

**Abstract**

COVID-19 has affected scientific research, teaching, and learning globally. In African low- and middle-income countries, this has been felt more acutely due to preexisting limitations such as poor internet access and dependence on international collaborators for equipment. The pandemic has also brought new challenges to African universities, including the diversion of substantial resources to COVID-19-related needs. Positive outcomes include recognition of the urgent need to address underlying challenges and innovative endeavors in some institutions.

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# How Has COVID-19 Affected Higher Education and Research in African Countries?

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**A**side from catastrophic loss of life and well-being, COVID-19 has significantly disrupted the global scientific enterprise. This is no different in Africa, where COVID-19 has reshaped scientific research.

## COVID-19 Reshapes Scientific Research in Africa

The African Academy of Sciences has laid out research priorities, and institutions and research groups with capacity and funding are working diligently to address them. For example, the Pasteur Institute in Dakar, Senegal, has launched a rapid COVID-19 diagnostic test platform ("Diatropix"), while institutions in several countries are undergoing clinical trials of COVID-19 therapies and vaccines within the ANTICOV consortium. Furthermore, approximately 1,200 journal articles (3 percent of the global output) reporting science outputs related to COVID-19 were produced in Africa (2019–2020).

In resource-limited contexts, however, the pandemic has been particularly disruptive for teaching, learning, and research in the sciences. Faculty and researchers in African low- and middle-income countries (LMICs) were already facing challenges. COVID-19 not only exacerbated these challenges, but also introduced new ones, exposing sharp disparities between institutions globally and within countries. We obtained feedback from scientific faculty and staff from various African universities based in Ethiopia, Kenya, Nigeria, Sierra Leone, Somalia, South Africa, Sudan, Uganda, and Zimbabwe to better understand how COVID-19 has affected research, teaching, and learning.

## Poor Digital Literacy and Internet Access Hampers Online Meetings and Classes

Like in most Western countries, the outbreak of COVID-19 in many African countries heralded a series of major lockdowns and subsequent closing of in-person classes and laboratories, with many students and instructors returning to their rural homes. While higher educational institutions worldwide grappled with the use of online learning platforms, in African LMICs, poor technological infrastructure, internet access, and digital literacy made online teaching and learning extremely challenging for students and teachers alike. For example, only 33 percent of Zimbabwe's total population are internet users and, although mobile data is amongst the cheapest in Africa, inflation (322 percent in February 2021) has rendered the cost virtually prohibitive. In contrast, one faculty member described how internet in Kenya is cheap and accessible, and many students were given support with data bundles. However, other faculty from Kenya (and one Nigerian professor) acknowledged that stable internet depends strongly on specific location, both in rural and urban settings. Encouragingly, a South African professor described how cell phone and other network service providers generously donated data and devices to universities to support needy students. Overall, online learning appeared to be detrimental to the quality of students' learning and their ability to engage and continue with their education. In some cases, students dropped out altogether or were denied access because they were unable to pay fees. Nigeria is facing the challenge of increasing involvement of idle students in violent political groups.

International collaborations were also affected, as students were unable to participate in international exchange programs, and networking/collaboration opportunities (for students and faculty) were severely hindered without international conferences/events or digital support for virtual events. In addition, students experienced less support from supervisors/faculty without face-to-face contact (and the internet challenges

described above). Since African culture relies heavily on in-person meeting to develop personal trust, this change involved a significant mindset shift.

### **Obstacles to Experimental Research**

Online learning is impossible for practical work/research in the experimental sciences. As with many universities globally, laboratories were initially closed, resulting in the loss of research (time and experimental work/samples), and fieldwork was inhibited. Because of preexisting limitations regarding scientific equipment and expertise, faculty from different African countries described how their research was hindered because they were unable to send samples for testing and analysis, purchase research materials, or fix research equipment due to their reliance on international resources and expertise. Moreover, because many African chemical suppliers import chemicals, the lockdown in March 2020 and subsequent travel restrictions resulted in dwindling supplies. Some suppliers closed indefinitely. Meanwhile, demand rose steeply for the chemicals required to make hand sanitizer and other COVID-19-related substances. Even issues such as reduced vehicle capacity (public transportation) affected research, as it made it increasingly time-consuming for laboratory-based workers and students to get to work, reducing their time at the bench.

### **Diversion of Resources to COVID-19 Related Needs**

Many African universities already struggle with inadequate funding and resources, but the pandemic further exacerbated this. Meagre government funding was prioritized for COVID-19-related needs rather than education and research. Both students and faculty faced reduced opportunities for scholarships and grants, and existing grants or budgets with fixed timelines were terminated without satisfactory completion. Additionally, as restrictions lifted, faculty across various African countries reported how funding was needed to implement COVID-19 precautions, such as purchasing masks, sanitizer, temperature monitors, and to ensure adequate hand washing facilities and cleaning—particularly in countries with limited water supplies—as well as training staff regarding precautionary measures and online learning. Already crowded classrooms and labs were further strained by social distancing requirements, and some university buildings were even taken over as quarantine facilities (e.g., [in Ethiopia](#)), further limiting available resources.

Rising inflation in many African countries also put pressure on staff/faculty and students, many of whom already struggled with low wages or limited funding support, and disparities widened as those already disadvantaged were disproportionately affected. Inflation also increased transport costs, making it increasingly difficult to travel for fieldwork, especially to rural areas, and, as one Ugandan professor mentioned, reimburse research participants for travel expenses. Some faculty and staff resorted to industrial strike action, requesting better conditions to reflect rising living costs, but this further disrupted research and teaching.

### **National Context Plays a Major Part**

In many LMICs, preexisting inadequate and over-stretched health systems, incompetent leadership, and poor information dissemination have only served to increase the pandemic's risks and challenges. African universities have been, and continue to be, significantly negatively affected by these factors, including by the prevalence of death and bereavement within university communities (i.e., deaths of prominent professors), and staff and students justifiably fear infection and are preoccupied with risks and uncertainties. COVID-19 has disrupted classes and research, lowered the quality of learning, and delayed graduation for students, with potentially detrimental long-term personal and national consequences.

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### **Glimmers of Hope**

Despite the immense challenges facing these institutions, there are glimmers of hope. For example, poor digital literacy in rural Ethiopia has prompted an Academics Without Borders-led collaboration with Injibara University to develop digital literacy skills of faculty, staff, and students. Necessity, “the mother of invention,” has resulted in locally led innovations such as test kits developed by the Nigerian Institute of Medical Research (cheaper and more efficient than the most commonly used PCR test). It is reassuring to see African universities stepping up to the challenges of COVID-19; however, international partnerships are vital to addressing some of the deep-rooted inequities exposed through the crisis. ▲