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College Tutors' Barriers and Challenges with their usage of Online Instructional Delivery Resources during Covid-19 Pandemic, Ghana

Obeng OWUSU-BOATENG^{a*}, Issifu YIDANA^b, Anas Seidu SALIFU^a, Ben-Bright BENUWA^b, Gilbert Naa EMMIDEME^c, Abdul-Mumin KHALID^a and Ben Kudus YUSSIF^d

^a*Department of Mathematics & ICT, E. P. College of Education, Bimbilla, Ghana.*

^b*Department of ICT Education, University of Education, Winneba, Ghana.*

^c*Department of Social Science, E. P. College of Education, Bimbilla, Ghana.*

^d*Department of English. Ohio University, Athens, USA.*

*Corresponding author: owusu@epcoebimbilla.edu.gh

Abstract

The study investigates the barriers and challenges Ghanaian College tutors faced during the Covid-19 Pandemic when schools had to be closed down which necessitated teaching and learning to be transitioned from the normal face-to-face to a completely online mode using online instructional delivery resources. The research design was descriptive statistics with a sample size of 100 tutors chosen from ten Colleges of Education in Northern Ghana. A purposive sampling technique was used to choose these tutors. The instrumentation used for data collection in this study was a questionnaire. A closed-ended questionnaire was developed for this study. An online Google Forms questionnaire was used to elicit responses using a 4-point Likert scale and the data was analyzed using IBM SPSS version 20. The results of this study found that, the major barriers identified by tutors in the usage of online instructional delivery resources during teaching and learning included; constant cuts in electricity supply, high cost of electronic devices, high cost of maintenance for electronic devices used for online teaching, poor internet connectivity, low level of incentives, low-level internet accessibility, high cost of data bundle and lack of incentives and motivation. The findings of this study further revealed that the challenges of online instructional delivery resources faced by tutors are the complex and complicated nature of some of the online platforms, low readiness of tutors to adopt online teaching mode, low technical support from the College IT department, insufficient IT skills, not being comfortable in an online teaching platform and a change in teaching styles. Based on the findings of this study, it is finally recommended that there should be a level of motivation and incentives for tutors in the form of monthly internet bundles (bandwidth) and renewal of same. The provision of the power plant to supplement and address the issue of electricity cuts, procuring electronic devices such as laptops, routers, smartphones, and iPads for tutors. The provision and maintenance of stable internet connectivity, routine technical support by the College ICT department, regular ICT training and workshops for tutors on existing and emerging technologies, and finally, the current curriculum in use by the 46 Colleges of Education across Ghana should be revised to include aspects of face-to-face and online teaching and learning pedagogies to address future pandemics. The results of this study will help policymakers in education, curriculum developers and educational institutions design timely, innovative, and useful online teaching platforms, resources, and technologies.

Keywords: Colleges of Education, COVID-19, Online Learning, Online Instructional Delivery Resources, Barriers, Challenges

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Introduction

In the spring of 2020, the term 'emergency remote teaching' began to emerge to describe what was occurring in education at all levels, despite the more commonly used term "online learning" dominating media descriptions of the instruction offered to students forced to remain at home. Hodges et al. (2020) described emergency remote teaching as an attempt not "to re-create a robust educational ecosystem but rather to provide temporary access to instruction and instructional supports in a manner that is quick to set up and is reliably available during an emergency or crisis. Online instructional delivery resources refer to any program, app, or technology that can be accessed via an internet connection and enhance a teacher's ability to present information and a student's ability to access that information. They are digital platforms and technologies used for supporting student learning that is delivered in multiple delivery models. These resources and platforms virtually connect teachers and students and aim to technologically assist in education. Examples include Zoom, YouTube, WhatsApp, BrightSpace, H5p, Google Classroom, and Webinars. The pandemic itself created an increase in the amount of digitized information and learning resources. Because these technologies have always been there, their implementation to the extent that society had to rely on them to learn was a very concerning transition for us all. With that increase in the usage of other resources for learning, their effectiveness, more specifically, digital learning resources, was put into question. The digital resources set forth to carry out the education of students gained broad acceptance as a result of the limited options available. (Diaz, 2021).

Because Covid-19 was declared a public health emergency on 30th January 2020 by the World Health Organization, social distancing was taken seriously including institutions of higher education after nations declared lockdowns. The world adopted some non-health interventions in curbing the spread of the pandemic in the form of technological resources for online teaching and learning to replace traditional face-to-face teaching. This led to the suggestion of online tools and resources that were offered online. These resources and tools were offered by certain individuals (e.g., Blackburn, 2020; Darling-Hammond, 2020; Schaffhauser, 2020; Soccolich, 2020); certain tech companies (FutureLearn, 2020; Zoom, 2020); some regional bodies (e.g., European Commission, 2020). All of these online tools and resources became freely available online during the COVID-19 outbreak for teachers' and students' usage. They were intended to help with disruptions to teaching and learning caused by COVID-19 national lockdowns and temporary campus closures.

In addition, these online resources were meant to facilitate access to digital educational content and help ensure teaching and learning continuity. Some of these tools and resources were general, while others were sector-specific, and targeted at given segments of a given sector. For example, in respect of the educational sector, there were tools and resources for usage by schools such as Zoom. Moreover, some of these tools and resources were distinguishable for the affordances they often provide: video conferencing; chatting; and writing.

The government of Ghana, through its Ministry of Education (2020) came out with a Policy paper, titled “Covid-19 Coordinated Education Response Plan which to a larger extent, sought to support the adoption of an online learning platform and technologies for the continuity of teaching and learning in our various schools across the country. The Policy paper covered immediate, short term and long-term strategies. Considerations covered the review of the existing curriculum and IT infrastructure to deliver content and facilitate distance and remote learning on the understanding that as many students as possible are provided with the opportunity to access the content and media technologies. The next consideration was the content to deliver during the emergency and how it can best be packaged for delivery over the existing infrastructure. The infrastructure identified as most appropriate for remote learning for all the grades were Radio, Television, and the Internet. (Ghana Covid-19 Coordinated Education Response Plan, 2020).

Methodology

Research Design

The research design for this study is descriptive statistics based on the piloting done to assess the barriers and challenges for tutors in the teaching and learning process during the Covid-19 Pandemic. According to Vetter (2017), descriptive statistics are specific methods used to calculate, describe, and summarize collected research data in a logical, meaningful, and efficient way. Descriptive statistics are reported numerically in the manuscript text and/or in its tables, or graphically in its figures.

Population, Sample Size, and Sampling Procedure

The population for this study was drawn from tutors of ten Colleges of Education within four regions of Northern Ghana. A sample of 100 tutors was used for the study. The idea and decision to use this current sample size are backed by findings and studies done by Haitham et al. (2018); Igor et al. (2018), who both concluded and argue that a study involving a large population, the minimum sample size should not be less than 100 people. The tutors were sampled from the following Colleges of Education located in the Northern, Upper East, Upper West, Savannah, and North-East regions of Ghana; Tamale College of Education, Tamale, Bagabaga College of Education, Tamale, St. Vincent College of Education, Yendi, Tumu College of Education in Tumu, Gambaga College of Education located in Gambaga, McCoy College of Education, Gbewaa College of Education, St. John Bosco's College of Education and E. P. College of Education, Bimbilla. The study again used a purposive sampling technique, this was because only tutors who taught using online instructional delivery resources were targeted during the closure of Colleges during the Covid-19 Pandemic.

Research Instrument

The main research instrument for data collection therefore for the study is a questionnaire. Close-ended questionnaires were developed using a four-point Likert scale; Strongly Agree which denotes 4, Agree which denotes 3, Disagree which denotes the value of 2 and Strongly Disagree which denotes the value of 1. The questionnaire was developed by the researcher using Google Forms, administered online, and tailored toward the research questions and objectives of the study.

Validity and Reliability

The questionnaire the researcher developed was subjected to face validation. To ensure this, the researcher presented a copy of the items based on the research questions to three experts in the field (one senior tutor and one tutor) in the College who have vast knowledge and many years of both teaching and research experience. They offered expert opinions by checking for the relevance of the questionnaire items. The items were again sent to a professor in the field of ICT education and educational technology at the Department of ICT Education, University of Education, Winneba, for his professional comments and corrections. These corrections were taken by the researcher and acted upon before administering the pilot test and main phase of the data collection of the current study which lasted for two weeks. 30 tutors were used for a pilot study and these tutors were not part of the final phase of the data collection process. The pilot study again ensured consistency and the workability and relevance of the questionnaire items before its final administering was done. These are backed by a study done by Taherdoost, (2016), who argues that face validity could be achieved by considering expert opinion. To ensure the reliability of the instruments, a reliability co-efficient was calculated which gave a value of alpha to be 0.7 to 0.8.

Data Collection

Data was collected using fourteen days using an online Google Forms questionnaire which was sent to the tutors sampled for the study through a URL on WhatsApp and Telegram to the Colleges of Education who formed part of the study population. Tutors were notified of the study via information sent to them through their heads of Departments in the various Colleges in collaboration with the researcher via phone calls and WhatsApp messages with regular reminders to record a high response rate. Consenting participants were asked to click on a link that redirected them to the online questionnaire. To boost participation and ensure a higher percentage return rate, follow-up calls were made every two-to-three days during the 2 weeks of data collection. There were 106 responses in all, with 3 complete responses from the tutors. The in-complete responses were deleted and wiped out during data cleaning in SPSS before the analysis.

Data Analysis

A descriptive statistics method of data analysis was used in this study. All the information that the researcher gathered from the tutors in the online questionnaire administered to the tutors was downloaded from Google Forms and analyzed using the IBM SPSS version 20. The data that was analyzed from the study respondents were again further analyzed using frequency and percentages in tables. For research questions 1 and 2, frequency and percentages were used.

Results

This section presents the descriptive statistics of the study participants, their demographic data, results, interpretations, and discussion of findings in line with the study objectives and research questions. One hundred tutors participated in the study consisting of ten Colleges of Education in the 5 Northern regions of Ghana. Their socio-demographic factors are summarized in Table 1 above. Male tutors dominated the study with 94%. Most tutors fell within the age range of 46-50 years old representing 40%, and the majority of the study participants, 85 of them responded as being Tutors representing 85% out of 100, according to the data collected.

Table 1. Socio-Demographic characteristics of study participants

Variable	Frequency (N= 100)	Percentage (%)	Total
Gender			
Male	94	94.0	100
Female	06	6.0	
Age range			
30-35	19	19.0	100
36-40	14	14.0	
41-45	12	12.0	
46-50	40	40.0	
50+	15	15.0	
Name of College			
Bimbico	18	18.0	100
St. Vincent, Yendi	13	13.0	
Tamale College	11	11.0	
Batco, Tamale	09	9.0	
Tumu College	09	9.0	
Gbewaa College	07	7.0	
McCoy College	07	7.0	
Nusrat Jahan	05	5.0	
St. John Bosco's	09	9.0	
Gambaga College	12	12.0	
Department			
Maths/ICT	41	41.0	100
Education	16	16.0	
Social Sciences	11	11.0	
Sciences	18	18.0	
Languages	14	14.0	
Designation			
Asst. Tutor	11	11.0	100
Tutor	85	85.0	
Snr. Tutor	04	4.0	

Research Question 1: What were the Barriers to using online instructional delivery resources?

With regards to erratic power supply, 80 respondents representing 80% strongly agreed, and 20 respondents representing 20% agreed that erratic power supply was a pressing barrier. 64 respondents (64%) asserted and strongly agreed with the high cost of electronic devices, and 32 (32%) of the respondents agreed. Under the theme of the high cost of maintenance, 60 (60%) of respondents strongly agreed, and 37 (37%) of them agreed. When it came to poor internet

connectivity as a barrier, 71 respondents (71%) strongly agreed, and 25 (25%) respondents agreed. When it came to the theme of low level of incentives, 67 (67%) respondents strongly agreed and 29 (29%) agreed.

Table 2. Barriers to using online instructional delivery resources during Covid-19

Variable	Frequency	Percentage (%)	Total
Constant issues with erratic power supply			
Strongly Agree	80	80.0	100
Agree	20	20.0	
High Cost of Electronic Devices			
Strongly Agree	64	64.0	100
Agree	32	32.0	
Disagree	04	4.0	
High Cost of Maintenance			
Strongly Agree	60	60.0	100
Agree	37	37.0	
Disagree	03	3.0	
Poor Internet connectivity			100
Strongly Agree	71	71.0	100
Agree	25	25.0	
Disagree	04	4.0	
Low level of Incentives			
Strongly Agree	67	67.0	100
Agree	29	29.0	
Disagree	03	3.0	
Strongly Disagree	01	1.0	
Low Level of Internet Accessibility			
Strongly Agree	95	95.0	100
Agree	05	5.0	
High cost of Data bundle			
Strongly Agree	63	63.0	100
Agree	35	35.0	
Disagree	02	2.0	

With regards to internet accessibility as a barrier, 95 (95%) of the respondents strongly agreed to this assertion as being one of the barriers to online instructional delivery resources.

Finally, 63 of the respondents, representing 63% strongly agreed that the cost of data (internet bundle) was expensive, and 35 of them representing 35% agreed.

Under the barriers of online instructional delivery resources, the results of this study reveal that constant cuts in electricity supply, high cost of electronic devices, high cost of maintenance, poor internet connectivity, low level of incentives, low-level internet accessibility, and high cost of data bundle were major barriers encountered during the Covid-19 Pandemic by tutors. The findings of this study are consistent with a previous study done by Khalil et al. (2020) who also found challenges of online instructional resources during the Covid-19 Pandemic at Qassim University, Saudi Arabia as follows; cuts in power supply, high cost of electronic devices, poor internet connectivity and high cost of data bundle.

The results from this study further agree with Ali, (2020) in his paper titled “Online Teaching during COVID-19 Pandemic in Zambian Universities: Unpacking Lecturers’ Experiences and the Implications for Incorporating Online Teaching in the University Pedagogy” in which he revealed as part of challenges faced as; high cost of data bundle, low level of incentives from school management, erratic power supply, high cost of electronic devices for online teaching, poor internet connectivity and high cost of maintenance for electronic devices used for online teaching and learning during the Covid-19 Pandemic. A study done by Day et al., (2021) also corroborates with the results and findings of this current study. Among the reported barriers in their study were; poor internet connectivity, erratic power supply, the high cost of electronic devices, and the high cost of maintaining electronic gadgets for online teaching. The results again agree with the findings of UNESCO, (2020b), which studied COVID-19 and Higher Education: Today and Tomorrow, Impact Analysis, Policy Responses and Recommendations. Their study revealed that access to technology and internet facility were all factors identified to be barriers to online education during the Covid-19 Pandemic.

Research Question 2: What were the Challenges associated with using online instructional delivery resources?

Based on Table 3 below which was on the challenges faced by college tutors during the Covid-19 pandemic, the first theme was on shortage of software. Under this theme, 25% of the respondents strongly agreed with this assertion and 17% agreed, 46% disagreed. On the issue of the online delivery platforms being complicated and complex, 75 respondents (75%) strongly agreed, and 15 respondents (15%) agreed. 70 (70%) % of the respondents strongly agreed that there was low readiness on their part in using online instructional delivery media, and 25% of them agreed.

Table 3. Challenges of using online instructional delivery Resources during Covid-19

Variable	Frequency	Percentage (%)	Total
Shortage of software			
Strongly Agree	25	25.0	100
Agree	17	17.0	
Disagree	46	46.0	
Strongly Disagree	12	12.0	
Complicated and complex			
Strongly Agree	75	75.0	100
Agree	15	15.0	
Disagree	10	10.0	
Low readiness to adopt Online teaching			
Strongly Agree	70	70.0	100
Agree	25	25.0	
Disagree	05	5.0	
Low technical support			
Strongly Agree	80	80.0	100
Agree	10	10.0	
Disagree	10	10.0	
Insufficient IT skills			
Strongly Agree	70	70.0	100
Agree	20	20.0	
Disagree	08	08.0	
Strongly Disagree	02	2.0	
Not comfortable teaching online			
Strongly Agree	65	65.0	100
Agree	15	15.0	
Disagree	20	20.0	
Change in teaching style			
Strongly Agree	60	60.0	100
Agree	20	20.0	
Disagree	15	15.0	
Strongly Disagree	05	5.0	
Not always prepared			
Strongly Agree	15	15.0	100
Agree	09	9.0	
Disagree	47	47.0	
Strongly Disagree	29	29.0	

Discussion

For low technical support for tutors during Covid-19 online teaching, 80 respondents (80%) strongly agreed, and 10 respondents representing 10% agreed with this assertion. On the theme of insufficient IT skills as a challenge, 70 (70%) of the respondents strongly agreed, 20 of them representing 20% agreed and 8 (8%) of the respondents disagreed with this assertion. Again, 65 (65%) of respondents strongly agreed that they are not always comfortable teaching online, 15 (15%) agreed and 20 (20%) disagreed. Furthermore, changes in teaching style were another theme under challenges faced by tutors, 60 of the respondents representing 60% strongly agreed and another 20 (20%) agreed with this assertion.

Lastly, 15 respondents (15%) strongly agreed they are not always prepared before online lessons and 9 (9%) agreed. It is worth mentioning that 47 respondents representing 47% disagreed and 29 (29%) strongly disagreed and asserted this was not a challenge they faced during the Covid-19 Pandemic. From the above results and analysis, it was evident that the key challenges this current study revealed include; the complicated and complex nature of online instructional delivery resources, low readiness on the part of tutors to adopt online teaching methods and modes, tutors not being comfortable on online teaching platform, low technical support from College IT department, insufficient IT skills and a change in teaching style. This study's results agree with previous studies done by Oladipo et al., (2020) & Ali (2020) who in their studies found that some challenges of online instructional delivery platforms include low readiness of teachers to adopt and embrace technology and online platforms, expert knowledge of teachers and computer literacy and skills level of teachers.

The results and findings of this current study are further consistent with those (Donitsa-Schmidt & Ramot, 2020; Khalil et al., 2020; Varea & Gonzalez-Calvo, 2020). Where they found out key among the challenges of online teaching platforms are technical support, expert knowledge in technology, and ICT tools. The study also revealed that there was a change in teaching styles and instructors not being comfortable using online platforms in teaching as notable challenges that were faced during the Covid-19 Pandemic. The results of this study further agree with a study done by Kebritchi (2017) titled, "Issues and Challenges for teaching successful online courses in higher education. His findings revealed among others that, there were changes in teaching styles. Some teachers had to change their teaching style due to the transition from face-to-face to a completely online platform which agrees with the findings of this study, where 60% of the respondents in Table 3 above agreed that, there was a change in teaching style after the transition to online teaching platforms.

The Implication of the Findings

Firstly, the identified barriers and challenges of the tutors in their usage of the online instructional delivery resources during the Covid-19 could be used as data for academia when it comes to implementing newer methods and techniques of online teaching and learning during and after the novel Covid-19 pandemic. Secondly, since online teaching is a new mode of teaching and novel in higher institutions and for tutors in Colleges of Education in Ghana, all educational institutions and their management should provide ongoing training for tutors regarding technology, online instructional delivery platforms, and other applications and technologies that are necessary and appropriate in the lecture halls. Thirdly, the results of this study will help policymakers, curriculum developers, and educational institutions such as GTEC, Ministry of Education, NACA, and Ghana Education Service, to design timely, innovative, and useful online teaching platforms, resources, and technologies in combating future pandemics.

Again, our in-depth understanding and appreciation of the challenges and barriers of online instructional delivery resources of college tutors would provide relevant information to educational stakeholders to better support the online teaching needs in our colleges and institutions of higher education. This information would also be critical and relevant in revisiting the experiences of tutors in using online resources in carrying out teaching and learning during the Covid-19 Pandemic. Finally, the results of this study will help policymakers in education, curriculum developers and educational institutions design timely, innovative, and useful online teaching platforms, resources, and technologies in addressing issues with barriers and challenges of online teaching and learning.

Conclusion

The conclusions of this study are based on the results. From the results, the following conclusions were made; Firstly, research question 1 was to identify the barriers involved in using online instructional delivery resources during the Covid-19 Pandemic. The results revealed that some of the key barriers identified were; constant cuts in electricity supply, high cost of electronic devices, high cost of maintenance, poor internet connectivity, low level of incentives, low-level internet accessibility, high cost of data bundle, and lack of incentives from college authorities. Secondly, research question 2 was to identify the challenges associated with the usage of online instructional delivery resources during the Covid-19 Pandemic. The results further identified challenges such as the complicated and complex nature of some online instructional delivery resources and platforms, low readiness on the part of tutors to adopt online teaching methods and modes, tutors not being comfortable on online teaching platforms, low technical support from College IT department, insufficient IT skills and a change in teaching styles.

Conflict of Interest

There is no competing interest among the authors of this manuscript in submission.

References:

- Aboagye, E., Yawson, J. A., & Appiah, K. N. (2021). COVID-19 and Online: The Challenges of Students in Tertiary Institutions. *Social Education Research*, 1-8. <https://doi.org/10.37256/ser.212021422>
- Addae, D., Amponsah, S., & Gborti, B. J. (2022). COVID-19 Pandemic and the Shift to Digital Learning: Experiences of Students in a Community College in Ghana. *Journal of Research and Practice*, 46(1-2), 101-112.
- Adeoye, I. A., Adanikin, A. F., & Adanikin, A. (2020). COVID-19 and Online: Nigeria Tertiary Education System Experience. *International Journal of Research and Innovation in Applied Science*. (IJRIAS). 5(5) ISSN 2454-6194.
- Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher Education Studies*, 10(3), 16-25.
- Barrot, J. S., Llenares, I. I., & Del-Rosario, L. S. (2021). Students' Online Learning Challenges during the Pandemic and how they cope with them: The Case of the Philippines. *Education and Information Technologies*, 26(6), 7321-7338.
- Bean, M. V., Aldredge, T., Chow, K., Fowler, L., Guaracha, A., McGinnis, T. (2019). Effective practices for Online tutoring. Sacramento. *Academic Senate for California Community Colleges*.

- Boelens, R., De Wever, B., & Voet, M. (2017). Four Key Challenges to the Design of Blended Learning: A Systematic Literature Review. *Educational Research Review*, 22, 1-18.
- Bowen, W. G., & Lack, K. A. (2012). Current status of research on online learning in postsecondary education. *Ithaka SandR*.
- Bhuyan, M. H. (2021). Practices of online teaching, learning and assessment of the students of the BSc in EEE programme during the COVID-2019 pandemic. *Contemporary Educational Researches Journal*. 11(2), 14–28.
- Blackburn, S. (2020). Updated: 48 free higher ed resources during coronavirus pandemic. Retrieved from <https://universitybusiness.com/free-college-management-software-faculty-resources-coronavirus-covid-19/>
- Carter Jr, R. A., Rice, M., Yang, S., & Jackson, H. A. (2020). Self-regulated learning in online Learning Environments: Strategies for Remote Learning. *Information and Learning Sciences*.
- Carmody, C., Duffy, S., Brown, L. & Fabbro, L. D. (2020). Preparing for work-integrated learning during COVID-19: how a new virtual orientation tool facilitated access for all. *International Journal of Work-Integrated Learning*, 21(5), 545.
- Cavanaugh, C. S., Barbour, M. K., & Clark, T. (2009). Research and Practice in K-12 Online Learning: A Review of Open Access Literature. *The International Review of Research in Open and Distributed Learning*, 10(1).
- Coman, C., Țiru, L. G., Meseșan-Schmitz, L., Stanciu, C., & Bularca, M. C. (2020). Online Teaching and Learning in Higher Education during the Coronavirus Pandemic: Students' Perspective. *Sustainability*, 12, 10367.
- Copeland, W. E., McGinnis, E., Bai, Y., Adams, Z., Nardone, H., Devadanam, V., & Hudziak, J. J. (2021). Impact of COVID-19 Pandemic on College Students' Mental Health and Wellness. *Journal of the American Academy of Child & Adolescent Psychiatry*, 60(1), 134-141.
- Darling-Hammond, L. (2020). Learning in the time of COVID-19. Retrieved from <https://www.forbes.com/sites/lindadarlinghammond/2020/03/19/learning-in-the-time-of-covid19/54dd08457203>
- Day, T., Chang, I. C. C., Chung, C. K. L., Doolittle, W. E., Housel, J., & McDaniel, P. N. (2021). The immediate impact of COVID-19 on postsecondary teaching and learning. *The Professional Geographer*, 73(1), 1-13.
- Diaz, A. (2021). Technology: Where it started, Where it is going. <https://opentextbooks.clemson.edu/sts1010fidlerfall2021/chapter/digital-learning-resources-in-education/>
- De la Varre, C., Keane, J., & Irvin, M. J. (2010). Enhancing online distance education in small rural US schools: A hybrid, learner-centered model. *ALT-J*, 18(3), 193–205.
- DePaul, K. (2020). Can Online Learning mitigate rural schools' biggest Challenges? Retrieved from <https://www.gettingsmart.com/2020/02/can-onlinonline-mitigate-rural-schools-biggest-challenges/>
- Duraku, Z. H., & Hoxha, N. (2020). The Impact of COVID-19, School Closure, and Social Isolation on Gifted Students' Wellbeing and Attitudes toward Remote (online) Learning. Impact of the COVID-19 Pandemic on Education and Wellbeing; *Duraku, ZH, Ed*, 130-169.
- Elaish, M. M., Shuib, L., Ghani, N. A., & Yadegaridehkordi, E. (2019). Mobile English Language Learning (MELL): A Literature Review. *Educational Review*, 71(2), 257-276.
- European Commission. (2020). Coronavirus: Online learning resources. Retrieved from https://ec.europa.eu/education/resources-and-tools/coronavirus-online-learning-resources_en

- Garcia, R., Falkner, K., & Vivian, R. (2018). Systematic Literature Review: Self-Regulated Learning Strategies using online tools for Computer Science. *Computers & Education*, 123, 150-163.
- Gonzales, G., de Mola, E. L., Gavulic, K. A., McKay, T., & Purcell, C. (2020). Mental Health needs among lesbian, gay, bisexual, and transgender College Students during the COVID-19 Pandemic. *Journal of Adolescent Health*, 67(5), 645-648.
- Gyampoh, A. O., Ayitey, H. K., Fosu-Ayarkwah, C., Ntow, S. A., Akossah, J., Gavor, M., & Vlachopoulos, D. (2020). Tutor Perception on Personal and Institutional Preparedness for Online Teaching-learning during the COVID-19 Crisis: The Case of Ghanaian Colleges of Education. *African Educational Research Journal*, 8(3), 511-518.
- Hodges, L. & Martin, A. (2020). Enriching work-integrated learning students' opportunities online during a global pandemic (COVID-19). *International Journal of Work-Integrated Learning*, 21(4), 415–423. Retrieved from <https://eric.ed.gov/?id=EJ1271537>
- Igor, S., Dmitriev, A., Al-Harosh, M., & Nikolaev, A. (2018, May). The optimal stimulation mode and the number of averaging epochs selection for P300 detection. In *2018 Ural Symposium on Biomedical Engineering, Radio Electronics and Information Technology (USBREIT)* (pp. 91-94). IEEE.
- Ivala, E. (2013). ICEL2013-Proceedings of the 8th International Conference on online: ICEL. Academic Conferences Limited. *Journal of Medical Science*, 36(4), 27-31.
- Kapasia, N., Paul, P., Roy, A., Saha, J., Zaveri, A., Mallick, R., & Chouhan, P. (2020). Impact of Lockdown on Learning Status of Undergraduate and Postgraduate Students during COVID-19 Pandemic in West Bengal, India. *Children and Youth Services Review*, 116, 105194.
- Kebritchi, M., Lipschuetz, A., & Santiago, L. (2017). Issues and Challenges for Teaching Successful Online Courses in Higher Education: A Literature Review. *Journal of Educational Technology Systems*, 46(1), 4-29.
- Kokutse, F. (2020). Ongoing closures threaten viability of private universities. University World News. The Global Window on Higher Education.
- KPMG (2020). The Economic Implications of Covid-19: The Ghanaian Perspective. Worldometer and John Hopkins University.
- Luongo, N. (2018). An Examination of Distance Learning faculty satisfaction levels and self-perceived barriers. *Journal of Educators Online*, 15(2), 1–12.
- Moath, A., Haitham, A., Saleh, A., Ghazi, A., Hebah, M., Ramy, A., & Aisha, T. (2018). Meta-analysis on subsyndromal delirium in ICU.
- Ministry of Education (2020). Covid-19 Coordinated Education Response Plan. Ghana. <https://ges.gov.gh/wp-content/uploads/2020/04/EDUCATION-RESPONSE-PLAN-TO-COVID-19-IN-GHANA-APRIL-2020-1.pdf>
- Mukhtar, K., Javed, K., Arooj, M. & Sethi, A. (2020). Advantages, limitations and recommendations for online learning during COVID-19 Pandemic Era. Pakistan.
- Mtebe, J. S., & Raisamo, R. (2014). Investigating perceived barriers to the use of open educational resources in higher education in Tanzania. *The International Review of Research in Open and Distance Learning*, 15(2), 43–65.
- Nambiar, D. (2020). The Impact of Online Learning during COVID-19: Students' and Teachers Perspective. *The International Journal of Indian Psychology*. ISSN 2348-5396. 8(2). DOI: 10.25215/0802.094.
- Nyabor, J. (2020). Johans Nyabor writes: 9 Ghanaian innovations covid-19 has triggered. *CityNewsroom*. <https://citinewsroom.com/2020/05/jonas-nyabor-writes-9-ghanaian-innovations-covid-19-has-triggered/> Google Scholar

- Olesova, L., Yang, D., & Richardson, J. C. (2011). Cross-Cultural Differences in Undergraduate Students' Perceptions of Online Barriers. *Journal of Asynchronous Learning Networks*, 15(3) 68–80.
- Otoo-Arthur, D., Koranteng, E. K. & Amoah, J. K. (2021). An Assessment of Ghanaian Colleges of Education Readiness for Online Given COVID-19 Pandemic. *Literacy Information and Computer Education Journal (LICEJ)*, 12(2).
- Owusu-Fordjour, C., Koomson, C. K., & Hanson, D. (2020). The Impact of Covid-19 on Learning- the Perspective of the Ghanaian Student. *European Journal of Education Studies*.
- Pham, T., & Nguyen, H. (2020). Vietnam-COVID-19: challenges and opportunities for Vietnamese higher education. *Higher Education in Southeast Asia and Beyond*, (8), 22-24. <https://headfoundation.org/2020/06/02/hesb-issue-8/>
- Pragholapati, A. (2021). The Covid-19 Pandemic: Higher Education Generation Alpha 5.0. *Studies in Philosophy of Science and Education*, 2(1), 1-2.
- Queiros, D. R., & de Villiers, M. R. (2016). Online learning in a South African higher education institution: Determining the right connections for the student. *The International Review of Research in Open and Distance Learning*, 17(5).
- Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the Online Component of Blended Learning: A Systematic Review. *Computers & Education*, 144, 103701. Retrieved from <http://www.iesalc.unesco.org/en/wp-content/uploads/2020/04/COVID-19-EN-090420-2.pdf>. On 06/12/2022
- Sahu, P. (2020). Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact on Education and Mental Health of Students and Academic Staff. *Cureus*, 12(4).
- Salifu, A. S. & Owusu-Boateng, O. (2022). Evaluating the Media Platforms, Devices and Challenges Associated with Online Teaching and Learning of Mathematics during the COVID-19 Pandemic. *Asian Research Journal of Mathematics*. 18(10): 92-104, DOI: 10.9734/ARJOM/2022/v18i1030420
- Sekulich, K. M. (2020). Developing an online community of learners. *The Delta Kappa Gamma Bulletin*, 86, 17–22.
- Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of Online Learning (1988-2018). *American Journal of Distance Education*, 33(4), 289-306.
- Sinha, E., & Bagarukayo, K. (2019). Online Education in emerging knowledge Economies: Exploring factors of motivation, de-motivation and potential facilitators; and studying the effects of demographic variables. *International Journal of Education and Development using Information and Communication Technology*, 15(2), 5–30.
- Sobhana, N. P. (2020). Challenges envisioned in online teaching on outbreak of COVID-19. DOI: [10.1002/hbe2.300](https://doi.org/10.1002/hbe2.300)
- Socolich, A. (2020). 111 Free tools to help you through the coronavirus pandemic. Retrieved from <https://www.entrepreneur.com/article/347840>
- Srichanyachon, N. (2014). The Barriers and Needs of Online Learners. *Turkish Online Journal of Distance Education*, 15(3), 50–59.
- Suryaman, M., Cahyono, Y., Muliansyah, D., Bustani, O., Suryani, P., Fahlevi, M., & Munthe, A. P. (2020). COVID-19 Pandemic and Home Online Learning System: Does it Affect the Quality of Pharmacy School Learning? *Systematic Reviews in Pharmacy*, 11(8), 524-530.
- Schaffhauser, D. (2020). Free and discounted ed tech tools for online learning during the coronavirus pandemic. Retrieved from <https://campustechnology.com/articles/2020/03/16/free-and-discounted-ed-tech-tools-for-onlinelearning-during-the-coronavirus-pandemic.aspx>

- Taherdoost, H. (2016). Validity and Reliability of the Research Instrument; How to test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management*, IRJAM. 5(3), 28-36.
- Turk, S. E., & Cherney, I. D. (2016). Perceived Online Education Barriers of Administrators and Faculty at a U.S. University in Lebanon. *Creighton Journal of Interdisciplinary Leadership*, 2(1), 15–31.
- UNESCO IESALC (2020). COVID-19 and Higher Education: Today and Tomorrow. Impact Analysis, Policy Responses and Recommendations.
- UNESCO. (2020b). COVID-19 Educational Disruption and Response. doi: [10.1007/s11125-020-09464-3](https://doi.org/10.1007/s11125-020-09464-3)
- Vetter, T. R. (2017). Descriptive Statistics: Reporting the Answers to the 5 Basic Questions of Who, What, Why, When, Where, and a Sixth, So What?. *Anesthesia and Analgesia*, 125(5), 1797–1802. <https://doi.org/10.1213/ANE.0000000000002471>
- Vlachopoulos, D. (2020). COVID-19: Threat or Opportunity for Online Education? *Higher Learning Research Communications*, 10(1) Pages 16–19. Doi:10.18870/hlrc.v10i1.1179
- Yamin, M. (2020). Counting the Cost of COVID-19. *International Journal of Information Technology*, 12(2), 311-317.
- Zhu, N. Zhang, D., & Wang, D. (2020). A Novel Coronavirus from Patients with Pneumonia in China. *Engl. J Med*, 382(2020), pp.727-733
- Zoom. (2020). This post has been updated to reflect new Zoom offerings and resources for educators in response to the COVID-19 (coronavirus) pandemic. Retrieved from <https://blog.zoom.us/wordpress/2020/03/29/how-touse-zoom-for-online-learning/>