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# Technology Appropriation in Higher Education: The Case of Communication Educators in Ghana

Akwasi Bosompem Boateng<sup>1</sup> and Stephen Tindi<sup>2</sup>

<sup>1</sup>School of Communication and Media Studies, University of Education, Winneba, GHANA.

<sup>2</sup>Department of Communication Studies, Ghana Institute of Journalism, GHANA.

<sup>2</sup>Corresponding Author: [stephen.tindi@gij.edu.gh](mailto:stephen.tindi@gij.edu.gh)



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## ABSTRACT

The outbreak of COVID-19 in 2019 challenged universities in sub-Saharan Africa to reinvent themselves and rely more on digital technologies for curriculum delivery. Before the pandemic, technology use in curriculum delivery was ad-hoc and depended mainly on teachers' self-efficacy. This article investigates how teachers in higher education institutions (HEIs) in Ghana appropriated new media technologies for teaching and research before the outbreak of COVID-19. This study explored the new media technologies used by teachers, their motivations for using them, how they used them, and the challenges they encountered in their appropriation of technologies for curriculum delivery. The study triangulated in-depth interviews and semi-structured questionnaires to gather data from university teachers who are members of the Communication Educators Association, Ghana (CEAG). Thematic and descriptive analyses were employed to analyze data collected through interviews and surveys. The study revealed that communication educators mostly used Google Scholar, YouTube, and Facebook. Their choices and usage of these new media were influenced by personal preference and the perceived usefulness of digital technologies to teaching and research. Communication educators face several challenges in using digital technologies; these include unstable internet connection, low digital literacy, and financial constraints, which impede their appropriation of new media technologies. The adoption and adaption of new media among communication educators is consistent with the Technology Appropriation Theory, and practicality rather than pedagogical imperatives drive their usages. The study concludes that teachers must carefully plan the deployment of new media in curriculum delivery; therefore, communication educators require institutional support and policy guidelines to appropriate and deploy new media technologies effectively.

**Keywords-** New media, Communication Educators, Higher Education Institutions (HEIs).

## I. INTRODUCTION

Information and Communication Technology (ICT) plays a key role in the educational landscape (Saurabh & Sairam, 2016; Edumadze & Owusu, 2013). ICTs, especially digital and new media technologies have become essential for teaching and learning due to the COVID-19 pandemic (Pozo, Echeverría, Cabellos & Sánchez, 2021; Valverde-Berrocoso, Fernández-Sánchez, Revuelta Dominguez & Sosa-Díaz, 2021). New media encompass many technologies, such as wikis,

podcasts, blogs, as well as social networking sites (SNS) such as Facebook, Twitter, WhatsApp, and Instagram, among others.

The distinctive features of new media especially their interactivity facilitates the dissemination and exchange of information in real-time. New media technologies have been introduced in education at various levels (Ansari & Khan, 2020; Higgins, 2003), which have proven to be beneficial for teaching, sharing information and fostering collaboration among others (McCarroll & Curran, 2013; Saurabh & Sairam, 2016).

Despite the benefits of new media, the potentials of communication technologies in the education, teaching and learning in many developing countries have not been fully realized (Edumadze & Owusu, 2013).

The deployment of technology in education in Sub-Saharan African countries is lagging due to lack of infrastructure and access to technology (Farell & Isaacs, 2007; Rivers, Rivers & Hazell, 2015). However, in settings where infrastructure exists, only few educators integrate these new forms of technology in curriculum delivery especially in Higher Education Institutions (HEIs) in Africa (Onwuagboke, Singh & Fook, 2015). The capabilities and constraints to using these new technologies affect the efficacy of educators to undertake specific activities, such as teaching, research and learning (Johnson, Jacovina, Russell & Soto, 2016). This study therefore investigates the appropriation mechanisms, usages and challenges to the deployment of technologies for curriculum delivery in HEIs in Ghana.

## II. BACKGROUND

Like other countries in sub-Saharan Africa, HEIs and indeed the entire educational sector in Ghana has a felt need to digitalize in line with the demands for education in the 21<sup>st</sup> century. Over the years, successive governments in Ghana have promoted the usage of digital technologies for the production and extension of knowledge through several well-intentioned but poorly implemented initiatives. For example, the government of Ghana adopted the ICT in Education Policy in 2015, and Ghana e-Schools and Communities Initiative, among others to promote the use of information and communication technology in education (Republic of Ghana, 2015). Several studies have been conducted with respect to the use of information and communication technologies in Ghanaian universities (Edumadze & Owusu, 2013); second cycle institutions (Yidana & Buabeng, 2015); and early childhood education (Asante, 2014), among others.

Inasmuch as research has been conducted in Ghana in information, communication and technologies, there are no studies on how new media as specific forms of communication technologies have been used by academics in communication training in higher education institutions for teaching, research, and student engagements. More so, previous research on the use of technology in higher education in Ghana have largely focused on quantitative approaches without exploring the detailed perspectives of educators' experiences with these new technologies. Furthermore, some scholars have argued that several academics in higher education institutions in Ghana are not digital natives, who may be resistant to new media technologies in teaching,

research, and engagements. Against this backdrop, this article attempts to investigate how communication educators in Ghana use new media technologies in their teaching and research work. The study explores the new media technologies used by communication educators and factors that affect the adoption of these new media, as well as the challenges encountered by the educators in their usages of new media technologies. To be able to ascertain these, the article sought to achieve the following research objectives:

## III. RESEARCH OBJECTIVES

This paper seeks to;

1. Find out the new media technologies used by communication educators in higher education institutions in Ghana.
2. Describe how communication educators in higher education institutions in Ghana use new media technologies.
3. Ascertain the motivation for the use of new media technologies by communication educators in higher education institutions in Ghana.
4. Examine the challenges encountered by communication educators in higher education institutions in Ghana in their usages of new media technologies.

## IV. RESEARCH QUESTIONS

To achieve the objectives above, the article addressed the following questions:

1. Which new media technologies are used by communication educators in higher education institutions in Ghana in their activities?
2. How do communication educators in higher education institutions use new media technologies in their activities?
3. Why do communication educators in higher education institutions use new media in their activities?
4. What challenges do communication educators in higher education institutions encounter in the use of new media in their activities?

## V. THEORETICAL APPROACH

This research is underpinned by two important communication theories. The first is the Technology Appropriation Model (TAM), which focuses on how people evaluate and use or incorporate technologies into various activities and practices over time. TAM is also concerned with how technologies become fully utilized. (Carroll 2002, 2004). By hinging this research on the *technology appropriation model*, this article could

explain how communication educators in higher education institutions in Ghana have adopted, adapted, and integrated new media as technologies in teaching, research, and engagements with students. Data gathered in this research indicates that communication educators in Ghana have appropriated new media technologies in the teaching and research activities since their emergence and diffusion because of their designs and attributes.

The second is the *Uses and Gratification* theory, developed by Kalz, Blumler and Gurevitch (1974). The Use and Gratification framework is particularly concerned with what individuals do with media rather than what the media do to individuals. The assumption of this theory is that people can affect or control the influence that media have on them; arguing that audiences are not merely passive recipients because they have the choice to determine how media could influence them or otherwise (Karimi, Khodabandelou, Ehsani & Ahmad, 2014). By using the uses and gratification framework, this study could describe how communication educators in Ghana selectively expose themselves to new media, as well as the use(s) derived from new media technologies. In other words, *uses and gratifications* help this study to explain how lecturers in communication education institutions in Ghana select and use technologies in different ways that suit their individual interests and purposes in teaching, research, and engagements. Data collected from this research indicates that communication educators in Ghana use the various types of new media technologies depending on the activities they want to embark upon especially in teaching and research. In other words, communication educators choose which new media platforms they felt at any point in time could enable them to impart knowledge and conduct research to contribute to knowledge production and dissemination.

## VI. METHODOLOGY

This study used the mixed methods approach. Mixed method approach which features elements of the two (qualitative and quantitative) paradigmatically opposite methodologies (Creswell, 2014) was employed because it is pragmatic and suitable for putting together the insights provided by qualitative and quantitative methods into a workable solution (Johnson & Onwuegbuzi, 2004). The mixed method approach enabled the researchers to combine numerical and textual (verbal) data to answer the research questions, that is, which new media technologies communications educators use, why communication educators use those technologies, how they use the technologies and the challenges they encounter in the process of using these new technologies.

The study triangulated in-depth interviews and survey (semi-structured questionnaires) to address the weaknesses of the individual methods of data collection. This implies that triangulation enhances the credibility and validity of research outcomes by gathering in-depth and nuanced understanding of research findings and clarifying disparate results by placing them in dialogue with one another to corroborate or dispute data from methods (Mertens & Hesse-Biber, 2012).

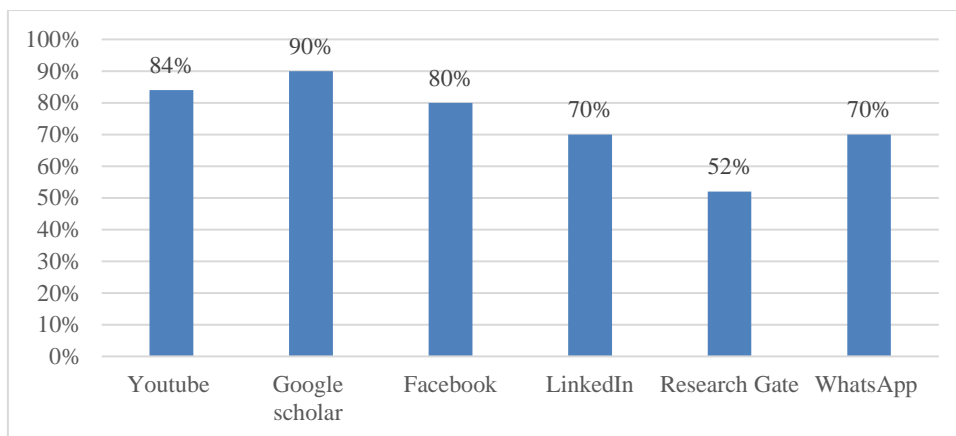
The study collected primary data from members of the Communication Educators Association of Ghana (CEAG), a national association of academics with specialisation in communication and media studies, who teach communication courses in universities in Ghana. Qualitative data was obtained through semi-structured interviews with six (10) senior lecturers who are members of CEAG. Quantitative data on the other hand was obtained through semi-structured questionnaires administered online (via google forms) to the wider membership of CEAG. Using purposive sampling, the study selected senior lecturers who have many years of experience as communication educators for the interviews. Since senior lecturers in most universities in Ghana have more than five years of teaching experience in addition to other qualifications, they could be more knowledgeable about the use of various technologies in curriculum delivery.

To satisfy the quantitative dimension of the study, online questionnaires were emailed to all members (N=62) on the emailing list of CEAG in June 2019 when primary data was collected for this research. However, twelve (12) members did not respond to the questionnaires. The response rate was 80.6%. The questionnaire results were subjected to basic descriptive analysis, whereas interview responses were thematically analyzed.

## VII. FINDINGS AND ANALYSIS

### **RQ1: Which new media technologies are used by communication educators in higher education institutions in Ghana in their activities?**

There is a plethora of new media technologies available to teachers at all levels. This study found that communication educators in higher education institutions in Ghana use wikis, blogs, websites, social media, video, and music streaming applications. Each educator or teacher is familiar with at least one new media technology, but most teachers use multiple new media technologies. The top six new media technologies used by communication educators in higher education institutions in Ghana is presented in diagram 1 below. The diagram is the result of a multiple response item on the questionnaire.



**Figure 1: New Media technologies used by communication educators**

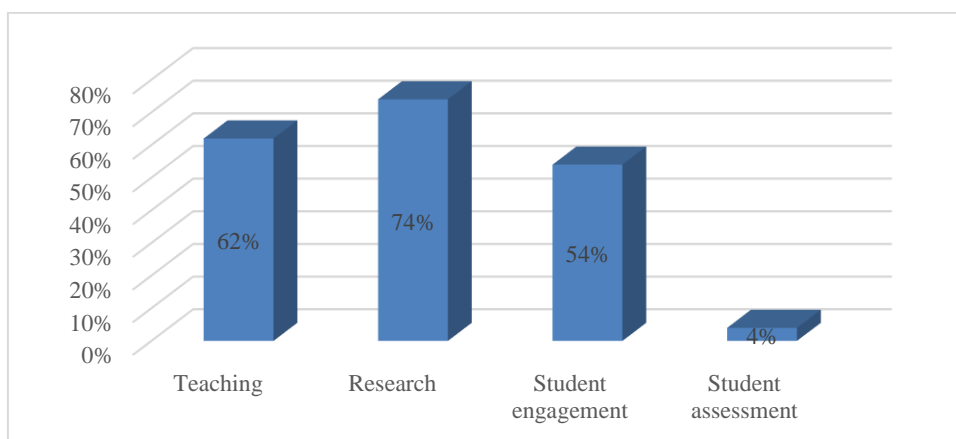
It is apparent from figure 1 that communication educators in Ghana use diverse new media technologies, which is consistent with earlier studies on educators familiarity with technological tools in other parts of Africa (Dintoe, 2018) and around the world (Aldahdouh, Nokelainen & Korhonen, 2020). The most used new media technology in this study (Google Scholar) is a free search engine developed by Google for academic and educational purposes. Google scholar was designed to locate scholarly literature available from relevant online repositories (Hoseth, 2011). YouTube on the other hand is a video sharing and streaming application which was not originally designed as an educational technology (ed-tech) when it was launched in 2005. The popularity of You Tube among communication educators is however not surprising because You Tube has significant educational videos, making it a useful learning technology in higher education (Fleck, Beckman, Sterns & Hussey, 2014).

It was found that the majority (42.9%) of communication educators in Ghana use new media technologies daily; 30.6% use them weekly, whilst the remaining 8.1% used these technologies occasionally. This implies that the usage of new media technologies for communication education is low as less than half of the sample (N=50) use new media daily for research,

teaching and student engagement. It is noteworthy to indicate that the choice of new media technologies used by communication educators follows the trend of popular new media usage in Ghana. Google search, Youtube, Facebook and Whatsapp are well known and highly appropriated new media technologies among the general population in Ghana. These technologies are popular in other countries where they are available and accessible. In Ghana over 6 million (40%) out of the more than 14.76 million internet users are on social media. Whatsapp, Facebook and You Tube are the top three popular social media platforms in Ghana (Kemp, 2020). The choice of new media technologies used by communication educators conforms to the general trend of new media adoption among the populace.

**RQ2: How do communication educators in higher education institutions in Ghana use new media technologies in their activities?**

Communication educators in Ghana use new media technologies for research, teaching and student engagement. This was evident from the data from questionnaire and interviews. The diagram below is a summary of the results of multiple response items on the questionnaire, which illustrates the preponderance of the various uses of new media technologies among communication educators.



**Figure 2: Uses of new media technologies among communication educators.**

Communication educators in higher education institutions in Ghana use new media technologies for several reasons. Each lecturer claimed to use new media technologies for more than one purpose. Majority of respondents (74%) use new media for research; 62% use them for teaching; 54% for student engagement; and 4% use new media for student assessment.

During the in-depth interviews, the lecturers explained how they used new media technologies. One of them stated: For example, Interviewee 1 explained:

I think I am a compulsive ‘Googler’. I use Google Search and Google Scholar a lot. I search for articles and books about the concepts and other things that I teach. I teach research, so I practically teach how to use search engines. I demonstrate it in class and ask my students to try searching for specific information with their mobile phones.

***Another respondent stated:***

I use WhatsApp for feedback and engagement because almost anyone can use it on their phone. I have been doing this for about two years now. Initially, I was skeptical about WhatsApp because I felt it was too personal. After all, it is phone-based, but when I started, I realized that the students were actively participating so now I encourage WhatsApp groups for all my classes. It is time-consuming, but it has helped my students, so I still use it. As for Facebook I only used it once. I created a class page and posted the course outline there for my students (Interview 4).

These responses indicate how teachers have appropriated new media technologies for research, teaching and student engagement. The teachers posited that the choice of technology to use is partly based on students' preference as well as their familiarity with the technologies. It is evident from the responses that some communication educators access new media technologies using mobile phones. The usage of mobile technologies in education hold high promise because mobile phones are more widely available in Ghana than other ICTs (Grimus & Ebner, 2014).

Communication educators leaned more toward using generic new media technologies, but they appropriate them for educational purposes. The lecturers appropriated technologies in the classroom and informally to engage with students after class. The appropriation practices of communication educators have pedagogical benefits of promoting active learning through hands-on experimentation. Consistent with Simoes and Gouveie (2011), the educators applied the technologies taking cognizance of their capabilities, students' interest, and the social dynamics. The educators adopted a learner-centred approach which is more effective than the teacher-centred approach when appropriating instructional technologies (Czajka & McConnell, 2019).

More so, lecturers in higher education are integrating readily available technologies such as search tools, social media and instant messaging applications

into teaching and learning to enrich the educational experiences of students. The lecturers have adapted existing new media technologies to serve their specific needs. Lecturers are using these technologies to transform educational experiences and outcomes despite the technological challenges in a developing country such as Ghana. The situation of communication educators is quintessential technology appropriation – a process whereby people adopt and adapt technologies to respond to specific contextualised challenges (Toure, 2009).

**RQ3: Why do communication educators in higher education institutions use new media in their activities?**

Gruzd, Haythornthwaite, Paulin, Gilbert and Del Valle (2016) posit that from the education and learning theories, prospective teachers could deploy new media to extend the learning environment, expose students to practice and promote a social and collaborative approach to learning. However, for lecturers in a technologically disadvantaged country such as Ghana, the motivation to use new media to support teaching and learning is born out of practical need rather than theoretical imperatives.

The data from questionnaire indicates that communication educators in Ghana deployed new media following the perceived usefulness of these new technologies. The majority (57%) of communication educators perceived the usefulness of social media for teaching and learning as very high; 24% considered it highly useful and the remaining 19% perceived it moderately high. Most (87.5%) educators agreed that new media technologies have had a significant impact on their teaching, research, and engagement with students. The interview responses confirmed the data from questionnaire. For example, Interviewee 5 narrated:

I use new media especially (social media) because they work for my students and me. Given the modern times we are in, these technologies are highly recommended. Before I even introduced them to my students, I was using social media for personal interactions with friends and I knew some of the students were also using social media, so I just asked myself: why do we not use them for something more beneficial like student-teacher engagement, and it worked for us.

***In another response, Interviewee 3 remarked:***

I use Twitter, Facebook and Wikipedia for illustration in class. I ask my students to create accounts and make it a point to check that they have done it. For me, these technologies present students with the opportunity to engage with outside resources. Besides, I am teaching communication to digital natives, so it is impossible to escape Facebook, Twitter, and Instagram, among others.

***On the other hand, Interviewee 6 said:***

Before I joined my current university, I was a teaching assistant in the United States of America during my PhD. I realised that in other parts of the world, they

encouraged students to learn on their own, so when I returned to teach in Ghana, I made it a point to give students the room to learn on their own through social media. I am intentionally not on some of the student group platforms, but they give me reports on their interactions during class presentations.

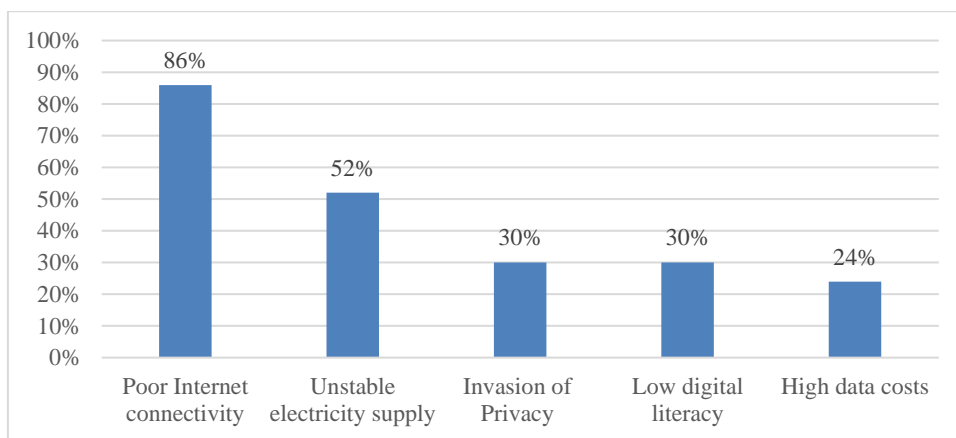
The interview responses highlight that most communication educators are motivated to appropriate new media technologies for teaching and student engagement given the affordances of these technologies. The appropriation of new media technologies as Wiredu (2007) noted is a function of many factors but the motive of the user is key, which the data from this study has revealed. As communication educators have demonstrated, when the motive for usage is strong, it could compensate for weaknesses in other factors, such as conditions of use and technology design or properties.

The motivation for using new media technologies; perceived usefulness, ability to facilitate peer to peer engagement and potential for enhancing

student engagement with outside resources seem to neutralise the challenges to appropriating new media for teaching and learning. Communication educators in Ghana have appropriated google Scholar, You Tube, Facebook and Whatsapp as pedagogical tools to construct knowledge and enhance students learning experiences. The findings confirm the postulations of the Uses and Gratification Theory (UGT) that people can control media influence and select the media to use in gratifying their needs (Karimi et al., 2014). Despite the bottlenecks to technology use, communication educators in Ghana are using new media in many ways to address their research, teaching and student engagement needs.

**RQ4: What challenges do communication educators in higher education institutions encounter in the use of new media in their activities?**

The data from the survey in Figure 3 shows that communication educators face many challenges in the use of new media technologies.



**Figure 3: Challenges faced by communication educators in using new media**

This item was a multiple response questions on the questionnaire, and it can be observed from the results displayed in figure 3 that all respondents (n=50) encountered multiple challenges in using new media technologies. The major challenge is poor internet connectivity in parts of the country. It is evident from Figure 3 that 86% of respondents face connectivity challenges; 52% had erratic electricity supply; 30% complained about invasion of personal privacy. Another 30% were constrained by self-perceived low digital literacy; while 24% were prevented by the high data costs associated with the use of new media.

Like the survey results, all six (10) interview informants admitted to facing challenges with the use of new media technology in teaching, research, and student engagement. The challenges that were pointed out by informants in the interviews were consistent with the data from the survey. For example, Interviewee 3 expressed her challenges as follows.

I have problems with internet connection because I normally do my research and other things at

home. However, the internet connection is not very reliable where I live. Sometimes it is difficult to get stable internet even on campus and that negatively affects my activities as a lecturer.

***This response is not extremely different from what Interviewee 6 expressed:***

I am not too that good with ICT, but I think I am learning fast. Some of my students are good with new media while others are not. There are even others who do not have smartphones or computers. I think that is also a challenge because as a lecturer I feel uncomfortable to use a technology that could exclude some of my students from whatever we do in and outside of the classroom.

Based on the survey and interviews, the main challenges faced by communication educators regarding their technology appropriation are poor internet connection and unstable electricity supply. Both challenges are systemic and widespread, not only in Ghana but in several other countries in Sub-Saharan Africa (Rivers, Rivers & Hazel, 2015). The challenges

identified are among what Ezumah (2020) described as macro-level infrastructural challenges to educational technology adoption in Africa.

In Ghana, Antwi, Bansah and Franklin (2018) and Peprah (2016) noted that systemic challenges, such as poor internet connection and unstable electricity supply restrict access to educational technologies by both teachers and learners. Concerns over the invasion of personal privacy and low digital literacy are described as personal challenges because they are specific to individual cases, which significantly impact technology appropriation because usage occurs at the micro-level that requires personal agency in adopting and adapting technologies.

Another challenge that can be identified from the responses is in respect of digital inequality. Digital inequality is the gap that exists in the access to and usage of digital technologies, which is the result of structural and personal factors. The disparities in access and usage of ICTs among communication educators could be due to geographical location, technological dexterity, and availability of resources. The disparities in digital skills, internet connection stability, electricity supply and financial resources to use new media technologies indicate digital inequality among communication educators in Ghana. Lecturers in communication training schools in urban areas had more access to infrastructure including internet, which largely enable them to access new media technologies as compared to those in smaller and rural areas in Ghana.

### VIII. CONCLUSION

This article explored how communication educators in HEIs in Ghana appropriate new media technologies for curriculum delivery. The study found that communication educators use multiple new media technologies such as Google Scholar, YouTube, and Facebook. Educators use these technologies formally and informally for teaching, research, and student engagement. Communication educators make personal decisions to adopt and adapt new media for teaching; hence the choice of new media technologies is influenced by the preference and perceived usefulness of technologies to the educators. Practicality rather than pedagogical imperatives drives the usage of new media among educators. Whilst these practices of communication educators are consistent with the Technology Appropriation Model and the Uses and Gratification Theory; they have implications for students' learning and educational outcomes. Educators' appropriation of technology is impeded by macro-level infrastructural challenges, such as unstable internet connection and erratic electricity supply. However, other micro-level challenges, such as the ability to purchase internet data, invasion of personal privacy and low digital literacy of some educators, also challenge their usages of new media technologies. These impediments

invariably impact technology appropriation and usage of new media by communication educators in higher education institutions in Ghana.

The outcomes of this study provide a valuable baseline for understanding how communication educators used digital or new media technologies before the outbreak of the COVID-19 pandemic. The conclusions of the study imply that technology use in curriculum delivery must be planned and coordinated to be effective. As a result, communication educators must be supported by the universities they work with and other stakeholders in their efforts to appropriate new media for teaching, research, and student engagement. There is also the need for further research to understand how the COVID-19 pandemic has impacted technology appropriation among communication educators in Ghana.

### REFERENCES

- [1] Aldahdouh, T. Z., Nokelainen, P. & Korhonen, V. (2020). Technology and social media usage in higher education: The influence of individual innovativeness. *SAGE Open*, 10 (1), 1-20.
- [2] Ansari, J. A. N. & Nawab, A., K. (2020). Exploring the role of social media in collaborative learning the new domain of learning. *Smart Learning Environments*, 7(1), 1-16.
- [3] Antwi, S., A. K. & T. Franklin. (2018). The information technology challenge in teaching senior high school geography in Ghana. *Issues and Trends in Learning Technologies*, 6(1).
- [4] Asante, J., N. (2014). The state of ICT integration in the early years in Ghana schools. *Literacy Information and Computer Education Journal*, 3(1), 1751-1757.
- [5] Buabeng-Andoh, C. & Yidana, I. (2015). Teachers' ICT usage in second-cycle institutions in Ghana: A qualitative study. *International Journal of Education and Development using ICT*, 11(2), 104-112.
- [6] Carroll, J. (2004). Completing Design in Use: Closing the appropriation cycle. Proceedings of the 12th European Conference on Information Systems. Turku: Finland, 2004.
- [7] Carroll, J., Howard, S., Peck, J. & Murphy, J. (2002). A field study of perceptions and use of mobile telephones by 16- to 22-year-olds. *Journal of Information Technology Theory and Application*, 4(2), 49-62.
- [8] Czajka, C. D. & McConnell, D. (2019). The adoption of student-centered teaching materials as a professional development experience for college faculty. *International Journal of Science Education*, 41(5), 693-711.
- [9] Dintoe, S. (2018). Information and communication technology use in higher education: Perspectives from faculty. *International Journal of Education and Development using ICT*, 14(2), 121-166.

- [10] Edumadze, J. & Owusu, A., K. (2013). Use of information and communication technology for teaching and learning in Ghanaian universities: Case of University of Cape Coast.
- [11] Edumadze, J., K., E. (2015). The integration of information and communication technology for teaching and learning at Ghanaian colleges of education: ICT tutors' perceptions. *African Journal of Teacher Education* 4(2), 2-16.
- [12] Ezumah, B., A. (2020). Challenges of educational technology adoption in Africa. *Critical Perspectives of Educational Technology in Africa. Digital Education and Learning*, 69-89.
- [13] Fleck, B., K., D., Beckman, L., M., Sterns, J., L. & Hussey, H., D. (2014). YouTube in the classroom: Helpful tips and student perceptions. *Journal of Effective Teaching*, 14(3), 21-37.
- [14] Hoseph, S. (2011). Google Scholar. *Advisor Reviews*, 12(3), 36-36.
- [15] Issa, T. & Isaias, P. (2014) Promoting human-computer interaction and usability guidelines and principles through reflective journal assessment. In: *Emerging research and trends in interactivity and the human-computer interface*. IGI Global, pp 375–394.
- [16] Johnson, A., M., Jacovina, M., E., Russell, D., G. & Soto, C., M. (2016). Challenges and solutions when using technologies in the classroom. ERIC Clearinghouse. In S., A. Crossley & D. S. McNamara (Eds.) *Adaptive educational technologies for literacy instruction*. New York: Taylor & Francis.
- [17] Karimi, L., Khodabandelou, R., Ehsani, M. & Ahmad, M. (2014). Applying the uses and gratifications theory to compare higher education students' motivation for using social networking sites: Experiences from Iran, Malaysia, United Kingdom, and South Africa. *Contemporary educational technology*, 5(1), 53-72.
- [18] Katz, E., Blumler, J. & Gurevitch M. (1974). Uses of mass communication by the individual. *mass communication research: Major issues and future directions*. In W., P. Davidson & Fredrick Yu (Eds.). New York: Praeger.
- [19] Kemp, S. (2020). *Digital 2020: Ghana*. New York: Hootsuite.
- [20] McCarroll, N., & Curran, K. (2013). Social networking in education. *International Journal of Innovation in the Digital Economy (IJIDE)*, 4(1), 1-15.
- [21] Pozo, J. I., Pérez Echeverría, M. P., Cabellos, B., & Sánchez, D. L. (2021). Teaching and learning in times of COVID-19: uses of digital technologies during school lockdowns. *Frontiers in Psychology*, 12 (1), 1-13
- [22] Republic of Ghana. (2015). *ICT in education policy*. Accra: Ministry of Education.
- [23] Rivers, P. A., Rivers, J. K. & Hazell, V. (2015). Africa and technology in higher education: Trends, challenges, and promise. *International Journal for Innovation Education and Research* 3(5), 14-31.
- [24] Saurabh S. & Sairam, A., S. (2016). Effect of social networking on higher education in India. *Social Networking and Education*, 51-68
- [25] Thierry, K. (2009). *Pedagogical uses of ICT in Africa: Teaching and reflecting strategies*. Montreal: University of Montreal.
- [26] Toure, K. (2009). Appropriating technologies and making them work for you in teaching and learning: depth is of essence.
- [27] Valverde-Berrocoso, J., Fernández-Sánchez, M. R., Revuelta Dominguez, F. I., & Sosa-Díaz, M. J. (2021). The educational integration of digital technologies preCovid-19: Lessons for teacher education. *PLoS one*, 16(8), 1 - 22
- [28] Wiredu, G., O. (2007). User appropriation of mobile technologies: Motives, conditions and design properties. *Information and Organisation*, 17(2), 110-129.