The results are intended to guide the development of effective support systems and strategic actions that can foster a more inclusive, resilient, and efficient higher education environment, one that aligns with Ghana's long-term goals for sustainable development and educational reform.

Purpose of the Study

This study is particularly relevant in the post-COVID-19 era, as it responds to Ghana's ongoing need to strengthen and sustain effective digital learning frameworks in higher education. Although emergency remote teaching provided a temporary solution during the pandemic, it also revealed persistent structural challenges, including limited access to technology, gaps in digital literacy, and unequal engagement across student populations. In the aftermath of the pandemic, there is a growing imperative to move beyond reactive measures and toward the intentional design of inclusive, resilient, and student-centred digital learning environments. By examining the current experiences and challenges faced by university students in navigating online education, this study provides critical insights into areas requiring targeted intervention, such as enhancing digital infrastructure, expanding access to resources, and fostering meaningful academic engagement. The findings are expected to

inform policy decisions by the Ghana Tertiary Education Commission and guide institutional efforts aimed at improving digital literacy, equity, and support systems in higher education. In doing so, the study contributes to Ghana's broader educational development agenda and aligns with Sustainable Development Goal 4, which advocates for inclusive and equitable quality education and lifelong learning opportunities for all.

Objectives of the study

The objectives of this study are directed towards addressing these pressing issues and challenges, encompassing:

- To examine how university students perceive online education
- To identify challenges that university students face in using online education platforms.
- To investigate the factors that hinder or influence full participation in an online class.

Research Questions

The specific research questions guiding this study are as follows:

- How do university students perceive online education with respect to its effectiveness, accessibility, and overall learning experience?
- What challenges do students encounter in the use of online education platforms within the university context?
- What key factors influence or hinder students' full participation and engagement in online learning environments?

Literature Review

The shift from traditional educational models to hybrid, blended, or entirely online formats has prompted a reassessment of teaching approaches and the integration of digital platforms. The shift in educational practices may be attributed to both the desire of administrators to use technology advancements and the increasing demand from students for engaging and interactive learning opportunities.

University Students' Perception of Online Learning

The COVID-19 pandemic has had a severe impact on education in different ways, especially in higher education institutions. Throughout the pandemic, electronic learning (eLearning) took over as the main means of knowledge transmission. In a study with 304 participants in Bangladesh, Sarkar, Das, Rahman, and Zobaer (2021) reported that most students struggled to participate in online classes and couldn't connect with their colleagues correctly. In effect, the majority of the students preferred the traditional learning method as they found it difficult to comprehend the content of online education.

The study showed that many students felt uneasy learning online. Interestingly, female students had a greater favourable attitude toward online education than male students, additionally, urban students had a higher positive attitude than rural students, according to the survey. Contrarily, Gismalla et al., (2021) researched medical students' perception towards eLearning during the COVID-19 pandemic in a high-burden developing country. The results showed that a greater number of the students thought favourably of online learning. However, numerous hindrances operated as a deterrent to using electronic technologies in medical education. According to Pokhrel and Chhetri (2021, p. 134), there are a number of drawbacks to online teaching and learning, including "the weak infrastructure for online teaching, teachers' limited exposure to online teaching, the information gap, unfavourable home learning environments, equity, and academic excellence in higher education."

Olayemi, Adamu, and Olayemi (2021) conducted a study during the COVID-19 pandemic to examine the perspectives and readiness of undergraduate students in Nigeria for online education. One hundred and forty-eight (148) undergraduate students responded to the survey. This study used a descriptive survey research design, with a structured questionnaire as the data collection instrument. A large number of respondents had a high level of information and communication technology (ICT) knowledge and proficiency needed for online education, according to the study. The outcome revealed that the students were ready and accustomed to online education. Henaku (2020) studied the Online Learning Experience of College Students in Ghana. Additionally, it was discovered that students experienced difficulties connecting to the internet, financial hardship due to the high cost of internet packages, equipment problems, and disruptions because of the need to assist with household tasks. According to Baczek et al. (2021), face-to-face instruction is more successful at improving competencies and social skills than online instruction. Students also claimed that online education has lower levels of engagement compared to traditional learning. eLearning was enjoyable by 73% of respondents.

Participation and Effectiveness of Online Learning

The rapid advancement of digital technologies has ushered in a transformative era in education, with online education platforms emerging as a prominent avenue for knowledge dissemination. As traditional classroom settings expand to virtual realms, the participation and effectiveness of online education have become central areas of exploration. This multifaceted inquiry delves into the dynamics of students' engagement, interaction, and contribution within online education environments, aiming to unravel the intricate interplay between technology, pedagogy, and learner outcomes. By examining factors such as learner performance, engagement patterns, technological interface, and the accessibility of digital resources, this study seeks to shed light on the evolving landscape of online education and its impact on modern learning paradigms.

Song, Rice, and Oh (2019) investigated online education with a focus on South Korea, where they employed a quantitative single-case research design. In their study, they explored the dynamics of online course participation and interactions involving virtual agents. Through factor and correlation analysis, they examined the interplay between learner performance, engagement with conversational agents, and involvement with the Learning Management System (LMS). The research cohort comprised 56 individuals selected from four graduate courses within an instructional technology program. The courses spanned a 15-week duration, commencing with an introductory module and culminating in a review phase followed by final paper submissions.

Shifting the focus to Indonesia, Harefa and Sihombing (2021) investigated the perceptual landscape of students regarding online education during the COVID-19 pandemic. Their findings revealed a dichotomy between students in rural and urban areas. Those situated in rural locations perceived online education as less effective compared to their urban counterparts. This discrepancy was attributed to inadequate communication networks and infrastructure prevalent in rural settings.

Vonderwell and Zachariah (2005) identified several key elements impacting online learners' participation patterns. These factors encompass technology and interface characteristics, learners' familiarity with the topic area, their designated roles as students, instructional tasks, and the challenge of information overload. Moreover, external aspects like the type of mobile device used and the availability of internet networks were highlighted as potential contributors to students' engagement in online education. Their study aimed to provide a deeper understanding of how learners engage in and contribute to online courses,

indicating that the extent of interaction or access to the learning platform is not the sole gauge of participation.

The contemporary learning landscape reflects a significant shift, with modern learners becoming avid consumers of eLearning. This trend is driven by their engagement with diverse technological innovations for various purposes (Vai, Marjorie, & Sosulski, 2015; Mohalikand & Sahoo, 2020; Ko & Rossen, 2017). The emergence of these technological tools has not only redefined the modes of learning but has also reconfigured learners' interaction dynamics, underscoring the need for comprehensive research to inform effective online instructional practices.

Challenges experienced by university students in the use of online education platforms

Though digital transformation in education is not novel, it has become very common in recent times due to COVID-19. According to Kopp et al. (2019); Leszczyski et al., (2018), digital transformation is not a recent phenomenon; higher education institutions have been linked to it for some time. The ability to use information and communication technology (ICT) in many facets of life is on the rise; thus, universities must be capable of preparing future professionals to address issues and offer solutions (Bond et al., 2018; Sandkuhl & Lehmann, 2017).

Muilenburg and Berge (2005) concluded in their study that administrative issues, technological skills, academic skills, learner motivation, social interactions, internet connectivity, time and support for studies, technical problems and cost, were some of the obstacles related to online education. Ms and Toro (2013) investigated the characteristics, benefits, drawbacks, and features that impact eLearning. The study discovered that some of the demographic features such as behaviours and cultural background impact student education in the online education field. Ms and Toro recommended that lecturers must design educational activities to make learning more effective, they should understand these features. This statement is critical for educational institutions in Ghana, where online education is still a relatively new phenomenon, particularly in deciding which eLearning platform to use.

Ribeiro (2020) noted that a number of logistical and behavioural changes accompany the digital revolution of online education and instructional delivery. A study by Fishbane and Tomer (2020) looked at what should be done by students without internet access in the time of the pandemic. The outcome revealed that as community poverty increases, internet accessibility decreases quickly. As a result, students with no or little socioeconomic means to afford a broadband connection are most at risk of falling behind or encountering new difficulties in online education.

In the context of Ghana, Henaku's study conducted in 2020 examined the lived experiences of college students grappling with the transition to online education amidst the challenging backdrop of the COVID-19 pandemic. The study brought to light a series of significant challenges that students encountered throughout their online education journey. Among the prominent hurdles, a prevailing issue was the persistent struggle with reliable internet connectivity. As many students attempted to engage in virtual classrooms and access online materials, they were frequently hindered by the unpredictability and inconsistency of their internet connections. Moreover, the financial strain imposed by the high costs of internet bundles emerged as a substantial impediment, rendering accessibility to online resources a luxury that not all students could afford.

Beyond financial constraints, students also grappled with the technological infrastructure required for effective online education. The study highlighted the stark reality that a significant portion of students lacked access to suitable devices, such as laptops or tablets, which are crucial for seamless participation in virtual classes and digital assignments. This technological deficit further accentuated the disparities in educational opportunities, exacerbating the existing divide between students with and without adequate resources. Compounding these challenges was the intrusion of household activities, which often disrupted students' engagement in online education. The blurring of boundaries between academic and domestic responsibilities proved particularly pronounced during the pandemic, as students navigated the complexities of sharing living spaces with family members engaged in their tasks and obligations. This collision of roles often led to compromised focus and reduced concentration during online education sessions.

Given the challenges, it became clear that a substantial number of students found the online education experience to be overwhelming and difficult to sustain. The cumulative impact of internet connectivity woes, financial strain, device limitations, and disruptions from household activities collectively led many students to consider discontinuing their engagement with online education platforms. Henaku's study thus sheds critical light on the intricate web of challenges that Ghanaian college students faced during the COVID-19 pandemic, prompting important reflections on the need for comprehensive support mechanisms and equitable solutions to ensure the continuity and efficacy of online education in the face of adversity.

Methodology

To investigate the perceptions, experiences, and challenges of Ghanaian university students regarding digital learning in the post-COVID-19 era, a descriptive survey research design was employed. This approach facilitated the inclusion of a substantial number of students in the study, encompassing both private and public universities, through electronic means. The survey instrument utilised in this study comprised a hybrid of closed-ended and open-ended questions. The closed-ended questions encompassed a variety of formats such as multiple-choice, yes/no, and ordinal ranked statements. Conversely, the open-ended questions provided respondents with the opportunity to expound on their perspectives, sentiments, attitudes, and comprehension of the subject matter. This comprehensive approach enabled the researchers to gain a more nuanced understanding of the participants' reported sentiments, perceptions, emotions, and grasp of the phenomenon under investigation.

Data collection was carried out over three weeks in June 2023, concluding as scheduled within the stipulated timeframe. The online survey was administered using Google Forms, a cost-effective and user-friendly platform that ensured both accessibility and consistency in the collection of student responses. A non-list-based random sampling method was employed to reach participants. Specifically, the questionnaire was distributed through student WhatsApp™ groups, leveraging peer networks and class representatives to disseminate the survey link. This approach is consistent with the methodology outlined by Fricker and Schonlau (2002), who emphasise the feasibility of selecting a probability-based sample even in the absence of a comprehensive sampling frame.

Ethical considerations

Respondents were informed about the voluntary nature of their participation in the survey. They were assured that their decision to participate or not would have no impact on their professional standing or any other aspect of their lives. It was emphasised that their involvement was entirely voluntary, and they could withdraw from the survey at any time without facing any consequences.

Before participating in the survey, respondents were provided with comprehensive information about the research objectives, procedures, and potential risks and benefits. They were informed about the nature of the data collection process and how their responses would be used exclusively for research purposes. Respondents were explicitly asked to provide their

informed consent before proceeding with the survey, ensuring they were fully aware of their rights as participants.

To ensure the privacy and confidentiality of the respondents, appropriate measures were implemented throughout the research process. All collected data, including survey responses and personal information, were treated as confidential and stored securely. Only the research team had access to the data, and strict protocols were followed to ensure that individual respondents could not be identified. Any published or reported results from the study were presented in an aggregated and anonymised manner to prevent the identification of specific individuals.

Findings and Discussions

The present research comprised a total of 255 participating students. A look into the participant composition reveals that a substantial majority, precisely 160 individuals, accounting for 62.8% of the total, were from Central University. Diving deeper into the demographic, a notable proportion of 177 respondents, translating to 69.4% of the total sample, were identified as female participants, and 74 respondents, 29.0% of the cohort, were affiliated with the University of Ghana. A distinct section of the sample, consisting of 13 students, or 5.1% of the total, represented the University of Professional Studies.
Additionally, 8 participants, accounting for 3.1% of the total, hailed from Valley View University.

A significant aspect of the participants' profiles pertains to their academic progression. 91 respondents, 35.7% of the entire sample, were first-year students. This distribution, as succinctly summarised in Table 1, serves as a foundational overview of the participants' diverse backgrounds and affiliations, laying the groundwork for a comprehensive exploration of the study's focal areas.

Respondents' Perception and Knowledge of Online Learning

Table 3 provides an in-depth investigation of the respondents' perspectives and grasp of the realm of online education. Within this context, a notable proportion of the participants, 165 individuals (64.7%) of the sample, expressed a genuine fondness for the process of learning through online platforms. Interestingly, a distinct viewpoint emerged as approximately 126 respondents, translating to 50.6% of the total, contested the notion that online lectures offered an easier learning experience compared to traditional, in-person lectures.

Among the 135 student respondents, a majority (54.7%) expressed a reluctance to continue with online education, indicating a clear preference for traditional, face-to-face

modes of learning. In contrast, approximately 57.7% (n = 146) acknowledged that online education had positively contributed to their understanding of course content. Furthermore, a significant proportion of participants (80.8%, n = 206) reported a strong sense of comfort and competence in using various digital platforms, such as Zoom™, Google Meet™, Microsoft Teams™, and Massive Open Online Courses (MOOCs), which they found instrumental in supporting their academic engagement and overall learning experience.

Notably, the findings of this study correspond with those of Almahasees, Mohsen, and Amin (2021), who explored the perspectives of faculty and students on online education during the COVID-19 pandemic in Jordan. Their research highlighted the widespread use of digital platforms such as Zoom™, Microsoft Teams™, and WhatsApp™ for extracurricular student engagement and academic collaboration. The study underscored the critical role online education played in sustaining academic continuity for both educators and learners amid the crisis. However, it also acknowledged that despite its many benefits, including increased accessibility and flexibility, online education could not fully replicate the depth of interaction and pedagogical efficacy characteristic of traditional face-to-face instruction.

These findings reinforce the notion that while students demonstrated commendable competence in navigating online platforms, the overall effectiveness of remote learning environments remains nuanced and context-dependent.

Participants in this study identified a broad spectrum of challenges associated with online education. Key among these were difficulties in adapting to digital learning environments, particularly for students with disabilities such as those who are hard-of-hearing or deaf, who faced unique accessibility barriers. A general lack of motivation and the absence of face-to-face interaction, hallmarks of traditional classroom settings, were also cited as factors that diminished student engagement. Additionally, technical issues such as unreliable internet connectivity, platform malfunctions, and concerns over data privacy and security further impeded the online learning experience.

Despite these challenges, participants acknowledged several significant benefits of online education. Chief among them was the opportunity for self-directed learning, which empowered students to take greater responsibility for their academic progress. Affordability and cost-effectiveness were also widely recognised, positioning online education as a more accessible alternative for diverse learner populations. Moreover, the inherent convenience and flexibility of online platforms allowed students to customise their study schedules to accommodate personal and professional commitments.

In summary, this finding provides a critical examination of university students' experiences with online education in the aftermath of an unprecedented global disruption. While a portion of respondents expressed a preference for traditional in-person instruction, the findings highlight the transformative potential of digital learning platforms in expanding access to education and fostering institutional resilience. The documented challenges—including limited technological access, reduced engagement, and inadequate library

support—should not be viewed merely as setbacks, but as catalysts for meaningful reform. Addressing these issues through strategic investment in digital infrastructure and targeted capacity-building initiatives for both students and faculty will be essential. By strengthening the digital education ecosystem, Ghana's tertiary institutions can move toward a more inclusive, adaptive, and future-ready model of higher education—one that is capable of withstanding future disruptions while promoting sustainable development and educational equity.

Regression Analysis of Predictors of Students' Participation in Online Learning

The focal point of this study, students' participation in online learning, was examined as the dependent variable through a regression analysis involving several predictor variables. These included gender, university affiliation, current level of study, perception of online education, familiarity with digital learning platforms, perceived effectiveness, and awareness of its limitations. The regression model revealed that gender, academic level, perception of online education, and perceived effectiveness emerged as statistically significant predictors of student engagement in online education. The model produced a statistically significant result, $F(11, 243) = 18.313$, $p < 0.001$, indicating that these four variables substantially influence students' active participation in online learning environments. Furthermore, the model demonstrated a strong explanatory capacity, with an R-squared value ($R^2 = 0.453$), signifying that 45.3% of the variance in students' participation could be attributed to the predictor variables. A comprehensive summary of these results is presented in Table 1.

These findings are consistent with existing literature on online education, particularly during the COVID-19 pandemic. The results corroborate previous studies conducted by Bataineh, Atoum, Alsmadi, and Shikhali (2020), as well as Rajab et al. (2020), which similarly documented student dissatisfaction and the multifaceted challenges associated with remote learning.

In the context of this study's geographical setting, the challenges confronting students were both pronounced and multifaceted. Many participants reported difficulty accessing online lessons and downloading course materials, often due to inconsistent internet connectivity. Interactions between students and lecturers during virtual classes were frequently disrupted, with students experiencing lengthy interruptions while attempting to reconnect to ongoing sessions. These interruptions negatively impacted the continuity and effectiveness of online engagement.

In addition, technological unfamiliarity emerged as a significant barrier to full participation, particularly among students lacking prior exposure to online education platforms. The unavailability of library resources during remote learning further exacerbated the situation, depriving students of essential academic materials. Moreover, the frequent intrusion of mobile phone calls during virtual classes disrupted students' concentration and engagement, undermining the learning experience. These challenges collectively underscore

the urgent need for strategic interventions aimed at improving digital infrastructure, increasing digital literacy, and ensuring equitable access to academic resources in Ghana's higher education institutions.

Table 1: Regression Analysis of Predictors of Students' Participation in Online Education

Participation	**B**	**St. Err.**	**t-value**	**p-value**	**[95% Conf**	**Interval]**	**Sig**
Gender							
Female	Ref						
Male	-1.738	0.813	-2.140	**0.034**	-3.339	-0.137	**
University							
UPS	Ref						
CU	1.166	1.620	0.720	0.472	-2.025	4.357	
UG	0.589	1.603	0.370	0.714	-2.569	3.747	
VVU	-0.135	2.312	-0.060	0.954	-4.688	4.419	
Current level							
100	Ref						
200	-3.074	0.970	-3.170	**0.002**	-4.985	-1.163	***
300	0.105	1.048	0.100	0.920	-1.959	2.170	
400	-1.478	1.483	-1.000	0.320	-4.399	1.443	
POL	-0.873	0.347	-2.510	**0.013**	-1.558	-0.189	**
POK	0.466	0.632	0.740	0.462	-0.779	1.711	
EOL	0.706	0.068	10.440	**0.000**	0.573	0.839	***
CES	0.050	0.047	1.080	0.283	-0.042	0.142	
Constant	15.563	2.424	6.420	0.000	10.788	20.338	***
Mean dependent var			27.447	SD dependent var			6.666
R-squared			0.453	Number of Obs			255
F-test			18.313	Prob > F			0.000
Akaike crit. (AIC)			1560.185	Bayesian crit. (BIC)			1602.68

*** *p<.01, ** p<.05, * p<.1*

Note: UPS – University of Professional Studies, CU – Central University, UG – University of Ghana, VVU – Valley View University, POL – Perception of online education, POK – Perception of Knowledge of online education, EOL – Effectiveness of online education, CES – Challenges experienced by the student using online education platforms.

Difficulties Students Encounter When Using Online Learning Platforms

Table 4 presents a summary of the challenges students experienced while engaging with online education platforms. The findings reveal a landscape of both technical and contextual barriers to effective participation.

A significant proportion of students. 140 respondents (54.9%) reported a lack of familiarity with online technologies, indicating that limited digital competence hindered their ability to engage fully in virtual learning environments. While 105 students (41.2%) disagreed or strongly disagreed that lecturers struggled with connectivity during online classes, approximately 97 participants (38.1%) identified the lack of access to library resources as a notable obstacle to effective online learning.

Interestingly, 137 respondents (53.8%) did not view internet access as a major challenge; however, 164 students (64.3%) acknowledged that the additional costs associated with internet subscription constituted a financial burden. This suggests that while connectivity may be technically available, the affordability of sustained access remains problematic for many students.

Furthermore, 128 respondents (50.2%) indicated that incoming phone calls during lectures disrupted their concentration, pointing to a unique but underexplored issue of mobile-based learning environments. Regarding connectivity interruptions, nearly half of the students—118 (46.3%)—reported that they were able to reconnect with little or no delay, suggesting some level of adaptability within the student body.

The clarity of lecture slides shared via Zoom™ was affirmed by 108 respondents (42.3%), reflecting moderate satisfaction with visual content delivery. However, 98 students (38.5%) reported difficulty in submitting quizzes or examinations within specified time limits, indicating ongoing challenges with assessment management in the online format.

The results align with findings from Mahyoob (2020), who reported that students across various contexts faced technological, academic, and communication-related barriers during the COVID-19 pandemic. Similarly, the International Association of Universities (2020) conducted a global survey, which revealed that the pandemic disrupted nearly all institutional operations, adversely impacting the quality of academic delivery and reinforcing disparities in access to educational opportunities.

Taken together, these findings underscore the multifaceted nature of challenges confronting students in online education. They highlight the urgent need for institutions to strengthen digital infrastructure, enhance student preparedness through targeted training, and adopt inclusive strategies that consider the socioeconomic realities of learners.

Table 2: Background Characteristics of the study participants

Characteristics	Frequency %
Gender	
Female	177 (69.4)
Male	78 (30.6)

University	
Central University	160 (62.8)
University of Ghana	74 (29.0)
University of Professionals study	13 (5.1)
Valley View University	8 (3.1)
Current Level	
100	91 (35.7)
200	57 (22.4)
300	82 (32.2)
400	25 (9.8)

Table 3: Perception and Knowledge of Online Learning

Variables	**Frequency %**
I like online learning.	
No	90 (35.3)
Yes	165 (64.7)
Online lectures are easier than traditional lectures.	
No	126 (50.6)
Yes	123 (49.4)
I wish to continue online learning for a more extended period.	
No	135 (54.7)
Yes	112 (45.3)
Online learning helps me understand the course.	
No	107 (42.3)
Yes	146 (57.7)
I am comfortable using online learning platforms, e.g., Zoom, Google Meets, Teams, MOCC, etc.	
No	49 (19.2)
Yes	206 (80.8)

Table 1: Challenges faced by students in the use of online education platforms

Statement	**Frequency**	**Per cent %**	
Lecturers struggle to connect with students during online classes.			
Strongly Disagree	69	27.1	41.2
Disagree	36	14.1	
Neutral	66	25.9	
Agree	32	12.5	32.9
Strongly Agree	52	20.4	
Lack of familiarity with online technologies makes it difficult for me to participate.			
Strongly Disagree	27	10.6	20.4
Disagree	25	9.8	

Neutral	63	24.7	
Agree	43	16.9	54.9
Strongly Agree	97	38.0	
Access to reliable sources of the internet is always a challenge.			
Strongly Disagree	93	36.5	53.8
Disagree	44	17.3	
Neutral	52	20.4	
Agree	33	12.9	25.8
Strongly Agree	33	12.9	
I have no access to library resources with the online classes.			
Strongly Disagree	50	19.6	36.1
Disagree	42	16.5	
Neutral	66	25.9	
Agree	27	10.6	38.1
Strongly Agree	70	27.5	
Phone call interference makes it difficult for me to concentrate on my classes.			
Strongly Disagree	25	9.8	24.3
Disagree	37	14.5	
Neutral	65	25.5	
Agree	54	21.2	50.2
Strongly Agree	74	29.0	
I spend long hours trying to reconnect to my class anytime there is an interruption.			
Strongly Disagree	75	29.4	46.3
Disagree	43	16.9	
Neutral	72	28.2	
Agree	31	12.2	25.5
Strongly Agree	34	13.3	
Slides shared on Zoom most of the time do not appear clear.			
Strongly Disagree	72	28.2	42.3
Disagree	36	14.1	
Neutral	67	26.3	
Agree	33	12.9	31.3
Strongly Agree	47	18.4	
I have never been able to finish my quizzes/exams online within the specified time.			
Strongly Disagree	50	19.6	34.9
Disagree	39	15.3	
Neutral	68	26.7	
Agree	28	11.0	38.5
Strongly Agree	70	27.5	

My mobile phone does not support online applications, i.e., Moodle, Zoom, etc.			
Strongly Disagree	115	45.1	63.5
Disagree	47	18.4	
Neutral	39	15.3	
Agree	12	4.7	21.2
Strongly Agree	42	16.5	
The added expense of purchasing data daily is my challenge.			
Strongly Disagree	33	12.9	19.2
Disagree	16	6.3	
Neutral	42	16.5	
Agree	15	5.9	64.3
Strongly Agree	149	58.4	
Online learning does not offer the opportunity for tutorial classes.			
Strongly Disagree	33	12.9	28.2
Disagree	39	15.3	
Neutral	74	29.0	
Agree	52	20.4	42.8
Strongly Agree	57	22.4	

Recommendations and Implications for Research

The findings of this study provide valuable insights into strategies for improving the quality, accessibility, and sustainability of online learning within Ghana's higher education institutions. Strengthening information and communication technology (ICT) infrastructure remains critical for effective teaching and learning in the post-COVID-19 era. Universities should invest in expanding digital infrastructure and providing continuous training for faculty and students to enhance digital literacy and confidence. Equipping stakeholders with the necessary technological skills will improve instructional delivery, support interactive learning, and ensure greater participation in online courses. Additionally, universities must enhance access to digital academic resources through institutional repositories, e-libraries, and expanded subscriptions to academic databases, enabling students to engage more meaningfully in online learning.

To promote equitable access to online education, collaboration between the government and telecommunication companies is essential. Such partnerships should focus on providing affordable and reliable internet connectivity by offering subsidised data packages tailored for academic use. This will reduce the financial burden on students while encouraging consistent participation in online learning activities. Similarly, expanding the Ministry of Education's 'One-Student, One-Laptop' initiative to include tertiary students would significantly improve access to digital learning tools, minimise mobile phone distractions during classes, and promote inclusivity in virtual education environments.

Institutions should also establish comprehensive student support mechanisms to address both technological and academic challenges associated with online learning. These mechanisms may include real-time technical support, flexible learning schedules, academic counselling, and systems for collecting and acting upon student feedback. Such initiatives will foster a more inclusive and responsive learning

environment. In addition, existing initiatives such as the Ghana Academic and Research Network (GARNET) should be scaled up and better coordinated across public and private universities to sustain digital transformation efforts and ensure that online education becomes a central feature of Ghana's tertiary education system.

From a research perspective, the study highlights several areas that warrant further investigation. Future studies should examine the long-term impact of online learning adoption on student outcomes, motivation, and digital competence. Researchers should also explore policy implementation gaps and how institutional readiness affects the success of online education initiatives. Furthermore, understanding equity issues, particularly how socio-economic and geographical factors influence online learning participation, remains crucial. Finally, more research is needed on innovative pedagogical approaches, the effectiveness of blended learning models, and cross-institutional collaborations that can enhance the quality and scalability of online learning in Ghana. Addressing these research gaps will provide evidence-based guidance for policymakers, educators, and stakeholders committed to building a resilient and inclusive digital education ecosystem.

Conclusion

This study has highlighted several critical challenges that impede students' full participation in online education within the Ghanaian higher education context. Key issues included limited internet accessibility, high data costs, and difficulties in submitting assessments on time—factors that collectively contributed to dissatisfaction with the online learning experience. Additionally, disruptions caused by mobile phone interference and limited access to digital library resources emerged as significant barriers to concentration and academic performance.

Despite these challenges, the study also identified the transformative potential of online education, particularly in its flexibility and ability to accommodate diverse learner needs. However, for this potential to be fully realized, institutions must implement strategic reforms aimed at enhancing technological infrastructure, expanding access to academic resources, and reducing financial and technical barriers. Addressing these concerns will be essential to fostering a more inclusive, resilient, and future-ready higher education system in Ghana—one capable of adapting to disruptions while promoting equitable access to quality learning opportunities.

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