Mainstream media, social media and quality education during and after the COVID-19 pandemic

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Abstract

Purpose – This study aims to comparatively analyze the role of mainstream media and social media in promoting quality education during and after the COVID-19 pandemic.

Design/methodology/approach – The social cognitive theory and technology acceptance model served as the theoretical framework for this study. A descriptive survey and mixed-methods research design were employed in this study. Twenty institutions (10 pre-tertiary and 10 tertiary) participated in the study. From each institution (pre-tertiary and tertiary) and stratum (students and lecturers), 10 teachers/instructors and 10 students were purposely selected to serve as the participants and respondents for this study.

Findings – The study disclosed that personal ownership of electronic gadgets among the staff is higher than among the students; the tertiary institutions deployed and used more social media and mainstream media platforms than pre-tertiary educational institutions; social media platforms are easier to use, most preferred, popular and most effective platforms for teaching and learning during and after the COVID-19 pandemic and lockdown than mainstream media. Specific use of WhatsApp, YouTube and Facebook is even more popular, easy-to-use, most preferred and most effective platforms for teaching and learning during and after the COVID-19 pandemic and lockdown. The researchers also acknowledge that technical and human factors impede the smooth use of media for teaching and learning.

Research limitations/implications – The findings seek to serve and inform the public and policymakers in the health and educational sectors about measures and platforms they need to deploy to meet the needs of their clients during public health emergencies.

Originality/value – To the best of the authors' knowledge, this study stands out as the first of its kind as it compares mainstream media and social media usage for teaching and learning during and after the COVID-19 pandemic.

Keywords Social media, Mainstream media, Teaching, Learning, COVID-19, Educational institutions

Paper type Research paper

Introduction

Acute respiratory syndrome coronavirus 2 (SARS-CoV-2), also known as COVID-19, has had a profoundly devastating impact on all facets of education, leading to the closure of most educational institutions. The Government of Ghana, through the Ministry of Education, directed all educational institutions nationwide to shut down until further notice. Thus, educational institutions saw forced closures, and students were asked and required to remain at home. Educational institutions canceled classes, and administrators had to struggle to convert courses and materials into an online format. Ghana had to deal with different problems when transitioning to online or blended learning compared to many developed countries that already had digital infrastructure in place. Problems such as unequal access to electronic devices, poor internet coverage in rural areas, and varying levels of digital literacy made it challenging for students to continue learning.

To address these challenges, educational institutions had to deploy mainstream and social media tools, as well as teaching techniques. Social media, technological systems and tools that use mobile and web-based technologies to create highly interactive platforms through which individuals and communities share, create, and cocreate, discuss and modify user-generated content (Dzogbenuku *et al.*, 2020; Abdul-Rahim, 2022) were among the media platforms deployed. These include collaborative projects such as Wikipedia, content communities like YouTube, social networking sites (Facebook, Instagram, Flickr, Twitter and LinkedIn), blogs like WordPress,

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and social messaging applications like Viber, Skype, Messenger and WhatsApp (Rahman and Reza, 2022). The mainstream media, also referred to as traditional media, use mass media platforms such as television, radio, newspapers and magazines (Chadwick and Vaccari, 2019).

The global crisis thus served as a natural experiment in Ghanaian education, assessing the effectiveness of traditional and digital media in improving and replacing classroom learning. However, the comparative roles, adoption strategies and perceived effectiveness of these media are still not well understood. To make education systems more resilient, prepare for recovery after the pandemic, and ensure sustainable use of digital platforms in Ghanaian schools, it is crucial to understand these dynamics.

Statement of the problem

The sudden shift to remote learning during the COVID-19 pandemic exposed significant gaps in Ghana's educational infrastructure, especially in access to and effective use of mainstream and social media for teaching and learning (UNESCO, 2021; UNICEF, 2022; GTEC, 2023). Despite increased adoption, disparities in media access, digital literacy and instructional quality remain unclear. In fact, the need to maintain social distancing and avoid physical contact created a challenge in the teaching and learning process. However, both social and mainstream media offered educational institutions opportunities to stay connected with students and enhance collaboration among staff, faculty, and students. In addition, there is a lack of comparative analysis on the usage, ease and perceived effectiveness of mainstream and social media in promoting quality education and Sustainable Development Goal 4 (SDG 4) during and after the pandemic. This gap poses a significant challenge to SDG 4, which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Addressing this knowledge gap is vital for developing effective and inclusive digital learning strategies that support Ghana's post-pandemic education recovery and the achievement of SDG 4 goals.

Aim and objectives

This study aimed to conduct a comparative analysis of the roles of mainstream media and social media in sustaining and promoting quality education, as outlined in SDG 4, during and after the COVID-19 pandemic in Ghana. Furthermore, a comparative discussion/analysis was conducted between pre-tertiary and tertiary educational institutions. Specifically, the study sought to:

1. Assess the ownership and access to electronic gadgets for teaching and learning among staff and students.
2. Discover when the educational institutions started using mainstream and social media for teaching and learning.
3. Establish which media types were mainly used to aid teaching and learning during and post the COVID-19 pandemic.
4. Which media is the most preferred, easy to use and effective to aid teaching and learning during and post the COVID-19 era?
5. Investigate the challenges associated with the utilization of mainstream and social media for educational purposes in Ghana.

Significance of the study

This study significantly deepens our understanding of the digital transformation in education in Ghana during and after the COVID-19 pandemic. It informs policymakers, such as the Ministry of Education and the Ghana Tertiary Education Commission (GTEC), about the effectiveness of collaboration between mainstream and social media, highlighting areas that require improvement. The results indicate that schools can effectively enhance blended learning, improve digital access and use social media as supplementary tools. It offers teachers and students ideas for simple and effective platforms that can help them teach and learn more efficiently. At the academic level, this study adds to the research on media use in crisis education, filling gaps in the existing literature in Ghana. More broadly, it supports achieving SDG 4 (quality education) by exploring long-term ways to make education systems more resilient during emergencies and beyond.

Theoretical and literature review

Social cognitive theory and technology acceptance model

The study integrates both the social cognitive theory (SCT) and the technology acceptance model (TAM) as the theoretical frameworks for this research. While the SCT explains how students and educators learned and adapted their behavior through social modeling and environmental interaction during the pandemic, the TAM provides insights into why certain media technologies were accepted and used more frequently than others.

The SCT was developed by Albert Bandura, evolving from his earlier Social Learning Theory. The SCT explains the intricate interplay between cognitive processes, human behavior, and environmental factors. According to Bandura (2001), learning occurs through reciprocal interactions between the individual, their behavior and the environment. Accordingly, people use their sensory, motor and mental systems as tools to accomplish activities such as teaching and learning, thereby achieving the objectives that give their lives direction and significance. The SCT seeks to explain how students and instructors behave and perform in different teaching and learning situations to acquire knowledge in a social framework. Instructors use various strategies to promote interactions with students across different environments and ensure access to information through multiple channels, including social media and mainstream media (Ansari and Khan, 2020). This affects human behavior as a product of the environment and social interactions with others, and these behaviors drive and influence more desired behaviors.

Teaching and learning are based on four phases: attention, retention, production and motivation. Through these phases, learner performance can be developed and positively directed to the production of the required behavior. Accordingly, teaching and learning occur through various behavioral patterns, promoting social engagement, critical thinking, fostering bonds and inclusivity. Instructors' and learners' attitudes toward a particular technology are determined by user expectations of simplicity, usability, enjoyment, attitude toward usage, behavior that affects satisfaction with use, and actual use of social media and mainstream media. Within the study context, students and teachers learned to adopt new media platforms (e.g. WhatsApp, YouTube) by observing peers, receiving feedback

and interacting with technology-enhanced environments. The study employs SCT to examine how observational learning, self-efficacy and environmental enablers/barriers influence the preference, ease of use and perceived effectiveness of mainstream and social media in Ghanaian educational institutions.

One of the most effective ways to gauge user learning support, learning, teaching, attitude, retention, social support and willingness to use and integrate SCT and technology is through the use of TAM. TAM, developed by Davis (1989), is designed to explain and predict user behavior regarding the acceptance and use of technology. It focuses on two main constructs, perceived usefulness and perceived ease of use. Usefulness and perceived ease of use have a direct correlation with interaction and self-efficacy, ultimately influencing the intention to use technological systems during the COVID-19 Pandemic. The TAM helped to explain not only the initial adoption of media platforms during the COVID-19 lockdown, but also their continued usage in the post-pandemic era. This framework is particularly relevant as institutions in Ghana and other developing contexts move toward more technology-integrated teaching models. The TAM is premised on the assumption that the perceived usefulness and ease of use of any system largely influence attitude toward use, intention to use and ultimately actual use. This means that if a user perceives social media and mainstream media as useful and easy to use, they will be more willing to use them for teaching, research and learning purposes.

Social media and mainstream media

The adoption of emerging web technologies in education is accelerating quickly. Because these technologies and media platforms are widely used in education, educators and students need to understand and use them to plan future lessons and deliver current course content on advanced technological platforms (Rahman and Reza, 2022; Sarwar *et al.*, 2019). Educational institutions can also use social media and mainstream media to support the management, organization, delivery and tracking of faculty teaching activities and students' academic progress during a pandemic (Khan *et al.*, 2021).

The mainstream media uses various mass communication platforms, including television, radio, newspapers and magazines. It may provide the public with various types of information beyond serving an informational or surveillance function (Effendi *et al.*, 2020; Mathenge, 2021). Strömbäck *et al.* (2020) found that consumers believed broadcast news could inform them about important topics. Participants often scan or read newspapers or online news sources for information. Similarly, alternative media might also enlighten the general public. In addition, mainstream media plays a crucial role in promoting globalization by facilitating cultural exchange and facilitating the flow of information and images across countries through global news broadcasts (Mathenge, 2021).

Social media has also become increasingly popular recently; however, human contact remains a common way for people to discuss material from mainstream media (Appel *et al.*, 2020). Social media's nature can perform some tasks more effectively than mainstream media, which mainly involves "one-way" news consumption and information dissemination (Mathenge, 2021). The interactive features of social media enable users to quickly and easily share and respond to news feeds, facilitating the expression of their opinions (Dei *et al.*, 2022). Social media is used to create social relationships and for educational purposes (Ansari and Khan, 2020). It has become a powerful tool for engaging students in the new learning environment, promoting interactions among students, peers, and teachers and potentially improving student learning (Manu *et al.*, 2021). Social media refers to websites, blogs, chats and computer programs that enable users to share information and express ideas (Dzogbenuku *et al.*, 2020). Manu *et al.* (2021) further argue that social media are technological systems or tools that use mobile and web-based technologies to create highly interactive platforms through which individuals and communities share, create, cocreate, discuss and modify user-generated content. They are platforms where users exchange information via the Internet or mobile systems and big data applications (Appel *et al.*, 2020). Some popular examples of social media include collaborative projects like Wikipedia, content communities such as YouTube, social networking sites (Facebook, Instagram, Twitter and LinkedIn), blogs like WordPress, and social messaging apps like Viber, Skype and WhatsApp (Dzogbenuku *et al.*, 2020; Abdul-Rahim, 2022).

Onset and adoption of social media and mainstream media for teaching and learning

Access to technological devices has become vital for digital learning. Several studies have also demonstrated that owning devices such as computers, tablets and smartphones is crucial for enabling teachers and students to use digital media effectively (Abdul-Rahim, 2022; Dei *et al.*, 2022). In Zimbabwean schools, 81% of students and 54% of teachers own mobile devices for learning purposes, according to research by Mupfiga *et al.* (2017). Similarly, 88.89% of Ghanaian university students have personal access to electronic devices, mainly laptops and cellphones, according to Dei *et al.* (2022).

Many studies confirm that platforms perceived as easy to use are more likely to be integrated into teaching methods (Al-Rahmi *et al.*, 2022). Accordingly, social media sites such as Wikipedia, WhatsApp and YouTube have been consistently identified as user-friendly resources that support both synchronous and asynchronous learning (Manu *et al.*, 2021; Dzogbenuku *et al.*, 2020). According to Ansari and Khan (2020), the interactive and collaborative features of social media platforms boost student engagement and promote a deeper understanding.

Use of media during and after the COVID-19 pandemic

The introduction of social media and other digital tools into the classroom was spurred by the start of the COVID-19 pandemic (Dei, 2024). According to Cavus *et al.* (2021), social networking platforms were essential resources for pandemic-era sustainable education, offering continuity even while schools were closed. This is supported by Papademetriou *et al.* (2022), who note that throughout this period, the use of social media technologies by higher education institutions increased dramatically. To maintain instructional continuity, Carrasco *et al.* (2021) found that pandemic-related challenges prompted teachers to use digital resources such as YouTube and WhatsApp.

Furthermore, social media is vital for collaborative learning, especially when in-person education becomes unfeasible, as noted by Khan *et al.* (2021). Sobaih *et al.* (2020) observed similar trends, indicating that social media use for academic communication increased during the pandemic in low-income countries. Despite their helpful role, popular media like television and radio had a one-way communication structure that limited participatory learning (Wang, 2021). In contrast, platforms like WhatsApp have enabled real-time communication, resource sharing and immediate feedback, making them the preferred choice for both students and teachers (Dei *et al.*, 2022; Miller *et al.*, 2023).

According to Papademetriou *et al.* (2022) and Manu *et al.* (2021), platforms such as YouTube and WhatsApp are considered the most effective due to their ease of use, multimedia capabilities and high engagement rates. Social media is more flexible and easier to use since it can save and replay content, exchange resources instantly and support asynchronous communication. On the other hand, while gatekeeping and editorial control make mainstream media more credible (Chadwick and Vaccari, 2019), their inability to interact with students limits their usefulness in modern, learner-centered classrooms. Wang (2021) suggests that although mainstream media is reliable, social media's dynamic features make it better suited for real-time learning and student engagement.

Methodology

This study employed a descriptive survey and mixed-methods research design, which involved collecting data from individuals through their responses to questions in a questionnaire. The descriptive survey enabled the researcher to gather data on respondents' opinions and knowledge related to the research objectives, as well as to identify problems. The researchers used a concurrent mixed-methods design, combining both qualitative and quantitative approaches. This design involves collecting both qualitative and quantitative data and methodologies for the same phenomenon, thereby improving the validity and reliability of the findings.

The selection of respondents took place in two stages. The first involved choosing cases and educational institutions. In this initial stage, the researchers intentionally selected 20 educational institutions, two from each of the 10 regions in Ghana, consisting of 10 pre-tertiary and 10 tertiary institutions. This method ensured fair representation of all 10 traditional regions and highlighted the diverse nature of the institutions. The second stage focused on selecting participants from these institutions for the study. Researchers divided the population into student and staff groups within each institution. From each institution and each group (students and staff), 10 staff members and 10 students were deliberately chosen to participate. Each of the 20 institutions was selected based on two main criteria: documented use of mainstream and/or social media platforms in education during or immediately after the COVID-19 pandemic, and regional representation to ensure inclusivity across all 10 regions of Ghana, capturing differences in infrastructure, digital readiness, and institutional responses to remote learning. As a result, a total of 400 respondents participated: 100 staff members from pre-tertiary institutions, 100 instructors/lecturers from tertiary institutions, 100 students from pre-tertiary institutions, and 100 students from tertiary institutions. The purposive approach allowed the researchers to select cases aligned with the research goals (Palinkas *et al.*, 2015). It enabled focusing on specific respondents (staff and students) from institutions known for integrating media into their instructional methods. Institutions were chosen to maximize variation across educational levels and geographic regions, providing direct access to respondents with practical media experience during the COVID-19 period.

The questions in the data collection instrument were guided by the research objectives outlined in the study's introduction and were structured using a mix of closed and open-ended questions. Data were collected with a structured questionnaire that included both types of questions. The questionnaire consisted of four main sections, each aligned with the study's goals. Section 1 collected demographic information, including gender, age, type of institution and role (student or staff). Section 2 examined the accessibility of electronic devices and the internet, as well as the frequency of media use. Section 3 evaluated perceptions of mainstream media (TV and radio) and social media (WhatsApp, YouTube, Facebook, Wikipedia and others) regarding teaching, learning and sustaining the quality of education during and after the COVID-19 pandemic.

To ensure the validity and reliability of the instrument, the questionnaire was developed based on extensive literature (e.g. Cavus *et al.*, 2021; Abdul-Rahim, 2022). A pilot test was conducted with 20 participants (5 from each of the staff and student groups across both levels) in institutions not included in the final sample. Feedback from the pilot helped to refine ambiguous items. Data were collected between March and October 2023, during a post-COVID stabilization period, when institutions had either maintained, improved, or phased out their media-based interventions. This timeline is important because it allowed respondents to consider both pandemic-era experiences and post-pandemic changes, providing richer long-term insights.

The quantitative data were analyzed using descriptive statistics, such as frequencies and percentages, along with inferential methods, including chi-square tests and t-tests, to evaluate group differences. The t-test was employed to compare the mean ratings of two different media types, mainstream media and social media, regarding ease of use and preference for teaching and learning. The test was deemed appropriate because the variables represented two independent categories with continuous outcome measures.

To confirm internal consistency, reliability analysis was conducted in SPSS v27. The results showed that the mainstream media use scale (α = 0.79, 8 items), the social media use scale (α = 0.83, 10 items), and the perceived impact on quality education scale (α = 0.81, 12 items) all demonstrated good internal consistency. The overall reliability coefficient for the 30-item instrument was 0.81, which extends the generally accepted threshold of 0.70 for social science research. The item-total correlations ranged from 0.52 to 0.71, indicating that all items contributed meaningfully to the scale. Furthermore, the analysis revealed that deleting any of the items would not have significantly increased Cronbach's alpha, thereby confirming the stability and robustness of the measurement instrument. A five-point Likert scale was used to evaluate how easy each type of media was to operate. Respondents indicated their agreement with statements like

"This medium is easy to use for teaching and learning" (1 = Strongly Disagree to 5 = Strongly Agree). The average scores for mainstream and social media were treated as continuous variables, in line with established social science research standards (Norman, 2010). An independent-samples t-test was performed to compare the perceived ease of use between mainstream and social media. The t-test was suitable because the two media categories (mainstream versus social) are independent, and the dependent variable (ease-of-use rating) is continuous.

The findings were triangulated with qualitative data to achieve a comprehensive understanding. Qualitative responses were analyzed using thematic analysis as outlined by Braun and Clarke (2006). No specialized software was used due to the manageable size of the qualitative data set, but coding procedures followed a rigorous manual protocol to ensure transparency and reproducibility.

The study adhered to the highest ethical research standards, including obtaining informed consent, ensuring voluntary participation, and maintaining confidentiality. Data were anonymized and stored securely.

Findings

The findings are presented in two main sections. Section 1 presents quantitative data with descriptive analysis, while Section 2 examines qualitative data.

Demographic characteristics of respondents

A total of 400 valid survey responses were collected. Of these, 219 (43 pre-tertiary staff, 64 tertiary staff, 55 pre-tertiary students and 57 tertiary students) were males, representing 54.75%, while 181 (57 pre-tertiary staff, 36 tertiary staff, 45 pre-tertiary students and 43 tertiary students) were females, accounting for 45.25% as shown in Table 1

Regarding age distribution as shown in Table 1 above, 116 respondents (29%) were 20 years or younger, 115 (28.75%) were between 21 and 30 years old, 82 (20.5%) between 31 and 40 years, 53 (13%) between 41 and 50 years, 31 (7.75%) between 51 and 60 years, and 3 (0.75%) were over 60 years old. This suggests that most respondents are youth or young adults who use technology for educational purposes.

Access to personal electronic gadget

Access to electronic gadgets is important for using mainstream and social media for teaching and learning. In this context, the researchers first wanted to find out how participants own or have access to electronic gadgets. It was found that most respondents, including staff at the pre-tertiary level (52%), staff at the tertiary level (81%), and students at the tertiary institutions (59%), own electronic gadgets personally, except for students at the pre-tertiary level, with only 19% owning gadgets personally. Conversely, the majority of student respondents at pre-tertiary institutions rely on their parents (57%), friends (32%) and acquaintances (25%) to access electronic gadgets as shown in Table 2.

A t-test was conducted to assess whether there were significant differences in access to personal electronic devices between students and staff. The results revealed a statistically significant difference [$t(398) = 4.62$, $p < 0.001$], with staff owning more gadgets than students. This finding suggests that staff are generally better equipped to use digital tools for teaching than students, especially at the pre-tertiary level.

The electronic gadgets mentioned by the respondents include laptops, mobile phones, tablets, desktop computers, television sets (TVs) and radios. This feedback clearly indicates that respondents have access to electronic gadgets that aid teaching and learning during and after the COVID-19 pandemic, through social media and mainstream media.

Since when has the mainstream and social media been used for teaching and learning

It was revealed that the use of mainstream media and social media for teaching and learning primarily began during and after the COVID-19 pandemic, with 79% of respondents (37% since 2022, after the pandemic and 42% since 2020, during the pandemic). However, tertiary educational institutions had already started using mainstream media and social media for teaching and learning before the COVID-19 pandemic occurred. This is shown in Figure 1 below.

Specifically, the use of mainstream media and social media for teaching at pre-tertiary educational institutions primarily began just four years ago (92%: 49% since 2022, following the COVID-19 pandemic, and 43% since 2020, during the COVID-19 pandemic). This is higher than that of tertiary

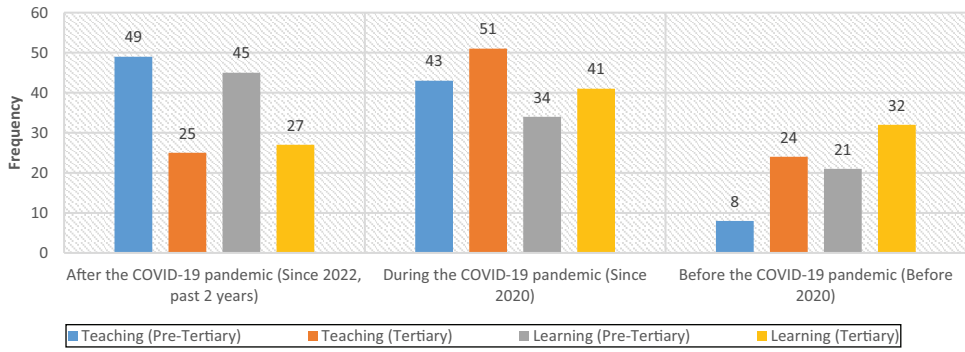
Table 1 Age and gender distribution of respondents

Demographic characteristics of respondents		Staff (Pre-Tertiary)	Staff (Tertiary)	Student (Pre-Tertiary)	Student (Tertiary)	Total
Gender	Male	43	64	55	57	219
	Female	57	36	45	43	181
Total		100	100	100	100	400
Age Distribution	20 years and below	6	0	85	25	116
	21 - 30 years	32	11	15	57	115
	31 - 40 years	30	41	0	11	82
	41 - 50 years	19	27	0	7	53
	51 - 60 years	12	19	0	0	31
	61 years and above	1	2	0	0	3
Total		100	100	100	100	400

Table 2 Cross-table analysis of access to personal electronic gadgets

Dimension	Pre-Tertiary students	Tertiary students	Pre-Tertiary staff	Tertiary staff
Access to personal gadgets	19% own gadgets; depend on parents (57%) and friends (32%)	59% own personal gadgets	52% own gadgets	81% own gadgets

Figure 1 Since when have the mainstream and social media been used for teaching and learning



educational institutions, with 76%: 25% since 2022 following the COVID-19 pandemic, and 51% since 2020 during the COVID-19 pandemic. This indicates that efforts by educational institutions to sustain teaching, learning, and quality education were made using mainstream and social media.

Regarding the use of mainstream and social media for learning in pre-tertiary educational institutions, 79% of institutions started using these platforms within the last four years, with 45% beginning since 2022 (following the COVID-19 pandemic) and 34% since 2020 (during the pandemic). Similarly, 67% started using them within the past four years, with 27% since 2022 (following the pandemic) and 41% since 2020 (during the pandemic) as shown in Table 3.

A chi-square test was conducted to examine whether there is a relationship between the type of institution (pre-tertiary vs tertiary) and the time at which they started using mainstream/social media for teaching. The results were significant, $\chi^2(2, n = 400) = 15.47$, $p < 0.01$, indicating that tertiary institutions were more likely to have adopted media usage earlier, even before the COVID-19 pandemic, compared to pre-tertiary institutions.

Easy-to-use media for teaching and learning (during and after the COVID-19 era)

The ease of using technology and media significantly affects their adoption. Therefore, respondents were asked to rate how easy it is to use specific media (mainstream media and social media) to support teaching, learning, and maintaining quality education during and after the COVID-19 pandemic lockdown. The feedback indicates that social media is the most accessible medium, with the majority of respondents mentioning YouTube, WhatsApp and Wikipedia, as illustrated in Figure 2.

Respondents rated the user-friendliness of both mainstream and social media on a five-point Likert scale, where 1 indicated "Very Difficult" and 5 indicated "Very Easy." The descriptive analysis showed that the average ease-of-use score for social media ($M = 4.31$, $SD = 0.62$) was higher than that for mainstream media ($M = 3.27$, $SD = 0.78$).

An independent samples t-test showed that this difference was statistically significant, $t(398) = 7.81$, $p < 0.001$, with a large effect size (Cohen's $d = 0.78$). This indicates that people found social media much easier to use for teaching and learning than regular media as shown in Table 4.

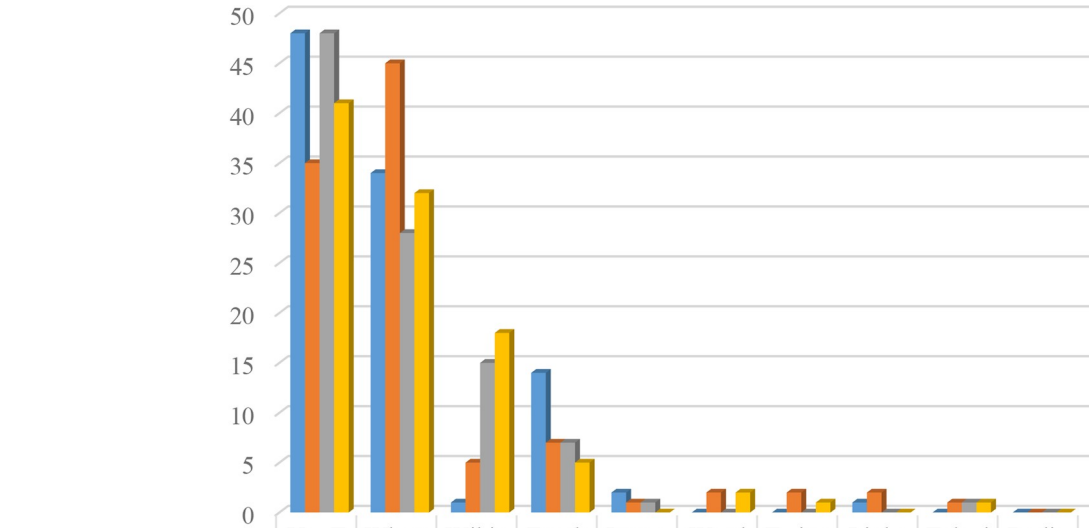
In comparison, the least easy-to-use media is the mainstream media. Thus, comparatively, social media is a more user-friendly medium to aid teaching and learning during and after the COVID-19 pandemic, as compared to mainstream media (television and radio).

The qualitative responses suggest that social media is the primary medium for teaching and learning, both before, during and after the COVID-19 pandemic. This was similar to the quantitative responses. The COVID-19 pandemic has led educational institutions to increase the use and deployment of social media to support teaching and learning during and after the COVID-19 pandemic lockdown. All respondents largely agreed, referring to YouTube, WhatsApp and Facebook as the primary media platforms used to support teaching and learning. Some of the respondents (both staff and student

Table 3 Cross-table analysis of use of media

Dimension	Pre-Tertiary students	Tertiary students	Pre-Tertiary staff	Tertiary staff
When media use began	92% began using media during/after COVID-19 (43% during, 49% after)	76% during/after (51% during, 25% after)	Same as students; closely linked to institutional adaptation	Some use before COVID-19; increased during lockdown

Figure 2 Easy-to-use media for teaching and learning (during and after the COVID-19 era)



	YouTube	WhatsApp	Wikipedia	Facebook	Instagram	WordPress	Twitter	LinkedIn	Television	Radio
Teaching (Pre-Tertiary)	48	34	1	14	2	0	0	1	0	0
Teaching (Tertiary)	35	45	5	7	1	2	2	2	1	0
Learning (Pre-Tertiary)	48	28	15	7	1	0	0	0	1	0
Learning (Tertiary)	41	32	18	5	0	2	1	0	1	0

Table 4 Summary of the t-test results

Media type	Mean	SD	t	df	*p*-value	Cohen's d
Mainstream media	3.27	0.78	7.81	398	< 0.001	0.78
Social media	4.31	0.62				

respondents) indicated that the YouTube videos and the extra links helped to enrich their lecture and learning experiences and served as a forum for enhancing communication, uploading content, and supporting students regarding extra learning and assignments. The findings support qualitative evidence that social media platforms like WhatsApp, YouTube and Facebook are seen as more user-friendly, interactive and adaptable than traditional platforms like television and radio.

Furthermore, some respondents mentioned that Facebook was used by members for online lectures and seminars through Facebook Live, both with colleagues and with people from other institutions. From the responses, it was revealed that some students were using Viber in addition to WhatsApp for managing group course assignments. Again, the forum feature of social media, such as Facebook, Viber and WhatsApp, facilitated engagement between students and teachers, as disclosed by some of the respondents. As a student respondent put it, "Viber and WhatsApp are easier for us to use for learning because they enable us to conduct group call sessions, discussions, and collaboration."

Use of mainstream media and social media to aid teaching and learning during and after the COVID-19 pandemic and lockdown

The respondents were asked to indicate whether they used specific mainstream media and social media to support teaching and learning while promoting quality education during the COVID-19 pandemic. It was found that social media was more frequently used and preferred than mainstream media for this purpose. Among social media platforms, YouTube and WhatsApp were the most popular. Therefore, mainstream media was the least used option for supporting teaching and learning during the pandemic compared to social media.

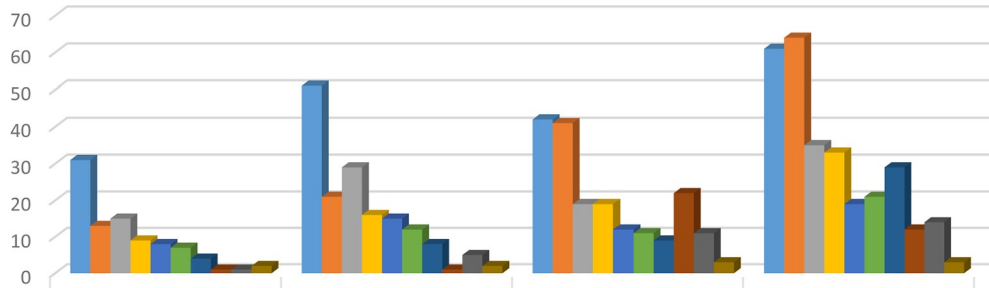
Regarding the use of specific mainstream and social media to support teaching and learning, as well as to maintain and promote quality education after the COVID-19 pandemic lockdown (since, 2022), it was again found that social media use remained higher and was more preferred compared to mainstream media. Among social media platforms, YouTube and WhatsApp are the most popular. This is followed by Facebook, Wikipedia and Instagram, respectively as shown in Figure 3.

Thus, comparatively, the mainstream media was the least used to support teaching, learning and promoting quality education after the COVID-19 pandemic, compared to social media.

From the qualitative responses, it became clear that social media was used to connect with students; teach them through WhatsApp conferences and Facebook Live; facilitate effective communication and information sharing; improve collaboration between staff and students; support learning and course completion; enable quick sharing of lecture notes, materials and slides; upload and share prerecorded content with students; access YouTube for lessons and tutorials; use Wikipedia to read and learn; and share news and information via Twitter and Instagram, among other uses. As some respondents mentioned:

- "When COVID struck, social media platforms such as WhatsApp, Facebook, Instagram and X (Twitter) enabled us to reach out to most of our students faster, as most of them are young and use social media a lot."

Figure 3 Use of media for teaching and learning presently (after the COVID-19 pandemic)



	Teaching (Pre-Tertiary)	Teaching (Tertiary)	Learning (Pre-Tertiary)	Learning (Tertiary)
WhatsApp	31	51	42	61
YouTube	13	21	41	64
Facebook	15	29	19	35
Instagram	9	16	19	33
Twitter	8	15	12	19
LinkedIn	7	12	11	21
Wikipedia	4	8	9	29
Television	1	1	22	12
Radio	1	5	11	14
WordPress	2	2	3	3

- "WhatsApp has a conference facility and this enabled us to easily communicate and collaborate with students."
- "We used the Facebook page of the university to disseminate information to our students and the general public on academic issues and measures put in place to manage COVID-19."
- "The YouTube was used by some of us (lecturers) as a means of uploading content and lecture notes for students to access."

The responses further indicate that the use of social media, both before, during, and after the COVID-19 pandemic, extended beyond teaching and learning to include admission and outreach to prospective applicants for enrollment. As outlined by one of the respondents (teacher) in the tertiary educational institutions:

- "Social media has been useful to us as an institution. It has enabled us to reach out to both current students and prospective students since they are young and most of them are actively on social media."

Television, a mainstream media, was also mentioned by one of the student respondents as a media used by the students during the lockdown. It was revealed that a dedicated TV channel was established for teaching and learning, primarily for pre-tertiary educational institutions. A respondent stated that:

- "My parent always encourages us (my siblings and I) to tune in to the GTV learning channel for our lessons. As the elder/older sibling, I guide my siblings to learn and take lessons during the COVID-19 pandemic."

Based on these responses, it is evident that social media systems have been very useful to educational institutions. This is vital for other educational institutions to use social media as a complement to the face-to-face medium of interaction, even after the COVID-19 pandemic.

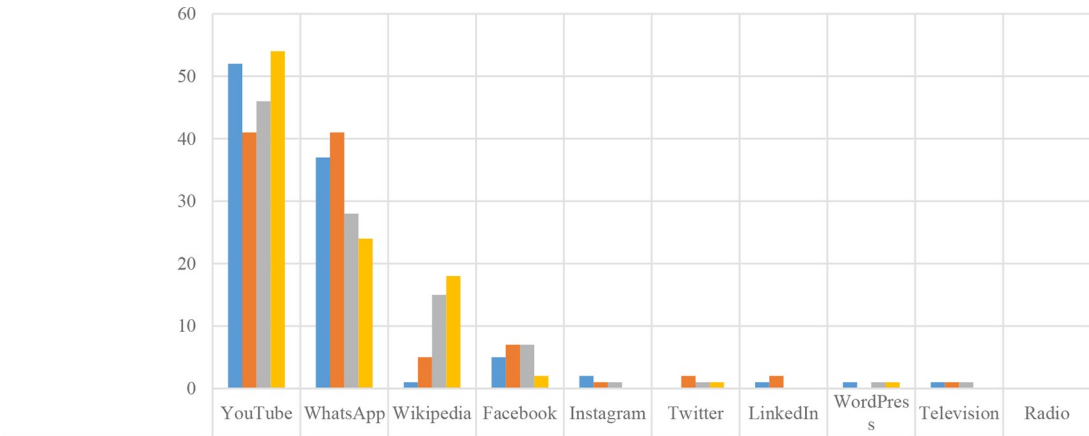
The most preferred and effective media to aid teaching and learning (after the COVID-19 pandemic)

Respondents were asked to compare different media, specifically mainstream media and social media, to determine which was most preferred for teaching, learning and supporting quality education at any time and in any place. The feedback shows that social media is the most favored platform, with YouTube, WhatsApp and Wikipedia being the most mentioned. However, social media was actually the least utilized medium for teaching, learning and promoting quality education during the COVID-19 pandemic, compared to mainstream media such as television and radio as shown in Figure 4.

A t-test was used to compare the average ratings of ease of use between mainstream media and social media. The results showed that social media was considered significantly more user-friendly [$t(399) = 7.81$, $p < 0.001$]. This aligns with participants' qualitative responses, in which they mentioned that platforms like WhatsApp and YouTube are easier to use than radio or television.

A further comparative response was collected from the respondents, who were asked to identify which specific media (mainstream media or social media) is the most effective for supporting teaching and learning, as well as maintaining and enhancing quality education. The feedback indicates that social media is the most preferred medium, with the majority of respondents selecting YouTube, WhatsApp and Wikipedia as their preferred platforms. Therefore, social media is regarded as the most effective medium for aiding teaching and learning and upholding quality education during the COVID-19 pandemic, in comparison to mainstream media (television and radio).

Figure 4 The most preferred media to aid teaching and learning (after the COVID-19 pandemic and lockdown)



	YouTube	WhatsApp	Wikipedia	Facebook	Instagram	Twitter	LinkedIn	WordPress	Television	Radio
Teaching (Pre-Tertiary)	52	37	1	5	2	0	1	1	1	0
Teaching (Tertiary)	41	41	5	7	1	2	2	0	1	0
Learning (Pre-Tertiary)	46	28	15	7	1	1	0	1	1	0
Learning (Tertiary)	54	24	18	2	0	1	0	1	0	0

Challenges of the use of media to aid teaching and learning (after the COVID-19 pandemic)

Despite the significant role played by various media in supporting teaching and learning, as well as in maintaining and promoting quality education at educational institutions during and after the COVID-19 pandemic, some respondents highlighted specific challenges. The main challenges can be categorized into two areas: human factors and technological factors. Human-related challenges include a lack of support from some educational leaders; bandwidth issues; lack of acceptance and utilization of social and mainstream media for teaching and learning by students, parents and stakeholders; limited experience among most teachers and some students in using media platforms; difficulties in monitoring and ensuring quality; and the use of media platforms without coordination or guidelines from educational and supervisory institutions.

- "Some of our leaders are yet to embrace the media platforms as a supplement to the traditional face-to-face class."
- "GTEC does not support the use of either mainstream or social media platforms for teaching and learning, which is a form of blended and e-learning. In fact, there is no policy or regulation governing this."
- "Some of our colleagues were spreading fake news, misinformation and disinformation via social media platforms, which caused some fear and panic among us. Some of this fake news affects us psychologically, affects our studies, and affects our ability to learn."

The challenges posed by technology include limited internet access, inadequate power supply, frequent power outages, and a shortage of computer labs and electronic devices. In addition, outdated computers hinder support for various media platforms. As some of the respondents stated:

- "Some of us don't have personal laptops and electronic gadgets to enable us to access the teaching materials sent to the platform by our teachers."
- "My parents want to monitor and control the use of social media as it can have a negative influence on us. Hence, they prefer us to use their personal gadgets or share the gadgets with our siblings."
- "Internet connectivity is poor and expensive, making it difficult for some of us to use media platforms such as YouTube."
- "The time for showing the lessons and tutorials on television is very bad, as most of our students are in school at the time. Hence, the television tutorials and lessons are not useful and relevant."

This means that, despite the significant role of both social media and mainstream media in supporting teaching and learning, as well as in maintaining and promoting quality education during the COVID-19 pandemic, some challenges still need to be addressed to harness the benefits of these media platforms fully.

Discussion

The study compared the use of mainstream media and social media for teaching and learning, as well as for promoting quality education as SDG 4, during and after the COVID-19 pandemic in Ghana. It also included a comparative analysis between re-tertiary and tertiary educational institutions. The main focus was to determine the availability and ownership of electronic gadgets for teaching and learning; how long mainstream and social media have been used for teaching and learning; a comparative analysis of their use before, during, and after the COVID-19 pandemic; and to identify the most effective, easy-to-use and preferred media for teaching and learning in the post-COVID-19 era.

There is no doubt that electronic gadgets offer many features that can be used to teach students, facilitate learning and access information and lessons. Mainstream media and social media are no exception, as electronic gadgets can provide access to these platforms. In this regard, it was first found that most staff at the pre-tertiary and tertiary levels have personal and direct access to electronic devices. The researchers found that students at tertiary educational institutions also own personal devices, while those at pre-tertiary institutions largely depend on others, such as their parents, siblings and schools, to access electronic gadgets.

Therefore, individuals without personal access to electronic gadgets must rely on others, like their parents, siblings, friends or school computer labs. According to TAM (Davis, 1989), access to electronic devices significantly influences both perceived ease of use and perceived usefulness of technology, which in turn affect users' intention to adopt. SCT (Bandura, 2001) complements this by emphasizing self-efficacy, or belief in one's ability to use a tool effectively. This suggests that many students at pre-tertiary institutions lack personal gadgets, possibly due to their parents' efforts to monitor and control gadget use because of potential negative effects, as well as their siblings' willingness to share their gadgets. This could be linked to staff experiencing high levels of gratification and recognizing the usefulness of adopting and owning personal electronic gadgets, as well as their capacity to purchase and own them. It can thus be inferred that the ability to own personal electronic gadgets largely depends on perceived usefulness, usability, user expectations and purchasing power. Mupfiga *et al.* (2017) reported that most students (81%) and 54% of lecturers own different mobile devices used for social media, while Dei *et al.* (2022) reported 88.89% ownership among students.

Regarding the timing of media use for educational purposes, the study showed an increase in adoption during and after the COVID-19 pandemic. This supports TAM's assertion that perceived relevance and usefulness enhance technology acceptance when users face significant contextual needs, such as remote learning during a global health crisis. From the SCT perspective, this change also reflects observational learning and social modeling, where users adopted new behaviors after observing peers, institutions or authorities using similar tools effectively.

The ease of using technology, mainstream media and social media (whether perceived or real) significantly influences the adoption and use of these tools for teaching and learning in pursuit of quality education. A comparison of media platform usability revealed that YouTube, WhatsApp, Wikipedia and Facebook, all social media platforms, are the easiest to use compared to other social media and traditional media, such as television and radio. Ease of use, whether perceived or actual, can lead to increased adoption, which then boosts user satisfaction. In line with SCT and TAM, the ease of use of any media depends on its ability to meet various needs, including learning, social, affective and cognitive needs. Furthermore, motivation to use either mainstream or social media largely relies on how easy the platform is to navigate. This supports a core TAM idea: ease of use enhances perceived usefulness, which ultimately encourages actual use. In addition, these platforms facilitate vicarious learning, social reinforcement and self-regulated behavior among users, key concepts in SCT that explain why intuitive tools are more likely to be adopted and retained in educational settings.

The need to integrate mainstream media and social media into educational activities is crucial and necessary, as their effectiveness has been demonstrated by numerous studies (Papademetriou *et al.*, 2022; Cavus *et al.*, 2021; Wang, 2021). The same applies to this study, as comparative analysis and discussions among different categories of educational institutions revealed that the use of mainstream and social media for teaching, learning and promoting quality education mainly began during and after the COVID-19 pandemic and lockdown. However, tertiary educational institutions had already started using mainstream and social media for teaching and learning before the pandemic struck. Specifically, the use of mainstream and social media for teaching at pre-tertiary institutions mostly began just four years ago (since, 2020). Despite technological advancements that have existed for years or decades, the use of social media and mainstream media for teaching, learning and promoting quality education saw a sharp increase during and after the COVID-19 pandemic, as most institutions had to adopt innovative methods to support and continue education. These platforms enabled educational institutions to reach both current and prospective students. Similar studies reported an increase in the adoption and use of social media during and after the pandemic (Papademetriou *et al.*, 2022; Effendi *et al.*, 2020; Khan *et al.*, 2021; Carrasco *et al.*, 2021). Carrasco *et al.* (2021) observed an increase in the use and frequency of smartphones, computers and tablets for teaching due to the COVID-19 pandemic.

Again, comparative findings suggest that the most preferred media for supporting teaching and learning during and after the COVID-19 pandemic were YouTube and WhatsApp, which are primarily social media platforms. The choice of different media or platforms depends on usefulness, ease of use and other factors. In context, YouTube, WhatsApp and Facebook can be used to upload course content, lecture recordings, videos, simulations and other relevant materials. WhatsApp offers additional features for live collaboration, making it the most favored option. Learners can watch videos on YouTube to gain a deeper understanding of a topic or examine photos, diagrams and images, which can help them visualize concepts. After all, "pictures, videos and simulations speak a thousand words." All of these demonstrate the ease of use of these media and the support they provide, as suggested by SCT and TAM. The ease of use of social media over mainstream media also influenced its actual use, since social media was seen as the most widely used medium during and after the COVID-19 pandemic. The central role of social media in education is now unquestionable. The integration of social media into education, as well as the extent to which educators, instructors and learners use it, is crucial for developing and improving the quality of education. Dei *et al.* (2022) also reported that YouTube, WhatsApp and Facebook are the most preferred social media platforms for disseminating information among students. Social media usage greatly outweighed that of traditional media, a pattern explained by TAM through increased task-fit and higher perceived benefits in communication, interactivity and content accessibility. SCT further clarifies this by emphasizing the triadic reciprocity among personal factors (motivation, self-efficacy), behavior (adoption, frequency of use) and environmental conditions (availability of social media platforms, institutional support). These dynamic interactions sustain the behavior of using social media for educational purposes.

One main advantage of social media over mainstream media is its real-time feedback and collaborative nature. The immediate feedback and live conversations are facilitated by social media platforms such as Facebook and Instagram, as established in this study. Unlike other media like mainstream outlets, social media allows for information to be uploaded, accessed, used and reused anytime, anywhere, making it more convenient for teachers and learners. This also makes social media the preferred choice for information retrieval, interaction, collaboration and ease of use. The study suggests that the public trusts social media more than mainstream media. Papademetriou *et al.* (2022) revealed that higher educational institutions' use of social media during the COVID-19 pandemic positively affected the educational process by fostering connections within the university community,

promoting teaching, research and learning, and motivating students to be active. Conversely, Wang (2021) indicated that mainstream media is more useful and credible than social media and alternative platforms. Wang (2021) further stressed that mainstream media can disseminate more reliable and credible information than social media during pandemics.

The mainstream media platforms also play a vital role in teaching and learning during and after the COVID-19 pandemic. Learners can log in or tune in to programs streamed on mainstream media and participate in the learning process, although they cannot save or replay the sessions unless a rebroadcast or telecast is available. Wang (2021) and Chadwick and Vaccari (2019) argue that mainstream media is more dependable because it has gatekeepers to prevent or reduce misinformation and fake news, a feature that social media lacks. This makes mainstream media superior to social media, according to them (Wang, 2021; Chadwick and Vaccari, 2019). Mainstream media tends to promote the posting and sharing of high-quality, trusted information compared to social media, although it does not offer real-time interaction, collaboration or immediate responses, which can limit its outreach. In TAM terms, these platforms score high in both ease of use and perceived usefulness. SCT supports this by emphasizing reinforcement and motivation; students and teachers continue to use platforms that offer real-time feedback, peer interaction and flexible learning environments. The preference for social media also reflects its ability to meet both cognitive and emotional needs, thus encouraging sustained engagement.

The study further revealed the existence of some challenges despite the significant role that various media played in supporting teaching and learning at educational institutions during and after the COVID-19 pandemic. The spread of misinformation on social media creates credibility issues with some of the content and information shared online. The lack of policies and guidelines for media use also diminishes the credibility of content and materials, mainly associated with mainstream media. As a result, content management and usage are impacted. Electronic devices are central because they serve as the hardware for operating social and mainstream media. Their absence, obsolescence or malfunctioning affects social media use for teaching and learning. The same applies to the cost of Internet access and the bandwidth of Internet connections. Literature reviews provide evidence that organizational, technological and behavioral issues are significant factors that hindered the use of social media in educational institutions during the COVID-19 pandemic (Abdelfattah *et al.*, 2023).

Conclusion

The research compared the roles of mainstream media and social media in promoting quality education during and after the COVID-19 pandemic in Ghana. The findings show that the use of social media and mainstream media for teaching, learning and maintaining quality education primarily started during the COVID-19 pandemic and the closure of educational institutions. This prompted the adoption of technologies such as media systems. The availability of electronic gadgets somewhat influenced the acceptance and use of social and mainstream media during and after the pandemic and lockdown. Tertiary institutions were found to be more actively engaged in using various media platforms for teaching and learning than pre-tertiary institutions. Social media platforms like WhatsApp, YouTube and Facebook were the most preferred, popular, easy to use and effective compared to mainstream media options. Although other platforms such as Instagram, Twitter, Wikipedia, LinkedIn and WordPress were available and used for teaching and learning during and after the COVID-19 lockdown, they remained among the least used social media platforms.

Based on the findings, it is clear that: personal ownership of electronic gadgets among staff is higher than among students since staff have more opportunities to acquire them; tertiary institutions use and engage with more social media and mainstream media platforms than pre-tertiary educational institutions; social media platforms are easier to use, more preferred, popular and more effective for teaching and learning during and after the COVID-19 pandemic and lockdown than mainstream media; and specific platforms like WhatsApp, YouTube and Facebook are even more popular, easy to use, preferred and effective for teaching and learning during and after the COVID-19 pandemic and lockdown compared to other social media platforms. The researchers also recognize that both technical and human factors hinder the smooth use of media for teaching and learning. These challenges can negatively influence the use of both main and social media for educational purposes.

Limitations and implications

Limitations

The research focused on pre-tertiary and tertiary educational institutions in urban areas of Ghana, where the lockdown and the impact of the COVID-19 pandemic were more intense and widely felt. The adoption and use of social media for teaching and learning, as well as maintaining quality education during and after the lockdown, may have different implications for institutions outside urban areas. In addition, the study was conducted after the lockdown was lifted, although activities and events related to teaching and learning that occurred during the lockdown were also taken into consideration. The researchers acknowledge that a reverse causal order could have been studied during the actual COVID-19 pandemic.

Implications for practice and suggestions

- Use social media platforms for blended learning: According to the study findings, educational institutions should formally integrate social media platforms, such as Facebook Live, YouTube and WhatsApp, into their regular teaching methods because of their ease of use and accessibility.
- Building teachers' and students' capacity: Regular training in digital literacy and social media use is essential to improve teaching, communication and teamwork skills.

Implications for policy and suggestions

- Framework for national e-learning and media policy: The Ministry of Education, GES and GTEC must develop or revise policies that recognize and regulate the official use of social and mainstream media in delivering education.
- Guidelines for digital ethics and media use: Policies should address false information and promote responsible digital communication to ensure media is used to enhance learning rather than disrupt it.

Implications for management and institutions

- Institutional media strategies: To ensure coordination, quality control and content monitoring, educational management should develop internal strategies to guide the use of social and mainstream media for academic purposes.
- Investing in ICT infrastructure, such as high-speed internet, reliable power supply and modern computer labs, should be a top priority for school administration.
- Stakeholder engagement: To reduce opposition and increase support for media-based learning, institutions should educate communities and parents about the educational benefits of social media.

Implications for technology and education

- User-centric platform design: To create educational platforms that are easy to use and incorporate social media features for low-bandwidth areas, tech developers and educational institutions should work together.
- Time zone sensitive broadcasting: To maximize engagement, programming for popular media such as radio and television should be scheduled based on learners' availability.
- Hybrid learning models: To accommodate different access levels and learning preferences, both synchronous and asynchronous models should be promoted across various media platforms.

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Ethics statement

All subjects and participants consented to inclusion before participating in the study. Ethical approval was obtained from the Ethics Committee of KAAF University College (KUC Ref No. 2023/009).

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