

## E-Learning in the Post-COVID Era: Experiences of Tertiary Students

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### Abstract

The present study sought to unearth challenges capable of confounding the success of e-learning and elicit the best practices. A total of 382 (291 undergraduate and 90 postgraduate) students from the University of Cape Coast in Ghana participated in this cross-sectional survey study. Data were collected using a structured questionnaire, which was conducted both in-person and online. The data were analysed using frequencies, percentages, correlation, and MANOVA. Key findings were that students found the e-learning sessions complicated. Specific challenges included access to an internet network, data cost, low IT skills, and e-classroom proficiency. It is recommended that universities and policymakers in Ghana take proactive steps to enhance digital literacy, provide affordable internet packages, and support students with computer literacy training to improve e-learning. Special measures should be implemented to address gender disparities by introducing targeted programmes for women to ensure equal participation in digital education. Additionally, e-learning initiatives should be designed with inclusivity in mind, considering the unique needs of students in collectivist cultures to foster effective and socially engaging learning environments. Implications from the study are particularly relevant for non-WEIRD (non-Western Educated Industrialised Rich Democratic) institutions.

**Key terms:** COVID-19 pandemic, e-classroom, educational technology, e-learning

## INTRODUCTION

E-learning is a mode of learning that takes place electronically, often via the Internet (Nichols, 2003; Mishra, 2008; Chitra & Raj, 2018; Simanihuruk, 2019; Peck, 2024). Otherwise described, e-learning is a type of instruction facilitated and supported by the use of information and communications technology. It involves students' use of electronic devices such as computers, tablets, and cell phones—usually their personal devices, but in certain instances, students depend on institutional devices as well. E-learning became a crucial mode of education during the COVID-19 pandemic, offering flexibility and accessibility when traditional face-to-face learning was disrupted. With e-learning, students theoretically can learn at any hour or place, so far as they can access a device and a data connection or WIFI.

Learning management systems effectively facilitate e-learning as these platforms can encapsulate students' courses, assessments, and grades. E-learning courses can be conducted live where students can digitally participate in lessons through the use of tools, apps, and a variety of other communication preferences. Alternatively, pre-recorded modules are available to guide students through their materials. E-learning mechanisms such as gamification and online polling and discussions are all means of facilitating interactive learning environments. Post-COVID, while many institutions have returned to in-person learning, e-learning continues to be a key component, offering both synchronous and asynchronous learning opportunities.

The distinctive rise of e-learning has revolutionised how teachers teach and the way students learn so that present-day teaching and learning can be done remotely on digital platforms. Thus, the developments in e-learning have altered the role of the teacher and the learning experiences of students, engendering a potentially more flexible and self-directed future where students progressively study from places other than the school (Celestino & Noronha, 2021). E-learning can provide better support for the less able, involve students who do not react actively to 'traditional' classroom learning, serve as a platform for hastened learning for gifted and talented students, and create independent learning skills through a personalised learning experience. Increased

development with e-learning in schools permits more flexible use of school buildings and the school day, as well as vertical grouping and movement of students. In the United Kingdom, for example, the enhanced connectivity of schools to the internet through broadband has given a greater opportunity for school managers to present and make use of e-learning materials across the school curriculum (Hesketh & Selwyn, 1999). Relative to conventional distance learning delivery agents, e-learning provides improved accessibility of courses that can be self-paced and available through the internet at a time that suits the learner. Perhaps surprisingly, e-learning has been shown to enhance retention rates due to the fact that materials are personalised and reflect different learning styles (Urdan & Weggen, 2000).

While e-learning has transformed education by providing flexibility and personalised learning experiences, existing research has largely overlooked the critical barriers that limit its full potential. Previous studies on e-learning have primarily concentrated on specific factors, such as the availability and effectiveness of technological tools (Hasan et al., 2021; Timotheou et al., 2023; Wolniak & Stecuła, 2024). Brackett, 2024), its impact on student motivation and outcomes (Yahiaoui et al., 2022), and the advantages and disadvantages of e-learning (Al Rawashdeh et al., 2021).

However, the broader, interconnected challenges that influence the overall success of e-learning remain underexplored. Factors such as inadequate infrastructure, insufficient teacher training, and ineffective learning management systems (Qashou, 2022; Semlambo et al., 2022) have been reported to continue to hinder the full realisation of the benefits of e-learning. This study sought to address this gap by identifying the primary barriers to e-learning success in higher education and offering recommendations to improve its effectiveness and ensure equitable access to quality education. This is imperative as e-learning enhances its effectiveness while ensuring equitable access to quality education.

## LITERATURE REVIEW

E-learning has rapidly become a significant component of higher education, offering numerous benefits that enhance the learning experiences among students.

Studies (Kokoc, 2019; Culdaz, 2024) show that e-learning provides students with greater flexibility and accessibility, enabling them to engage with course materials at their own pace. According to Enancio (2021), e-learning not only facilitates knowledge acquisition but also improves student motivation and engagement by fostering a more interactive and personalised learning environment. Similarly, Yahiaoui et al. (2022) emphasise that e-learning has a positive impact on student outcomes, such as knowledge, skills, and attitudes, particularly when technical requirements and perceived value are well-established. The integration of big data and advanced technologies further enhances e-learning systems, enabling a more customised learning experience that adapts to the needs of individual learners (Liu & Yu, 2022).

Despite the numerous benefits, several factors have been identified as barriers to the success of e-learning. For example, Kisanga and Ireson (2015) reported that there are challenges for instructors and students in conducting online lessons; such challenges include the selection of tools, equipment, apps, and communication preferences that are numerous, widely open, and available. Advocates of traditional teaching methods often criticise e-learning, viewing it as just a training tool rather than a true reflection of the traditional classroom environment, which fosters debate, discussion, and interactive learning. However, other researchers argue that advances in e-learning tools are now allowing opportunities for such elements to be engaged and e-learning to evolve into a virtual classroom. Additionally, Joshi et al. (2020) emphasise the importance of face-to-face interaction in the learning process, noting that the absence of direct contact in e-learning can lead to lower engagement and diminished educational quality. This challenge is even more pronounced in areas where both students and educators lack the necessary tools and training to effectively transition to online education. Furthermore, Stecuła and Wolniak (2022) underscore the social isolation that e-learning can create, as students experience limited interaction with their peers and instructors.

Turnbull et al. (2021) examined how higher education institutions worldwide responded to the challenge of transitioning to e-learning during the COVID-19 pandemic. Their research revealed that while many

institutions quickly adopted online learning platforms, challenges such as logistical issues, faculty resistance, and the need for rapid training remained prominent. Similarly, the transition to e-learning in Ghana faces obstacles due to the limited resources available to educational institutions and the population at large. As noted by Kisanga and Ireson (2015), e-learning success is contingent upon having adequate infrastructure, support systems, and a readiness to embrace technological changes. In Ghana, where internet connectivity is often unreliable, and many students do not have access to necessary devices, the shift to online education can be a struggle. The challenges faced by educators in adapting to e-learning platforms, as highlighted by Joshi et al. (2020) and Stecuła and Wolniak (2024), are also relevant in the Ghanaian context, where many instructors may not have received adequate training in online pedagogy.

Despite these barriers, there is a growing recognition of the potential of e-learning to transform education in Ghana and other developing countries. By examining the challenges and opportunities specific to Ghana, the current study aims to contribute to the development of more effective and inclusive e-learning strategies that can enhance access to education and improve learning outcomes for students. This study, therefore, sought to assess university students' experiences of e-learning as a mode of instructional delivery in Ghana. In particular, the study examined accessibility to internet-connected devices, availability of internet and power, and students' preparedness and literacy aptitude to participate in e-learning as a medium of instruction. Finally, the study assessed the impact of e-learning on the psychosocial resources that are assumed to be present in the traditional face-to-face classroom. The specific questions and hypotheses were:

## Research Questions

RQ1: What is the nature of the devices that students use for e-learning lessons?

RQ2: What challenges do students encounter while accessing the internet and data for e-learning lessons?

RQ3: What are the psychosocial challenges associated with e-learning?

RQ4: What are the e-classroom proficiency challenges that students encounter with e-learning?

## METHODOLOGY

The study employed a descriptive survey design to gather information about their e-learning experiences from undergraduate and postgraduate students at the University of Cape Coast in Ghana. This design was selected for its ability to provide detailed insights into students' attitudes, challenges, and overall engagement with e-learning (Prime, 2024). The study involved 382 (253 males and 129 females) undergraduate and postgraduate students pursuing various programmes at the University of Cape Coast, with ages ranging from 20 to 54 years and an average age of 33.57 years (SD = 6.65). There were 90 postgraduate and 291 undergraduate students. The sample was obtained through convenient sampling due to the era (COVID-19 pandemic) in which the data was collected and the issues under investigation. Participants' consent was received prior to their participation in this research. This research was approved by the ethics committee of the University of Cape Coast.

Data was obtained through both in-person and online distribution of a structured questionnaire. The questionnaire was developed purposely for this study by the researchers through a careful review of the

literature regarding e-learning and taking into consideration the objectives of the study. The items were carefully generated, content validated by IT experts and lecturers, and finally pilot-tested within one of the faculties in the university. The data were analysed using frequencies and percentages to summarise the challenges faced by students, means and standard deviations to assess the extent of these challenges across four domains, and Pearson's product-moment correlation coefficient to examine the relationship between participants' ages and the challenges experienced.

## FINDINGS AND DISCUSSION

### What is the Nature of the Devices That Students Use For E-Learning Lessons?

The object of this research question was to ascertain the kinds of devices that students used for their e-learning lessons, who owns the devices and what the state of the devices were. In response to the question, 'Which device did you use for the e-learning lessons and who owned the device?' a summary of responses regarding devices used is shown in Table 1. It indicates that the majority of students used cell phones, while about one-third used laptops.

**Table 1: Devices Used for the E-Learning Lessons**

Type of Device	Frequency	Per cent
Laptop	132	34.6
Computer	20	5.2
Cell phone	215	56.3
Tablet	12	3.1
I-PAD	3	.8
Total	382	100.0

Smaller minorities of students used either tablets, iPads, or desktop computers. Most of the respondents (359; 94%) indicated that the devices they used for the lessons belonged to them, while 4.7 per cent reported that the device belonged to friends, only one respondent used a device belonging to an employer, and four used devices owned by their family members. No student indicated the use of an institutional device, perhaps because the e-learning sessions were conducted at a time when students had limited access to campus due to lockdown regulations by the government to prevent community transmission of

the pandemic. There are also anecdotal reports from the University of Cape Coast indicating that the university's computers do not have the features and applications needed to engage in e-learning. In the words of Dadzie (2009), a specific institutional policy to support online teaching is relevant to ensure that there is a standardised use of e-learning tools in order to provide guidelines and rules for conducting online teaching.

## General Perception/View of the E-Learning Sessions

This study also examined how the respondents found the e-learning sessions. Results showed that quite a significant percentage (69.4%) found it complicated,

with 25.7 per cent and 5 per cent respectively being of the view that the sessions were simple, or very simple. The results are displayed in Table 2.

**Table 2: E-Learning Experience in Encountered Degrees of Complexity**

Description	Frequency	Percentage
Very Complicated	81	21.2
Complicated	184	48.2
Simple	98	25.7
Very Simple	19	5.0
Total	382	100.0

## Challenges with Access to Device, Quality of Device, Internet/Bundle, and IT Literacy

### Access to and Quality of Devices

The study further investigated challenges experienced by students with regard to access to devices, quality of devices, internet access and data bundle, and ability to use the e-learning platforms and engage in e-classrooms. The study further explored the psychosocial challenges students might have experienced during the e-learning sessions. The results indicated that about one-fourth of the students used devices that were not functioning properly, while

about half of them used devices that had difficulties connecting to the internet or were extremely slow. A few of them had used devices with faulty keypads, while some of the devices had weak batteries and could not last beyond two hours without connecting to a power source. Twenty-nine per cent indicated that they did not have any challenges with the electric power supply during the e-learning sessions, while most (57.1%) had occasional power challenges, with the rest having frequent power challenges. This information is expressed in Table 3.

**Table 3: Access to and Quality of Devices**

Description	Percentage%
Was not functioning properly	27.8
Could not connect to the internet	50.0
Did not have a camera feature	26.0
Was too slow	55.2
Had faulty keypads	16.0
Could not stay on for a long period of time (e.g., up to 2 hrs)	53.4
Had a poor sound, and I could not hear what the lecturers said	48.4

### Internet Access and Data Bundle Challenges

Regarding access to the internet and data bundles, 50 per cent of the students indicated that they did not have internet access at their locations, while 72.7 per cent and 85.6 per cent complained about poor internet access and the high cost of data bundles, respectively. Further, 47.9 per cent indicated that they could not get data to purchase at their locations. The results seem to confirm a report by Akakpo (2008) that the majority of Internet Service Providers (ISPs) in Ghana are located in the capital cities, with a few service providers visible in one or two regional capitals

and mining communities around the country, whereas a few others provide Wide Area Network connectivity via Virtual Private Networks to banks with branches dotted around the country. As such, the status of Internet connectivity and energy in rural Ghana is quite disheartening, such that for e-learning sessions, students who are located in such rural areas will definitely find it difficult to participate. In the words of Mohammed (2019), steady access to the internet remains a problem in Ghana, and Ghana's internet is unacceptable for the vast majority of users. Mohammed (2019) attributes many of the problems to

the mobile service providers owning the entire market and a lack of government investment. In the Afrobarometer Round 8, Dome and Armah-Attoh (2020) reported that many students, particularly those living in rural or poor households in Ghana, will find it difficult or impossible to participate in e-learning initiatives because they do not have access to the required devices, to the internet, or to reliable electricity. Thus, the present results not only reveal the e-learning challenges among students but also broaden our understanding of the status of internet service and electricity coverage and accessibility status in Ghana. Further analysis revealed cost (85.6% of the participants) as a barrier to internet accessibility, and this finding was quite expected because, in 2017, the Alliance for Affordable Internet reported that Ghanaians spend an average of 3.89 per cent of income on 1GB of data per month. A comprehensive account of broadband services in Ghana shows that

they are comparatively expensive and, thus, remain a luxury commodity for many Ghanaians. According to the ITU, a prepaid 500MB mobile handset mobile broadband package in Ghana costs 9 per cent of Gross National Income (GNI) per capita, almost double the UN's 5 per cent target, and ranks Ghana 96 out of 126 countries. A prepaid 1GB Internet bundle package costs 11.3 per cent of GNI per capita, which gives Ghana a rank of 90 out of 124 countries. It is important to note that many Ghanaians do not earn close to the official GNI per capita figure of \$1,410 per annum (Jorge, 2017). At the end of 2012, the ITU reported that only 17.1 per cent of Ghanaians used the internet, and the cost was cited as the primary reason for not accessing the internet, with almost 60 per cent of respondents indicating that the internet is too expensive to use (Alliance for Affordable Internet, 2017). Table 4 provides a summary of the internet access and data bundle domain.

**Table 4: Access to Internet and Data Bundle**

Description	Percentage%
I did not have access to the internet in my area	47.6
The internet connectivity at my location was poor	72.5
The cost of data was too much for me	85.6
I could not get data to buy for the exercise	47.9

### IT and E-Classroom Proficiency Challenges

The participants indicated that they struggled with the use of e-learning tools and applications. We assume that the underpinning challenge was poor knowledge and preparation towards the e-learning system. Otherwise described, the sudden transition to an e-classroom in response to the pandemic did not provide adequate preparation time for the students. It is worth mentioning that some degree of computer literacy is required for e-lessons, without which students may not be functional in communicating on such platforms. In a country like Ghana, where computer literacy is already low (Thomas, 2019; Sawa, 2019), preparatory training for e-learning is very much needed. This view is supported by research reporting a significant positive relationship between computer literacy and online learning attitudes among students

(Li & Lee, 2016). Previous exposure to computers is an important factor for successful e-learning practices among students (Link & Marz, 2006). Even in Taiwan, where computer literacy is assumed to be quite widespread, a study exploring graduate students' competencies in computer use and their attitudes toward online learning in asynchronous online courses of distance learning programs showed that there is a considerable positive relationship between computer literacy and online learning attitude among the students. In a system like Ghana, where digital citizenship was somewhat imposed on most students at the height of the pandemic, low IT literacy was generally going to cause problems with the success of e-learning. The results of participants' responses are expressed.

**Table 5: IT and E-Classroom Proficiency Challenges**

Description	Percentage
I did not have enough training on how to use the internet	36.7%
I did not know how to use the cyber for lectures	38.7%
I got confused when my computer's settings changed a little	42.9%
I did not understand the emojis on the computer	26.7%
I did not know how to type my concerns and contributions	28%
I did not know how to use emojis to communicate.	28%
I found the general e-learning activities to be far beyond my computer competencies.	20.2%

### E-Learning Psychosocial Challenges

It is intriguing that a greater percentage (63.1%) of the participants noted that the e-learning sessions were disrupted by noise because their colleagues were not disciplined enough to mute their microphones when either the instructor or someone else was supposed to be talking. Our understanding is that since most of the students were not familiar with the e-learning resources, they might have unconsciously kept their microphones on and consequently caused inconveniences through their immediate locational signals and feedback. Put another way, such disturbances and interruptions during e-lessons could be an index of students' inexperience in the use of e-learning tools and applications. A significant few (29.8%) also indicated that they felt lonely in the e-classrooms. Arguably, a protagonist of traditional teaching and learning describes e-learning as training in contrast to the traditional classroom situation that engenders debate (Twum et al., 2021). Thus, the physical face-to-face interaction is assumed to possess some inherent psychosocial fulfilment and

empowerment, which is perceived to be missing in virtual classrooms.

In a seminal study, Govender et al. (2021) showed that the potential impact of the COVID-19 outbreak on the academic and psychosocial well-being of students warrants further exploration because the associated rapid changes and disruption to normal academic life has left many students feeling socially isolated and stressed by having to cope with enormous uncertainty. Contrary to this present assertion of loneliness, Kurtz et al. (2009) have shown that there is no correlation between loneliness and student attitudes toward e-learning. We assume that, since the Ghanaian culture is predominantly collectivistic, people tend to value face-to-face relationships, social interaction and discussions. For individuals from collectivistic environments, group discussion and cooperative work remain relevant, and any action that reduces such interactions becomes a threat to their psychosocial well-being. The survey results concerning e-classroom psychosocial challenges are expressed in Table 6.

**Table 6: E-Classroom and Psychosocial Challenges.**

Description	Percentage%
I felt lonely during lectures	29.8
It was boring to hear voices without seeing the physical presence	53.4
Interaction among friends was difficult, such as having group discussions	74.3
My colleagues were not disciplined in muting their microphones	63.1

### E-Learning Experience Domains and Age of Participants

Pearson's product-moment correlation test (Table 7) shows that the age of the respondents related negatively with only their access to the internet and

data bundle,  $r_{(380)} = -.197, p < .001$ . The challenges to internet access were positively related to psychosocial challenges and level of proficiency challenges. Finally, the results showed that challenges with IT literacy and proficiency with the use of the e-classroom

significantly related positively to psychosocial challenges. The correlation analyses confirm the earlier speculation that the psychosocial challenges that students faced were motivated by their low level of IT and e-classroom proficiency. If a student does not know how to use tools and apps to interact during e-lessons, it limits his/her engagements in the e-classroom and subsequently impairs the student's psychosocial attainments. They also tend to bother others, for example, by transmitting their locational

signals and disturbing the group because their microphone is left unmuted. Regarding access to the internet and data bundle, we assume that since younger students are predominantly full-time students who do not work, they tend to depend on their parents and caretakers for the internet and data bundle and thus may not have it as accessible as the older ones who work and use their own finances.

**Table 7: Pearson Product-Moment Correlation Coefficients between E-Learning Experience Domains and Age**

		AGE	Internet access	Proficiency	Psychosocial
<b>AGE</b>	Pearson Correlation	1			
	Sig. (2-tailed)				
<b>Internet access</b>	Pearson Correlation	-.197**	1		
	Sig. (2-tailed)	.000			
<b>Proficiency</b>	Pearson Correlation	.077	.357**	1	
	Sig. (2-tailed)	.131	.000	1	
<b>Psychosocial</b>	Pearson Correlation	-.034	.374**	.398**	1
	Sig. (2-tailed)	.510	.000	.000	

### Sex and Programme Level Mean Differences

To test whether the extent of challenges experienced by the students differed based on their sex (male-female) and level of programme (undergraduate-postgraduate) across the four domains of access/quality of devices, proficiency, access to

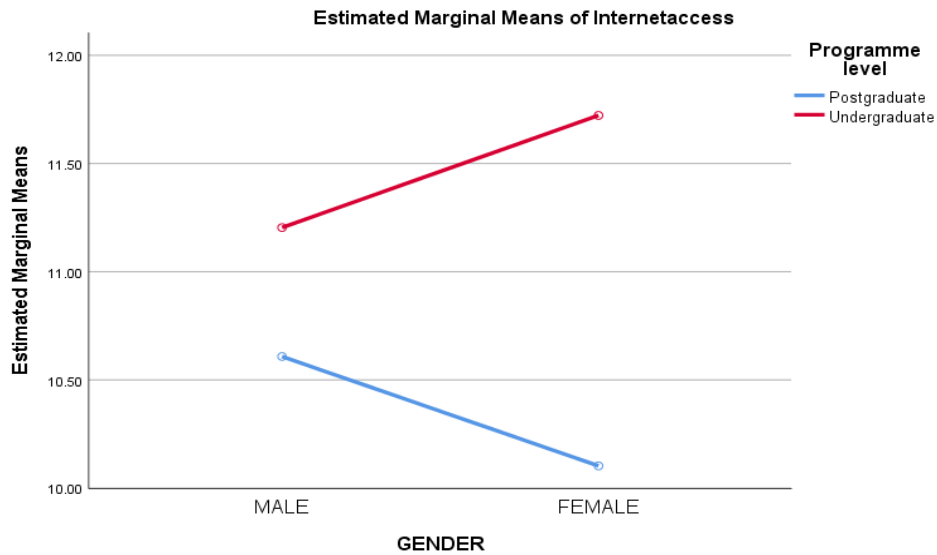
internet and data bundle, and psychosocial challenges, a two-way between-group multivariate analysis of variance (MANOVA) was performed. Table 8 shows the means and standard deviation of scores on the four domains across programme levels and the sex of respondents.

**Table 8: Means and Standard Deviations for the Various Domains, with Sex and Programme Level Distributions**

Domains	GENDER	Programme level	Mean	Std. Deviation	N
Internet access	MALE	Postgraduate	10.61	2.42	51
		Undergraduate	11.21	2.46	198
		Total	11.08	2.46	249
	FEMALE	Postgraduate	10.10	2.76	39
		Undergraduate	11.67	2.28	89
		Total	11.19	2.53	128
	Total	Postgraduate	10.39	2.57	90
		Undergraduate	11.35	2.41	287
		Total	11.12	2.48	377
Proficiency	MALE	Postgraduate	13.71	4.75	51
		Undergraduate	14.5707	5.08432	198
		Total	14.3936	5.01989	249
	FEMALE	Postgraduate	15.6923	5.20705	39
		Undergraduate	15.8315	4.12100	89
		Total	15.7891	4.45918	128
	Total	Postgraduate	14.5667	5.02141	90
		Undergraduate	14.9617	4.83453	287
		Total	14.8674	4.87595	377
Psychosocial	MALE	Postgraduate	10.3333	2.10396	51
		Undergraduate	10.2121	3.02535	198
		Total	10.2369	2.85752	249
	FEMALE	Postgraduate	10.3077	3.03622	39
		Undergraduate	10.8427	2.71736	89
		Total	10.6797	2.81708	128
	Total	Postgraduate	10.3222	2.53438	90
		Undergraduate	10.4077	2.94311	287
		Total	10.3873	2.84785	377
Access	MALE	Postgraduate	14.8824	3.73977	51
		Undergraduate	15.6616	4.01667	198
		Total	15.5020	3.96672	249
	FEMALE	Postgraduate	15.0513	4.49531	39
		Undergraduate	16.7528	4.49313	89
		Total	16.2344	4.54459	128
	Total	Postgraduate	14.9556	4.06108	90
		Undergraduate	16.0000	4.19290	287
		Total	15.7507	4.18030	377

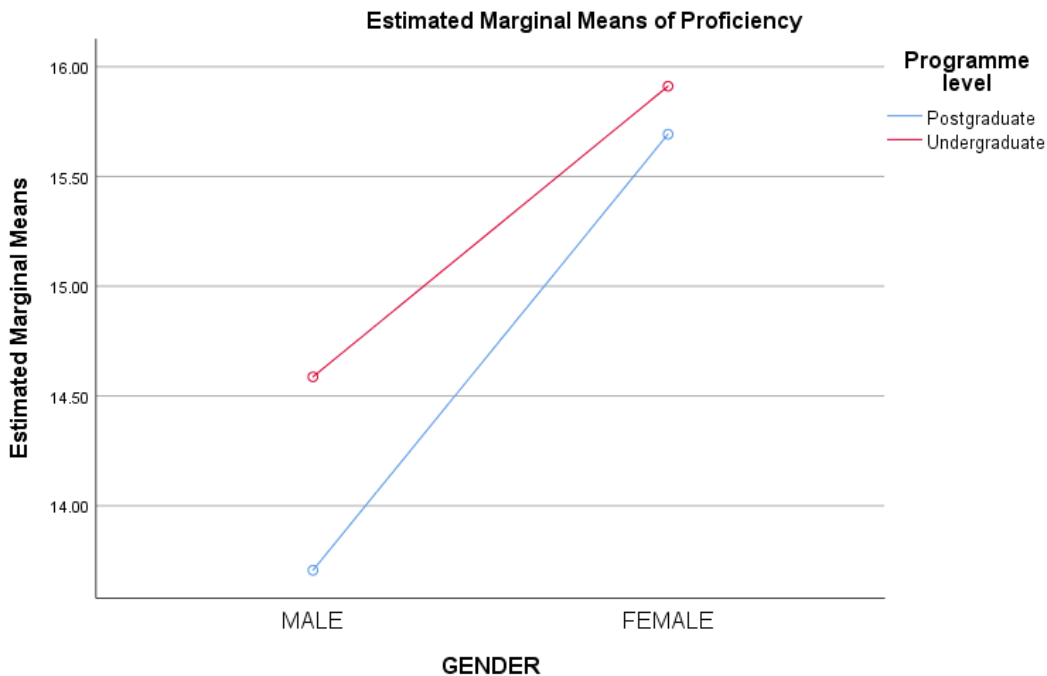
Preliminary checks showed that the distribution of the data was largely normal for all four domains. The box test showed that the observed covariance matrices of the dependent variables were equal across groups, Box's  $M = 27.45$ ,  $F(18, 91239.09) = 1.49$ ,  $p = 0.82$ . The multivariate test showed a main effect for both sexes, Wilk's Lambda (3, 375) = .977,  $p = .035$ ,  $\eta^2 = .023$ ;

and programme level, Wilk's Lambda (3, 375) = .964,  $p = .003$ ,  $\eta^2 = .036$ . Interaction of sex and programme, however, was not significant, Wilk's Lambda (3, 375) = .987,  $p = .180$ ,  $\eta^2 = .013$ . Figure 1 depicts the estimated marginal means of internet access as a function of sex and programme level (undergraduate versus postgraduate).



**Figure 1: Estimated Marginal Means of Internet Access**

Figure 2. depicts the estimated marginal means of proficiency as a function of sex and programme level.



**Figure 2: Estimated Marginal Means of User Proficiency**

Figure 3 depicts the estimated marginal means of psychosocial challenges as a function of sex and programme level.

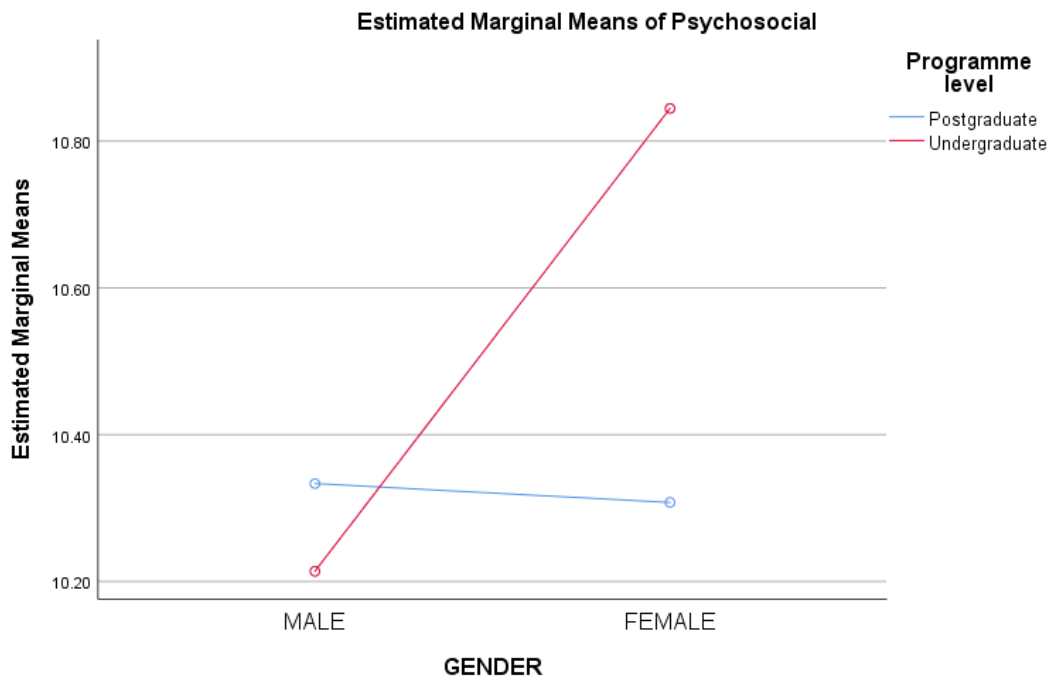


Figure 3: Estimated Marginal Means of Encountered Psychosocial Challenges

Figure 4 depicts the estimated marginal means of access to devices as a function of sex and programme level.

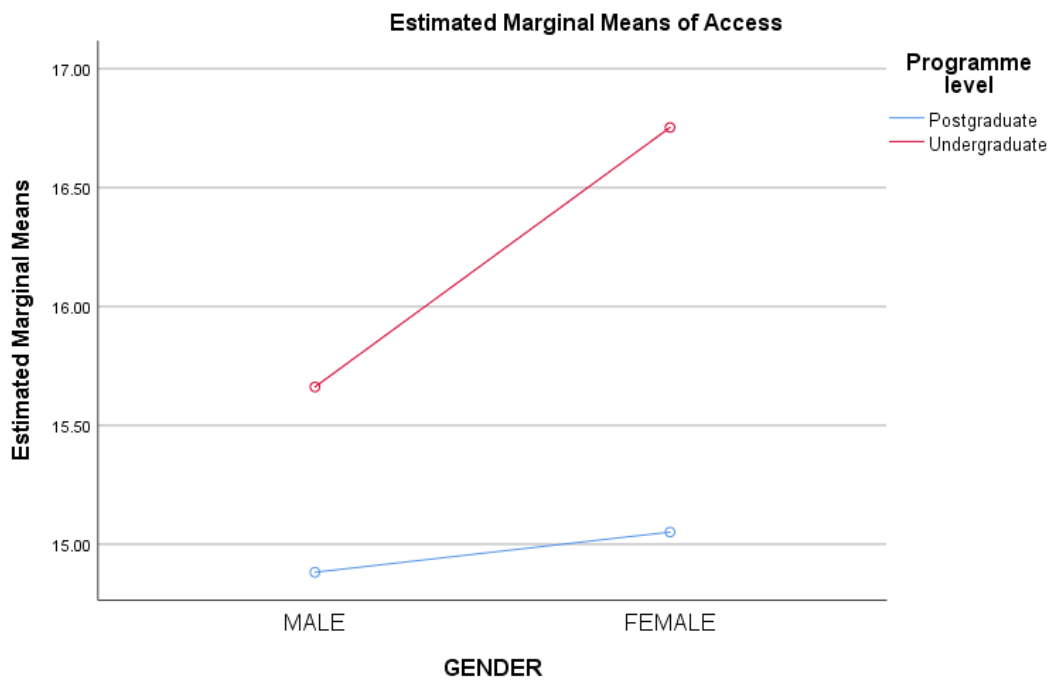


Figure 4: Estimated Marginal Means of Access to Devices Relevant to E-Learning.

In Australia (Australian Broadcast Authority, 2001), men, compared to women, are reported to be more likely to use the web for financial trading (23 per cent vs. 14 per cent), accessing the news (58 per cent vs 38 per cent), and looking at sexually explicit materials (25 per cent vs 6 per cent), thus depicting differences between men and women in their use of the web (Twum et al., 2021). Among most ethnic groups in Ghana, there are cultural definitions for the roles of men and women, and these sex roles subtly spread to other areas of life, including IT use. Using this a priori information, we hypothesised that there would be a gender difference in the participants' IT and e-classroom proficiency.

To check the between-subject effect, observation of Levene's test showed that the error variance of all the dependent variables, except the psychosocial domain, were equal across the groups. The between-subject effect test showed that there was a sex difference in only the IT literacy and e-classroom proficiency domain,  $F(1, 373) = 7.31, p = .007, \eta^2 = .019$ . Studies have shown that websites tend to be male-oriented, female-oriented, or androgynous and from the Ghanaian socio-cultural perspective, men are known to be gadget and electronically inclined. Men also get the opportunity to manipulate such gadgets more, which subsequently enhances their proficiency in IT tools. Awotwi and Owusu (2008) have also articulated that Ghanaian women have very limited access to these technologies, and in situations where governments' resources needed to finance the bridging of the digital divide are limited, women get handed the short end of the stick.

For programme levels, there were significant differences between undergraduate and postgraduate students in access to and quality of devices,  $F(1, 373) = 5.81, p = .016, \eta^2 = .015$ ; and access to internet and data bundle,  $F(1, 373) = 12.82, p < .001, \eta^2 = .033$ . Again, since most undergraduate students do not work, they depend on parents and caregivers for IT devices and data bundles. Hence, the quality of their devices depends on the financial status of their caretakers, and their access to quality devices and regular browsing data will not be as efficient as the postgraduates, who are predominantly workers.

## Discussion

The shift to digital learning and instruction in higher educational institutions, initially driven by the COVID-19 pandemic, has continued to impact the education sector in the post-COVID era. In the newer platforms, the methods by which students receive lessons and use them have been significantly altered. To summarise, there are several uncertainties about the e-learning system (Shea, 2020). Our current findings revealed access to the internet and the cost of data, unstable electricity supply, low levels of literacy in the use of e-learning resources among students, and concomitant psychosocial impairments as the primary challenges of e-learning in Ghana.

One of the most significant challenges for students in Ghana in accessing and effectively utilising e-learning platforms is the high cost of internet data (Ofori Atakorah et al., 2022; Kyei-Arthur & Aidoo, 2022). Despite the growing presence of mobile internet services across the country, the expense of accessing the internet remains prohibitive for many students, particularly those from low-income households. As e-learning requires consistent and reliable internet access, students are often forced to choose between allocating funds for data or meeting other essential needs. Again, the data consumption of online learning platforms can be heavy (Budiman, 2020), further intensifying this challenge. E-learning platforms that rely on video lectures, interactive materials, and live-streamed classes consume significant amounts of data, making it difficult for students to fully engage in these educational opportunities. This leads to interruptions in learning, with students either limiting their participation in online classes or dropping out of courses entirely due to the inability to afford sufficient data. University administrators and policymakers often struggle to negotiate affordable data packages that effectively meet the needs of students. While some efforts have been made, there has been little success in this area (Tsikata, 2024). Moreover, frequent power outages in Ghana exacerbate the difficulties students face in engaging in e-learning (The Conversation, 2024; Nyabor, 2024).

The current findings further reveal that there is a significant gap in computer literacy among students, which poses a barrier to effectively utilising e-learning platforms. Many students lack the necessary skills to

navigate e-learning systems (Kevor & Asiedu, 2010; Nyagorme, 2018; Otoo-Arthur et al., 2021). Moreover, the findings showed a significant gender gap in the use of e-learning. A global digital divide between men and women continues to exist (OECD, 2018; Granryd, 2020), particularly in IT and e-classroom skills. While G20 economies have taken steps to address this, challenges such as limited access, affordability, and socio-cultural barriers still restrict women's ability to fully benefit from digital technologies (OECD, 2020). Despite some improvement in closing the gender gap in IT attitudes and skills, disparities remain, suggesting that historical disadvantages may contribute to women's lower proficiency in e-learning environments.

The claims that online lessons are often boring for the same reasons that in-person classes are boring seem contrary in the present study. These findings herein show that the problems of e-classroom manifest in the form of people not experiencing the presence of their colleagues and finding it difficult to relate to sounds without the physical presence of the speaker. In a collectivist culture like Ghana, the shift to e-learning raises unique challenges that go beyond technological barriers. Collectivist societies prioritise social interaction, community, and group learning, where collaboration, peer feedback, and the presence of others play critical roles in motivating students and enhancing learning outcomes (Thi Nguyen & Dinh Thi, 2024). However, with the shift to digital platforms, students have reported feeling disconnected from their peers and instructors, which negatively impacts their engagement, social learning, and overall learning experience. The absence of physical presence in the classroom makes it difficult for students to experience the collective learning environment they are accustomed to, which is often crucial in maintaining their motivation and academic success (Urdan & Weggen, 2000). The communal aspects of education, such as group discussions, spontaneous interactions, and face-to-face collaborations, are significantly diminished in an online setting, leading to feelings of isolation among students.

## CONCLUSION AND RECOMMENDATIONS

**Conclusion:** The shift to e-learning in Ghana, driven initially by the COVID-19 pandemic, continues to present significant challenges in the post-pandemic era. The findings from this study reveal that issues

such as high data costs, unreliable electricity, and low levels of computer literacy among students remain key barriers to the effective use of e-learning platforms. These obstacles have resulted in disruptions to students' ability to engage fully in digital learning, particularly for those from lower-income backgrounds. Furthermore, the study highlights the gender disparity in IT proficiency, with women facing additional challenges in accessing and using e-learning resources, contributing to a broader digital divide.

The shift to e-learning has also exposed the cultural disconnect in a collectivist society like Ghana, where the absence of physical interaction and community-based learning has diminished students' engagement and motivation. The social aspect of education, which plays a crucial role in the learning experience, is less prevalent in digital environments, leading to feelings of isolation and disengagement among students. Overall, while e-learning has the potential to offer educational opportunities, the challenges highlighted in this study underscore the complexities involved in its implementation, particularly in a context like Ghana's.

**Recommendations:** These findings draw attention to the need to prioritise radio and television programmes in the short run and invest in expanded access to online resources for the long haul. Given the cost barrier that e-learning presents, it is recommended that university management and government collaborate with internet service providers to establish special data packages that can ease the financial burden on students during e-lessons. These packages could include discounted rates for higher education students, which would enable broader access to online learning platforms.

In addition, universities should introduce basic computer literacy courses for students to ensure they are equipped with the necessary skills to fully benefit from e-learning opportunities. Special measures must be implemented to support students with limited computer skills, preventing them from being disadvantaged in digital classrooms.

Moreover, the gender gap observed in IT and e-classroom proficiency should be addressed through targeted initiatives, with gender activists leveraging the transformative potential of ICTs to empower

women, particularly those from underprivileged or rural backgrounds. By providing tailored programmes and support, we can work to close this gap and ensure equality access to educational resources for all students.

Considering the ongoing challenges posed by the COVID-19 pandemic, these issues must be integrated

into future pandemic recovery strategies. The recommendations made here could serve as a comprehensive framework to address the broader developmental needs of women, particularly in non-WEIRD (non-Western Educated Industrialized Rich Democratic) contexts, where access to technology, the internet, and digital education resources is often limited.

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