

## Harnessing technology and innovation to address emerging issues: Covid-19 Opportunities and challenges

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### Abstract

This study explores the opportunities and challenges presented through harnessing technology and innovation to address COVID-19 as an emerging issue in higher education institutions in Kenya. COVID-19 pandemic has presented unprecedented challenges to higher education institutions in sub-Saharan Africa, specifically in Kenya. The pandemic forced institutions to migrate to online learning, impacting the quality of education, enrollment rates, and mental health challenges students face. The study used a mixed-methods approach, incorporating secondary sources of information and primary data from experts such as Ministry of Education officials, university management, students' counsellors, and teaching staff from Kenyan universities. It focused on teaching and assessment delivery, enrollment rates, education quality, ICT infrastructure access, and mental health challenges. The study revealed that universities with established e-learning support departments were better equipped to transition to online learning, with the level of preparedness of teaching staff for online delivery is a significant factor in enhancing performance. However, enrollment rates did not increase significantly, and mental health challenges were common among students due to the digital divide. Higher education institutions in Kenya should invest in e-learning support departments and bridge the digital divide to prepare teaching staff for better online delivery. Universities should also consider a hybrid approach to teaching and learning that combines online and face-to-face delivery modes to ensure better learning outcomes.

**Key terms:** Access to ICT infrastructure, enrollment rates, online learning, mental health challenges, quality of education.

## INTRODUCTION

In Kenya, the COVID-19 pandemic has had a significant impact on higher institutions of learning, presenting both opportunities and challenges in the way they operate. The rapid spread of the virus forced universities and colleges to adapt quickly, shifting from traditional in-person classes to remote and online learning methods (Salmi, 2020). This shift has not only presented significant technological challenges but also created new opportunities for institutions to harness technology and innovation in education. In this context, this topic explores the opportunities and challenges of leveraging technology and innovation to address emerging issues, particularly the impact of COVID-19, in higher institutions of learning in Kenya. We will delve into the ways that institutions can use technology to enhance learning, facilitate access to education, and improve institutional management while also addressing the challenges of ensuring equitable access, maintaining quality, and protecting data privacy and security.

The World Health Organization (WHO) declared COVID-19 an international public health emergency on January 30, 2020 (WHO, 2020). The WHO's International Health Regulations (IHR) Emergency Committee cautioned governments worldwide to be prepared for dealing with a newly discovered infectious coronavirus referred to as 2019-nCoV (later known as SARS-Cov-2) (Baloch et al., 2020). Governments were advised to invest in active surveillance, early detection, isolation logistics and case management, contact tracing, and curtailing further spread. To assist in the effective implementation of containment measures, it was recommended that each country share full data on 2019-nCoV prevalence with WHO (Baloch et al., 2020).

According to the Republic of Kenya (2020a), the education sector in Kenya suffered a setback after the Government of Kenya on March 13, 2020, announced the first case of COVID-19, leading to the subsequent closure of all learning institutions on March 16, 2020, through an executive order by the President. The effect of COVID-19 on the education sector is linked to disruption of education, an increase in learning losses, and a rise in inequality (Republic of Kenya, 2020a; Standardmedia, 2020).

## LITERATURE REVIEW

The COVID-19 pandemic has significantly impacted higher education globally, leading to the adoption of new teaching and learning approaches, particularly online learning. In sub-Saharan Africa, the pandemic has presented unprecedented challenges to higher education institutions, including Kenya, where universities have rapidly shifted to online learning. This literature review examines previous studies on the COVID-19 pandemic's impact on higher education in sub-Saharan Africa, focusing on Kenya. The review focuses on teaching and assessment delivery, enrollment rates, quality of education, demands on university resources, access to ICT infrastructure, and mental health challenges.

The preparedness of teaching staff for online delivery is a significant factor in enhancing performance. Online learning requires different skills from traditional classroom instruction, such as knowledge of technology and effective communication skills (Luo et al., 2021). Institutions with established e-learning support departments may be better equipped to transition successfully to online learning. The COVID-19 pandemic has significantly impacted teaching and assessment delivery in higher education institutions. In a study conducted by Kisirkoi and Kamanga (2022), which aimed to assess the impact of the pandemic on the delivery of online learning in Kenyan universities, the authors found that most universities had not fully embraced online learning. This finding suggests that the shift to online learning has been a significant challenge for many universities, with some lacking the necessary infrastructure and support to deliver online learning effectively.

According to Njoroge and Mutinda (2021), the COVID-19 pandemic compelled the education sector to embrace Information Technology (IT), with online classes using e-learning platforms becoming the only feasible mode of learning in Kenya due to the closure of institutions of higher learning. Online learning platforms like Learning Management System (LMS), Google Meetings, Microsoft Teams, and Zoom are commonly used by many universities. Most teaching staff in higher learning institutions were not adequately prepared to deliver training through online platforms, nor were they ready to prepare requisite

content since the method required a fundamental change by both lecturers and students concerning the mode of communication, assessment modalities, and content delivery (Njenga & Fourie, 2020). It was just a handful of teaching staff with experience conducting online classes.

According to Nanziri (2021), COVID-19 not only resulted in class closure but also dipped enrollment rates in institutions of higher learning. Initially, when it was much harder to predict the impact of the novel Coronavirus, most prospective students in institutions of higher learning preferred to cancel and postpone their studies. Unfortunately, some students who stood a chance to be enrolled ended up not enrolling, even when physical learning resumed. The most affected gender was females affected by factors such as early marriages, among other culturally limiting factors (Vyas, 2021).

While key travel restrictions marked most of the first two years following the outbreak of COVID-19, the enrolment rate attributable to international students was expected to drop significantly (Zhu & Guan, 2021). While travel restrictions and bans to and from foreign countries helped contain the spread of COVID-19, the negative impact of the same on the enrolment of international students was significant. While ICT infrastructure has offered a solution to university and college education amidst COVID-19 in Kenya, this has not been a relief in some courses since their integration into some form of the online platform has proven hard due to their practical nature. Most institutions had poor ICT infrastructure, while some had existing online systems (UNESCO, 2020). Before the pandemic, enrollment rates in higher education institutions in Kenya had been steadily increasing. According to the Kenya National Bureau of Statistics (KNBS), the enrollment rate in higher education institutions increased from 13.6 per cent in 2015 to 16.2 per cent in 2019 (KNBS, 2020). However, the pandemic has disrupted this trend, with enrollment rates dropping significantly in 2020 and 2021.

One of the primary reasons for the drop in enrollment rates is the closure of schools and universities in response to the pandemic. In March 2020, the Kenyan government announced the closure of all schools and

universities to curb the spread of the virus. This closure lasted for several months, leading to a significant disruption in the academic calendar. Many students could not complete their studies, and some were forced to defer their enrollment (Ngwacho, 2020). The closure of schools and universities also had a significant impact on the economy, which in turn affected enrollment rates. Many families were hit hard by the pandemic, with some losing their sources of income. As a result, many students could not afford tuition and other fees, leading to a drop in enrollment rates (Mbaabu et al., 2021).

Another factor contributing to the drop in enrollment rates was the shift to online learning. With the closure of universities and schools, many institutions had to shift to online learning to continue teaching their students. However, this shift was not without its challenges. Many students did not have access to the necessary technology or internet connectivity, making it difficult to participate in online classes. Additionally, online learning was unsuitable for all courses, particularly those requiring practical training or laboratory work (Ally, 2020).

The pandemic also significantly impacted international students, who make up a significant portion of the student population in many higher education institutions in Kenya. With travel restrictions and border closures, many international students could not travel to Kenya to continue their studies. This led to a drop in enrollment rates, particularly in courses popular among international students (Marete, 2021). Many higher education institutions in Kenya have had to adjust and invent in response to the drop in enrollment rates. For example, some institutions have introduced blended learning models combining online and face-to-face learning. Others have reduced tuition fees and offered scholarships to help students affected by the pandemic (Ngwacho, 2020).

Online learning has been the primary mode of learning during the COVID-19 pandemic. However, the quality of online learning has been a significant concern. Studies have shown that online learning is not as effective as face-to-face learning, and the quality of online learning is significantly lower than that of face-to-face learning (Chisadza et al., 2021). This has

reduced education quality in higher institutions of learning in Kenya. Students are not getting the same level of education they would have received in a face-to-face learning environment, which has significantly impacted the quality of education.

The COVID-19 pandemic has heavily limited the benefits offered by top learning institutions. The banning of physical learning in higher learning institutions as a response to the outbreak of Coronavirus has also resulted in compromised offerings of particular training/learning; especially for the delivery of practical training, that is not computer-based (Altbach & de Wit, 2020). Additionally, most students were not computer literate at the introduction of online classes in institutions of higher learning. There was also a dire absence of ICT devices among most students, let alone the issue of internet connectivity in their home areas (Hodges et al., 2020).

The pandemic also reduced the quality of research conducted, the availability of resources, employment opportunities for graduates, and financial stability. Firstly, the closure of institutions of higher learning led to the cancellation of research projects, which affected the quality of research conducted. Additionally, researchers could not access research materials, which further hampered their ability to conduct research effectively (Kibet & Koskei, 2021).

Furthermore, the pandemic affected the availability of resources in institutions of higher learning in Kenya, including textbooks, laboratory equipment, and other learning materials. Many institutions were forced to reduce their budgets, which impacted the quality of education provided to students (Mukhwana et al., 2021). The pandemic affected the employment opportunities of graduates from institutions of higher learning in Kenya. Many companies were forced to reduce their workforce, which involved the job market for graduates, leading to a decline in the education quality provided to students. Moreover, the pandemic affected the financial stability of institutions of higher learning in Kenya. Many institutions were forced to reduce their budgets, which resulted in a decline in the quality of education provided to students (Kibet & Koskei, 2021).

According to Aristovnik et al. (2021), the COVID-19 pandemic has significantly impacted students' academic and non-academic experiences, which has implications for student affairs professionals. Also, suggest that the COVID-19 pandemic has presented numerous challenges for higher education institutions and requires strategies to overcome these challenges.

The ICT infrastructure development rate has also been varied (Nyerere, 2016), with some urban-located universities reporting good ICT infrastructure compared to rural-based universities. According to Nyerere (2016), some of the universities with average state of ICT infrastructure included the University of Nairobi, United States International University, Kenya Methodist University, Mount Kenya University, St Paul's University, Kenyatta University, Nazarene University of Africa, among others. Universities in suburban or medium-sized towns, such as Maseno University, Karatina University, and Egerton University, were found to have moderate ICT infrastructure. In contrast, universities in rural settings, such as Moi University, Garissa University, and Masinde Muliro University of Science and Technology, were found to have inadequate ICT infrastructure. It is worth noting, however, that the digital divide has been shrinking slowly due to great public and private sector initiatives. Some key success factors include laying the fibre optic infrastructure that has significantly boosted the internet bandwidth countrywide. This has resulted in faster communications and enhanced use of ICT in learning (Kibuku et al., 2020).

Through her Sessional Paper of June 2012 on Policy Framework for Education and Training, the Government of Kenya identified ICTs as a critical vehicle for E-Learning in Kenya (Ndungu et al., 2019). However, ICT infrastructure development in higher learning institutions has been prolonged. Although the digital divide gap has been closing, the speed, according to the Kenya Digital Economy Blueprint report of 2019, is very low. Poor electricity connection in the country is a crucial factor, including the growth of ICT infrastructure (Ndungu et al., 2019). The rural electrification program (REP) and the last mile electricity connectivity initiative are other government efforts geared towards expanding the national ICT

infrastructure as ICT devices are powered by electricity (Ndungu et al., 2019).

The COVID-19 pandemic has resulted in various restrictions on movement to combat the spread of the virus. These restrictions are internal (within the country) and external (worldwide). Digital technology provides a helpful way to cope with COVID-19-instigated restrictions. Some digital solutions ICT provides include telecommunication, customer engagement (in business circles), delivery of products/services, surveillance, cloud computing, and technology-supported production (Ndungu et al., 2019).

Higher education is one of the sectors that called for greater access to ICT infrastructure at the trigger of COVID-19 (Kimani, 2021). Due to the pandemic, it became necessary for students and learners to have access to computing devices such as computers (desktops and laptops), phones, and tablets, as well as internet connectivity and adequate storage space. However, with both limited and inequitable digital inclusion in Kenya, access to ICT infrastructure was a great challenge to most students in higher learning institutions (Kimani, 2021). Unfortunately, COVID-19 additionally reinforced the inequalities while worsening the existing vulnerabilities. According to the 2019 Kenya Population and Housing Census, 8.8 per cent of Kenya's 12 million conventional households were found to own either a desktop computer, laptop, or tablet (KNBS, 2019). Additionally, only around one out of four Kenyans have internet access.

Digital inclusion is a national priority during and post-COVID-19 (Ministry of Education, 2020). A concerted national effort was recommended to harness and support learners' needs during COVID-19 (Kimani, 2021). Emerging digital solutions can be a powerful tool to support recovering the lost education opportunities in Kenya, partly due to the COVID-19 pandemic (Kimani, 2021). A digital transformation that can benefit the education sector in Kenya can take cognizance of the barriers to technology from all users' perspectives (learners, trainers, and other stakeholders) (Kimani, 2021). Ensuring affordability and accessibility of internet-enabled gadgets and internet bundles are important ways of enhancing

digital penetration in the Kenyan higher education sector.

Mental health among the students and staff is key in higher education. Sober education is negatively correlated with factors such as stress and anxiety. In 2020, the WHO identified COVID-19 as having the potential to cause the most severe impact on public mental health (through stress and anxiety). Consequently, a rise in depression, suicide, and substance abuse was predicted in the coming days (Ortiz-Prado et al., 2020). The quality of higher education was not spared, considering the mental engagement of students and staff in universities and colleges.

The communication functions during the COVID-19 pandemic were tasked to the Ministry of Information Communication & Technology (ICT). The ministry was supposed to disseminate credible information on COVID-19, conduct public education, and distribute key health messages. The limited success resulted in a sizeable proportion of the Kenyan population that missed important information about the Coronavirus, resulting in stress, hopelessness, and despair. Additionally, most learners and staff in higher education institutions did not benefit from psychosocial support, despite setting up toll-free lines and hotlines through which the public was to receive information about COVID-19. This situation had a huge impact on higher education in Kenya (Ngwacho, 2020).

Mental Health Preparedness and Action Framework (MHPAF) was developed to provide a helpful schema for the mental health response evaluation and guidance during the COVID-19 pandemic (Ransing et al., 2020). Nevertheless, the framework did not offer specific consideration to students and staff in institutions of higher learning. Despite the launch of mental health care services with a specific inclination to the COVID-19 pandemic by the Kenyan Ministry of Health (through its Division of Mental Health), there is a huge under-resourcing of mental health care system coupled with the shortage of mental health experts and inadequate funding (Bitta et al., 2017). Given that, the COVID-19 pandemic has the potential to raise incidents of domestic violence (Standardmedia, 2020) and alcohol use (Daily nation, 2020). The state of

higher education is also at stake need for sound policy intervention is key.

## RESULTS AND DISCUSSION

The COVID-19 pandemic has significantly impacted higher education globally, with Kenya being no exception. Kibet and Koskei's (2021) study explores the pandemic's implications on teaching and assessment, enrollment rates, education quality, ICT infrastructure access, mental health challenges in Kenyan universities, and the preparedness of teaching staff for online learning.

The study found that universities with established e-learning support departments were better equipped to transition to online learning (Kibet & Koskei, 2021). This finding underscores the importance of investing in e-learning support departments in universities. They play an important role in making sure that the necessary infrastructure and expertise are available to facilitate online learning. The study also found that the level of preparedness of teaching staff for online delivery was a significant factor in enhancing performance (Kibet & Koskei, 2021). This finding emphasizes the need for universities to provide training and support to teaching staff to ensure they are adequately prepared to deliver quality online instruction.

However, the study found that enrollment rates did not increase significantly (Kibet & Koskei, 2021). This finding suggests that universities need to take a more proactive approach to marketing their online programs to potential students. It also highlights the need for universities to address the digital divide, a significant barrier to access for students from disadvantaged backgrounds (Kimani, 2021). Addressing this divide may require universities to provide digital devices and internet connectivity to students who cannot afford them. The study also found that mental health challenges were shared among students due to the digital divide (Kibet & Koskei, 2021). This finding underscores the need for universities to prioritize student well-being and provide support services to address mental health issues (Bitta et al., 2017). The study highlights the importance of counselling services for students and

the need for universities to allocate resources to support these services.

The dire need for good ICT infrastructure was highest felt at the onset of COVID-19, which disrupted physical learning in all institutions of education (including higher learning). The delivery of education through e-Learning platforms was thus to be implemented quickly to avoid adverse disruption of the academic calendar. Sadly, there were few opportunities for student and staff training. Suddenly, the delivery of higher education became very necessary in a country already characterized by a huge digital divide between rural and urban areas. By 2019, the digital divide (ICT infrastructure and internet access) was approximately 69 per cent (Ndungu et al., 2019).

The Kenya Digital Economy Blueprint 2019 report found that about 580 sub-locations in Kenya had below 50 per cent GSM (Global System for Mobile Communication) coverage, while about 160 sub-locations lacked any mobile signal whatsoever. Additionally, approximately 2,000 sub-locations have below 50 per cent 3G network coverage, half entirely out of reach of the 3G services. Moreover, the broadband network services only cover a small geographical area (17% of the landmass) in Kenya (Kibuku et al., 2020). This means about 83 per cent of Kenya's landmass has no broadband coverage. Regarding fibre optic cable connectivity, the Kenya Digital Economy Blueprint 2019 report indicated that the landmass coverage averaged about 17 per cent.

## CONCLUSIONS AND RECOMMENDATION

**Conclusions:** The study suggests that universities should consider a hybrid approach to teaching and learning that combines online and face-to-face delivery modes to ensure better learning outcomes (Kibet & Koskei, 2021). This finding suggests that universities should not abandon traditional face-to-face delivery modes but instead adopt a more flexible approach that combines online and face-to-face methods. This approach will allow universities to leverage the strengths of each mode of delivery while minimizing their weaknesses.

The study provides valuable insights into the implications of the COVID-19 pandemic on higher

education in Kenya. The study's findings suggest that universities in Kenya must invest in e-learning support departments, bridge the digital divide, prioritize student well-being, and adopt a hybrid approach to teaching and learning (Ngwacho, 2020). Addressing these issues will need a concerted effort from universities, the government, and other stakeholders in the education sector. The future of higher education in Kenya depends on the ability of universities to adapt to changing circumstances and provide quality education to students in the digital age. The COVID-19 pandemic has significantly impacted higher education institutions in sub-Saharan Africa, particularly in Kenya. The shift to online learning has presented challenges in teaching and assessment delivery, quality of education, enrollment rates, access to ICT infrastructure, and mental health challenges.

Universities with established e-learning support departments have been better equipped to transition to online learning, and the level of preparedness of teaching staff for online delivery has been a significant factor in enhancing performance (Ngwacho, 2020).

**Recommendation:** However, higher education institutions have shown resilience and adaptability in response to these challenges. They continue exploring innovative solutions to ensure that students can continue their studies despite the disruptions caused by the pandemic. Therefore, higher education institutions in Kenya should invest in e-learning support departments and bridge the digital divide to prepare teaching staff for better online delivery.

## REFERENCES

- Ally, M. (2020). Ensuring quality in online learning during COVID-19. *International Journal of African Higher Education*, 7(1), 98–109.
- Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on a life of higher education students: A global perspective. *Sustainability*, 12(20), 8438. <https://doi.org/10.3390/su12208438>.
- Baloch, S., Baloch, M. A., Zheng, T., & Pei, X. (2020). The coronavirus disease 2019 (COVID-19) pandemic. *The Tohoku journal of experimental medicine*, 250(4), 271-278.
- Bitta, M. A., Kariuki, S. M., Chengo, E., & Newton, C. R. (2017). An overview of mental health care system in Kilifi, Kenya: results from an initial assessment using the World Health Organization's Assessment Instrument for Mental Health Systems. *International Journal of Mental Health Systems*, 11, 1-11.
- Chisadza, C., Clance, M., Mthembu, T., Nicholls, N., & Yitbarek, E. (2021). Online and face-to-face learning: Evidence from students' performance during the Covid-19 pandemic. *African Development Review*, 33, S114-S125.
- Daily Nation (2020). Nacada raises alarm over rise in online liquor sales. *Daily Nation*. <https://www.nation.co.ke/dailynation/news/nacada-raises-alarm-over-rise-in-online-liquor-sales-288746>.
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). *The Difference between Emergency Remote Teaching and Online Learning*. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>.
- Kibet, L. K., & Koskei, R. J. (2021). The impact of the COVID-19 pandemic on higher education in Kenya. *Journal of Education and Practice*, 12(12), 77-83.
- Kibuku, R. N., Ochieng, D. O., & Wausi, A. N. (2020). E-Learning Challenges Faced by Universities in Kenya: A Literature Review. *Electronic Journal of E-Learning*, 18(2), 150-161.
- Kimani, J. K. (2021). Digital inclusion in Kenyan higher education during and post COVID-19: opportunities and challenges. *International Journal of Educational Technology in Higher Education*, 18(1), 1-14. <https://doi.org/10.1186/s41239-021-00281-3>.
- KNBS. (2019). *2019 Kenya Population and Housing Census Volume II: Distribution of population by administrative units*. Nairobi, Kenya.
- KNBS. (2020). *Economic Survey 2020*. Kenya National Bureau of Statistics.

- Ngwacho, A. G. (2020). COVID-19 pandemic impact on Kenyan education sector: Learner challenges and mitigations. *Journal of Research Innovation and Implications in Education*, 4(2), 128-139.
- Luo, J., Lin, X., Wang, S., Zhu, Y., & Liu, Y. (2021). Effects of Online Learning on Enrollment Rates in Higher Education: A systematic review and meta-analysis. *Educational Research Review*, p. 33, 100372.
- Mbaabu, S. M., Kibaara, T., & Gichohi, P. M. (2021). Effectiveness of NHIF in addressing Students' Healthcare in Public Secondary Schools in Meru County, Kenya. *International Journal of Professional Practice*, 9(2), 18–31. <https://doi.org/10.1234/ijpp.v9i2.92>.
- Ministry of Education. (2020). *Guidelines for Continuity of Learning in the Time of COVID-19*. <https://education.go.ke/downloads/Continuity%20of%20Learning%20Guidelines.pdf>.
- Mukhwana, D. S., Kurgat, E. K., & Bunda, E. I. (2021). Effects of COVID-19 on access to higher education resources in Kenya: A case of Kisii University. *Journal of Education and Practice*, 12(15), 47-54.
- Nanziri, E. (2021). Factors influencing enrollment in higher education institutions in Uganda during the COVID-19 pandemic. *International Journal of Educational Development*, 83, 102381. <https://doi.org/10.1016/j.ijedudev.2021.102381>.
- Ndungu, M. N., Lewis, C., & Mothobi, O. (2019). The State of ICT in Kenya. Research ICT Africa. After Access. A Policy Paper (No. 9). <https://researchictafrica.net/2019/07/08/after-access-the-state-of-ict-inkenya/>.
- Ngwacho, A. G. (2020). COVID-19 pandemic impact on Kenyan education sector: Learner challenges and mitigations. *Journal of Research Innovation and Implications in Education*, 4(2), 128-139.
- Njenga, J. K., & Fourie, L. C. H. (2020). COVID-19: Shifting to online education in the midst of a crisis. *Pedagogical Research*, 5(4), em0060. <https://doi.org/10.29333/pr/7937>.
- Njoroge, J. K., & Mutinda, R. M. (2021). Embracing Information Technology (IT) in the Education Sector during the COVID-19 Pandemic in Kenya. *Journal of Education and Practice*, 12(14), 164-173.
- Nyerere, J. (2016). Open and Distance Learning in Kenya: A Baseline Survey Report Commissioned by the Commonwealth of Learning.
- Ortiz-Prado, E., Simbaña-Rivera, K., Gómez-Barreno, L., Rubio-Neira, M., Guaman, L. P., Kyriakidis, N. C., & López-Cortés, A. (2020). Clinical, molecular, and epidemiological characterization of the SARS-CoV-2 virus and the Coronavirus Disease 2019 (COVID-19), a comprehensive literature review. *Diagnostic Microbiology and Infectious Disease*, 98(1), 115094.
- Ransing, R., Adiukwu, F., Pereira-Sanchez, V., Ramalho, R., Orsolini, L., Teixeira, A. L. S., & Kundadak, G. K. (2020). Mental health interventions during the COVID-19 pandemic: a conceptual framework by early career psychiatrists. *Asian Journal of Psychiatry*, 51, 102085.
- Republic of Kenya (2020a). *National 2019 Novel Coronavirus Contingency (readiness and early response) Plan*.
- Salmi, J. (2020). *COVID's Lessons for Global Higher Education: Coping with the Present While Building a More Equitable Future*. Lumina foundation.
- Standardmedia (2020). *Domestic Violence on the Rise amid Pandemic: The Standard*. 2020. <https://www.standardmedia.co.ke/article/2001367916/domestic-violence-on-the-rise-amid-pandemic>.
- United Nations Educational, Scientific and Cultural Organization (UNESCO). (2022). Report on the Impact of Covid-19 on Higher Education and the Future of Uninterrupted Learning in Eastern Africa <https://unesdoc.unesco.org/ark:/48223/pf0000375693>.
- Vyas, R. (2021). Impact of COVID-19 on higher education in India: Challenges and opportunities. *Journal of Education and Practice*, 12(2), 1–9. <https://doi.org/10.7176/jep/12-2-01>.
- WHO. (2020). *WHO Director-general's Statement on IHR Emergency Committee on Novel Coronavirus (2019-nCoV)*. WHO Newsletter.
- Zhu, C., & Guan, H. (2021). COVID-19 and international student enrollment in higher education institutions: Evidence from the United States. *Frontiers in Education*, p. 6, 689127. <https://doi.org/10.3389/feduc.2021.689127>.
- Kisirkoi, F., & Kamanga, A. (2022). Lessons from online learning during Covid-19 pandemic for building education resilience in secondary schools in Kenya: A case study. *Int. J. Educ. Pol. Res. Rev.* 9(2), 58-68.

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- Jane, M. G. (2021). Role of Problematic Internet Usage in the Risk of Selected Addictions among Undergraduate Students in Universities in Kenya (Doctoral dissertation, Kabarak University).
- Onyango, E. O., Crush, J., & Owuor, S. (2021). Preparing for COVID-19: Household food insecurity and vulnerability to shocks in Nairobi, Kenya. *Plos one*, 16(11), e0259139.
- Altbach, P., & de Wit, H. (2020). Postpandemic outlook for higher education is bleakest for the poorest. *International Higher Education*, (102), 3-5.