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Report on the Impact of COVID-19 on Higher Education in the East African Community

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SURVEY IMPLEMENTATION

This project was funded by the Digital Skills for an Innovative East African Industry (dSkills@EA) and implemented through a consultancy arrangement in collaboration with the Inter-University Council of East Africa (IUCEA). The project implementation team was composed of the following members:

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EXECUTIVE SUMMARY

The COVID-19 pandemic has not only been a challenge to the entire globe but also to learning institutions. Higher Education Institutions (HEIs) in the East African region are no exception to the negative effects of the pandemic. The pandemic has exacerbated the region's HEIs' heavy reliance on tuition to finance their operations. Consequently, many HEIs in the region are experiencing financial distress. As a result, many of them have instituted cost-cutting measures including salary cuts, increasing workload for their staff, among other measures.

In terms of continuity in teaching and learning, the HEIs in the region have shown great resilience in that most of them successfully transitioned into eLearning with basic ICT infrastructure. The COVID-19 driven eLearning implemented in the region has caused or exposed a digital divide arising from differences in access to the internet, affordability of ICT gadgets, and ICT skills. The pandemic has also caused a gender divide in relation to access to education, as male and female students have been impacted differentially. For female students, early marriages have been a major cause of disruption in their education. For male students, drug use and the need to engage in alternative sources of income have caused disruption in their education.

The pandemic has negatively impacted HEIs' research activities, mainly because of restricted human movement and reduced research funding. The reduced research activities will have implications on HEIs' rankings.

Collaborative initiatives with both the industry and other institutions of higher learning have also been negatively impacted. This will have negative implications on the integration of education standards in the region. Further, reduced collaborations with the industry have the implication of continued isolation of HEIs from the industry, yet the HEIs should be training their students for the same industry.

On a positive note, the pandemic has seen an increase in the number of HEIs' students venturing into business. Unfortunately, the pandemic has also seen a reduction in the number of students' business ideas being linked with the industry. At the same time, due to the pandemic, there has been a reduction in the internal funding of business incubation centres and in the number of business mentors willing to help students develop their business ideas.

It is apparent that HEIs will require significant financial support to overcome the impact of the pandemic and play their role in research, innovation, and development of human capital for the economic development of the region. Equally, the pandemic has exposed regional disparities in the EAC countries in terms of internet and electricity reach. There is a need for the EAC countries to double their efforts to ensure electricity and internet connectivity so that every EAC citizen is part of the global village.

1.0 INTRODUCTION

The outbreak of the COVID-19 pandemic brought unprecedented disruption to universities in Africa, as many of them were shut down as a precautionary measure (UNESCO, 2020). Many governments directed their higher education institutions (HEIs) to migrate to online teaching and learning and observe the necessary health protocols (Srivastava, 2020).

In its second global survey on the impact of Covid-19 on higher education, the International Association of Universities (IAU) found that 89% of the HEIs had shifted to online teaching and learning, while 11% had not (Jensen, 2021). The shift to online teaching and learning globally and among different continents was as indicated in Table 1.

Region	Student population reach	Percentage of HEIs indicating 100%	Percentage of HEIs indicating less than 50%
Global	86%	27%	10%
Europe	92%	39%	2%
Asia	84%	30%	6%
Americas	82%	25%	6%
Africa	74%	14%	24%

Table 1: Proportion of HEIs that had shifted to online teaching and learning by region

Globally, 86% of the student population had shifted to eLearning, with Africa coming last at 74%. Regarding HEIs indicating less than 50% of the student population that had shifted to online learning, Africa had the highest proportion at 24%.

In the East African region, the first cases of COVID-19 were reported in March 2020 (IUCEA, 2021). Following this, most countries in the region implemented immediate mitigation measures against the pandemic. Such measures included closure of all learning institutions, suspension of all international flights, a dusk to dawn curfew except for essential services sectors, closure of bars and restaurants, suspension of public gatherings, restrictions for public service vehicles, and a mandatory requirement to wear masks in public places.

In addition to following respective government directives, most HEIs in the EAC migrated most of their operations to online platforms. These operations included teaching, examinations, academic workshops and conferences, student orientation, proposal and thesis defenses, and graduation ceremonies (Waithima et al., 2021).

The responses of HEIs in the wake of COVID-19 varied from one HEI to another, with most institutions cancelling in-person classes and moving to eLearning (IUCEA, 2021). On March 19, 2020, the Tanzanian government ordered all colleges and universities to suspend in-person classes to curb the spread of the pandemic (Mtebe, 2021). All students were sent home, apart from some

international students who could not travel. Like many universities in Africa, universities in Tanzania were caught unprepared and could not easily switch to online teaching and learning immediately.

To address these challenges, most HEIs formed COVID-19 crisis committees to chart the way forward. The University of Dar es Salaam in Tanzania began by forming a team that conducted an audit to identify the university's existing ICT infrastructure, skills gaps amongst instructors, and information systems that could be quickly adopted to deliver various courses during the COVID-19 crisis (Mtebe, 2021).

During the lockdown, Makerere University in Uganda instituted a committee to study and immediately roll out eLearning (Nawangwe, 2021). The university's Institute of Open Distance and eLearning immediately began to support the staff in developing their skills in using online and distance education pedagogical approaches.

1.1 THE IMPACT OF COVID-19 PANDEMIC ON HIGHER EDUCATION INSTITUTIONS

In this section, we will look at how the pandemic has affected the following: teaching and learning, research and innovation, regional exchange programs, HEI-industry linkage; as well as how it has exposed inequality, social, and gender divide.

1.1.1 Teaching and Learning

Most HEIs in East Africa struggled with online teaching and learning due to the lack of policy frameworks, inadequate ICT infrastructure, inadequate eLearning skills, and poor internet coverage (Waithima et al., 2021). Nevertheless, a good number of HEIs have managed to transition a significant proportion of their students and academic programs into eLearning. The speed with which the HEIs were able to do this varied, deepening on whether an HEI was privately or publicly sponsored.

For example, in the case of Uganda, it was difficult for private universities to effectively carry out teaching and learning during the COVID-19 lockdown (Nawangwe, 2021). Only the public universities such as Makerere University remained functional, mainly in research and community engagement. The lack of a common strategy on higher education in Uganda during the COVID-19 lockdown meant that various universities had to struggle on their own to account for their students and staff (Nawangwe, 2021).

The University of Rwanda (UR) shifted to online teaching and learning due to the COVID-19 total lockdown imposed in the country in March 2020. The teaching staff had to upload the course content online, whereas students had to download the online courses. However, the university experienced various challenges, such as the lack of training and technical support for students and staff; and lack of access to the required infrastructure, technological devices, and software (Uwizeyimana, 2021).

1.1.2 Inequality and the social and gender divide

The shift to online teaching and learning has exposed the social and economic inequalities as well the digital divide within the African continent: between the countries with better ICT infrastructure and the ones whose infrastructure is not adequate; between HEIs within the same country, with some being far better equipped and experienced than others; and between students within the same institution - the rich living in urban areas and the poor living in the rural areas who can barely afford to access the Internet (Mohamedbhai, 2020).

According to a survey by IUCEA, most of the students (47%) in HEIs in the EAC member countries are drawn from the rural setup, while only 28% are drawn from the urban setup (IUCEA, 2021). Students' home setups have far-reaching implications on the interventions that HEIs choose to put in place. For most EAC member countries, the rural areas have neither electricity nor internet connectivity, hence the digital divide in the wake of eLearning.

The IUCEA survey showed that more women (85.2%) reported their classes being affected by COVID-19 than men at 81.3%. This was reported by 83.8% of women and 80% of men in East Africa, 91.3% of women and 84.2% of men in West Africa, and 87% of women and 78.9% of men in Southern Africa. This reflects the persistent gender bias that still pervades many communities across Africa due to traditional views about the role of women in the household (Faraj, 2020). The report also revealed that more young female students participated in household chores at home during the lockdown at the expense of their online studies compared to their male counterparts (IUCEA, 2021).

1.1.3 Research and Innovation

The COVID-19 pandemic has had both negative and positive impacts on research. On the one hand, it has made it impossible for researchers to travel and collaborate with others nationally and internationally. As a result, some joint research or project work became difficult to complete. Moreover, some research projects had to be halted due to the COVID-19 restrictions on travelling and physical meetings.

According to the second global survey by the IAU, the pandemic has not had a major impact on all research activities (Jensen, 2021). In Africa, the survey reported a 58% decrease in fellowships and scholarships, 41% decrease in the number of publications in international journals, 40% decrease in the number of PhDs, and 54% increase in the time for PhD completions. Though research priorities have not changed, research in health and welfare increased at 46% of the HEIs.

Most of the HEIs' research initiatives in developing countries are funded by European countries, agencies, and foundations in the United States, and lately by China. A significant amount of the research projects in African HEIs are also undertaken in collaboration with HEIs in the stated regions. Considering that Europe, the United States, and China have been severely hit by the pandemic, the research projects that were ongoing in Africa funded by the agencies and foundations from the said regions were seriously disrupted (Mohamedbhai, 2020).

The government of Kenya, through Konza Technopolis Development Authority (KoTDA), in partnership with the Association of Countrywide Innovation Hubs, the private sector, academia, non-governmental organizations, and the United Nations Development Program (UNDP), launched the Great Covid-19 Innovation challenge (Nairobi Garage, 2020). The Innovation Challenge sought to harness the collective capability of the technology and innovation sector, in a structured manner in response to three grand challenges that recognize the combined package of infrastructure, technological tools, human capacity and data delivered by a unique combination of multiple stakeholders.

A team of students, engineers, researchers, and innovators from Jomo Kenyatta University of Agriculture and Technology (JKUAT) developed several innovations to help in the fight against the Covid-19 pandemic (Muoki, 2020). The innovations include portable solar-powered ventilators, a contact tracing application, a digital system that predicts Covid-19 infection trends in Kenya, and an automatic solar-powered hand-washing machine.

Also, Makerere University in Uganda developed several innovations for managing the COVID-19 pandemic. These included "a thermal imaging detector for Covid-19, biodegradable face masks,

the wide range use of 3D printing technology in Covid-19 control in public spaces, and green low-cost touchless hand wash technology for public shared spaces” (Makerere University, 2020, para. 2).

1.1.4 Regional Exchange Programs

Exchange programs in the higher education sector have been severely affected by the COVID-19 pandemic due to travel restrictions. Lockdown measures, which saw the cancellation of international travels from and into countries, severely affected the movement of international students and, resultantly, the exchange programs. The number of foreign students, faculty, and researchers traveling abroad, from and into the East African region, remarkably reduced due to the restrictions and new travel policies, health and safety concerns, and financial hardships resulting from the economic shutdown (Agyapong, 2020).

According to a 2020 survey by IAU, 89% of the sampled institutions indicated that they suffered from the impact of student mobility, and 33% indicated that all student exchanges were cancelled (IAU, 2020). This clearly demonstrates that Covid-19 related restrictions on movement affected academic exchange programs.

1.1.5 Collaboration of Universities with the Industry

There has been some industry-academia collaboration in the wake of the COVID-19 pandemic regarding the provision of solutions (Segun, 2021). Nonetheless, the industry partnerships required to support these efforts through opportunities for further validation and commercialisation have not been widely available due to the huge divide in industry-academia relations that have long existed on the continent.

The University of Oxford and AstraZeneca partnered in the development of a vaccine to combat the spread of the COVID-19. Nigeria was the first African country to sequence the SARS-CoV-2 genome through the collaboration of the Nigeria Centre for Disease Control, independent research institutions, and other research centers based in universities across the country. Kwame Nkrumah University of Science and Technology in Ghana partnered with a diagnostic startup to develop a rapid test that detects COVID-19 antibodies (Segun, 2021).

Makerere University partnered with Kiira Motors Corporation and the Ministry of Science, Technology and Innovation (MOSTI) to develop an open design low-cost ventilator adapting open access designs from the Massachusetts Institute of Technology, University of Florida, and other public license ventilator technology developers (Makerere University, 2022).

Several universities in Kenya partnered with mobile network providers - Safaricom PLC, Airtel Network and Telkom Kenya, through Kenya Education Network (KENET) - for eLearning discounted bundles for faculty and students (Kenya Education Network, 2022). The eLearning discounted bundles have gone a long way to enhance access to eLearning for needy students. However, the discounted bundles were restricted to accessing educational resources from sources that are whitelisted by the mobile network service providers. Several universities in Kenya have also partnered with hospitals for vaccination against COVID-19 for their students and staff.

The University of Nairobi (UoN) and the University of Helsinki (UH) in Finland forged a strategic partnership to provide solutions to some challenges of the current pandemic and future pandemics, climate change, and loss of biodiversity (University of Nairobi, 2021),

From its COVID-19 experience, the University of Rwanda (UR) initiated more inter-university partnerships and collaboration agreements and increased its investment in online teaching and

learning (Nshimiye, 2020). UR identified the lack of technical support and training as one of the challenges to effective online teaching and learning, thus embarked on organising training sessions for its students and teaching staff.

In collaboration with four other universities, namely Makerere University (Uganda), State University of Zanzibar (Tanzania), Kenyatta University, and Strathmore University (Kenya), all the first-year undergraduate students in UR would be offered a cross-cutting module through blended learning in a partnership dubbed “the Partnership for Enhanced and Blended Learning (PEBL).” (Uwizeyimana, 2021).

1.2 Background to the study

It is against the backdrop described in the section above that Digital Skills for an Innovative East African Industry (dSkills@EA) project, in partnership with IUCEA commissioned a survey to document how the COVID-19 pandemic has impacted HEIs in the EAC. Specifically, the study aimed at determining how the pandemic has impacted the following:

- a) HEIs’ operations and responses to the pandemic
- b) COVID-19 driven eLearning and inequity in access to quality education
- c) Research output
- d) Innovation
- e) HEIs-industry linkage
- f) HEI collaborations
- g) HEIs’ incubation, business startups, and commercialisation of business ideas.

2.0 STUDY METHODOLOGY

The survey was implemented by a consultant identified through a competitive process. A project implementation team comprising a representative from GIZ and three representatives from IUCEA was set up to work with the consultant. The implementation team played the role of quality assurance by reviewing reports from the consultant at various stages of the project.

In preparing this report, we relied on existing literature, dataset collected by IUCEA between April and June of 2021, and analysed primary data collected specifically for this assignment between October and November of 2021. Primary data was collected from HEIs (data collection tools were administered to research directors, internship and career placement officers, members of faculty, and students), national research commissions, and the intellectual property rights offices in the EAC member countries.

2.1 Survey Responses

Data was collected in the six EAC member countries from various respondents, as summarised in Table 1. As expected, the highest response was drawn from students followed by faculty.

Respondent	Total	Percentage of the total
Faculty	235	30.1
Student	449	57.6
Internship and Career Placement Officers	50	6.4
Business Innovation/ Incubation Centre Coordinators	8	1
Research Directors	28	3.6
Intellectual Property Rights Offices	5	0.6
National Research Commission Representatives	5	0.6

Table 2: Composition of the sample

In terms of country representation, the highest response was drawn from Kenya (40%). Unfortunately, we did not get any response from South Sudan. Except for data from the intellectual property rights office and the national research commission offices involving personal interviews in Tanzania and Burundi, the other data collection tools were deployed using survey monkey. The data collection period was October 15 to November 20, 2021.

50% of HEIs rely on tuition to finance more than 90% of their annual budgets

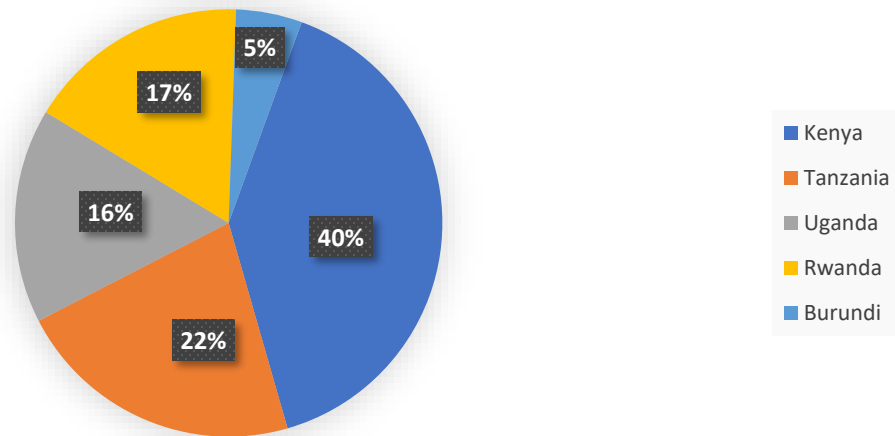


Figure 1: Country representative of the sample

In preparing this report, we also made use of a survey dataset carried out earlier by IUCEA. The IUCEA survey solicited responses from HEI key stakeholders, including HEI vice-chancellors, academic registrars, faculty, non-teaching staff, students, Ministry of Education officials, and HEI regulators.

In total, 1,658 participants responded to the online data collection tools at an average completion rate of 52%, which the research team considered adequate. During the data collection period, COVID-19 infections had spread throughout the East African region and nearly all countries, with the exception of Tanzania and Burundi, had instituted one containment measure or another. Figure 2 shows the percentage composition of the respondents for the IUCEA dataset.

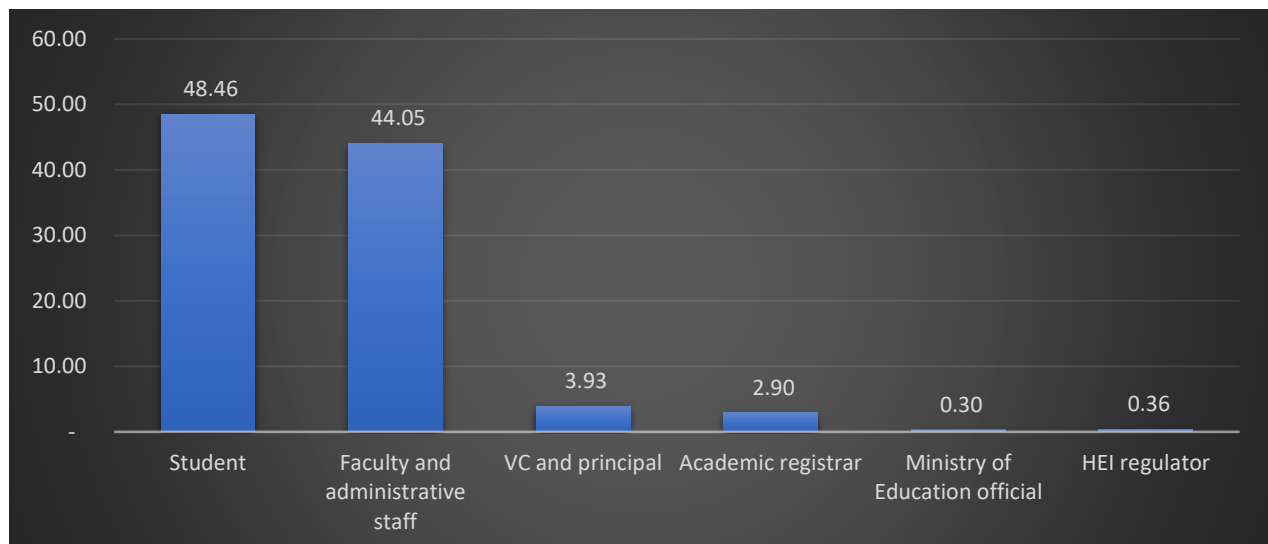


Figure 2: Percentage distribution of respondents across categories

3.0 STUDY FINDINGS

The findings are organised in line with the study objectives.

3.1 Identifying the varied responses by HEIs

When COVID-19 struck, the continuity of most HEIs, and especially the privately sponsored ones that rely on tuition, was threatened. Table 2 demonstrates the extent to which HEIs rely on the various sources of revenue to finance their annual budgets. Fifty percent (50%) of HEIs rely on tuition to finance 90% of their annual budgets. Any event that disrupts the ability of the students to pay tuition or has an impact on the number of tuition-paying students will seriously impact the survival of HEIs. As a result of the heavy reliance on tuition, there was a need for HEIs to develop ways of continued operations to realise tuition income.

At the onset of the pandemic, 50% of the HEIs in EAC did not have an ODeL policy in place

Revenue Source	Extent of HEIs' reliance on various sources of revenue to finance their annual budgets					
	<11%	11-30%	31-50%	51-70%	71-90%	>90%
Government resources	56.52%	4.35%	0%	8.70%	26.09%	4.35%
Tuition fees	7.69%	0%	0%	11.54%	30.77%	50%
Accommodation and cafeteria charges	61.54%	7.69%	7.69%	7.69%	11.54%	3.85%
External grants	45.83%	33.33%	4.17%	4.17%	4.17%	8.33%
Transport services	80%	5%	0%	0%	15%	0%
Consultancy	68.18%	18.18%	4.55%	0%	9.09%	0%
University business enterprise	68.18%	18.18%	4.55%	0%	9.09%	0%
Others	80%	0%	0%	0%	20%	0%

Table 3: Extent to which HEIs rely on various income sources to finance their annual budgets

3.1.1 Transition into eLearning

The transition by HEIs, to eLearning was never going to be easy, given the challenges they faced in that quest. Table 4 details the challenges that confronted HEIs. A sizeable number of HEIs

(50%) cited the lack of an Online, Distance and Electronic Learning (ODEL) policy as an impediment to their transition. Some of the other challenges that most HEIs faced in their quest to transition to eLearning included lack of internet connectivity, lack of online resources, and reluctance by both faculty and students.

Immediate challenges hampering transition into eLearning	Percentage of HEIs
We did not have an ODeL policy in place.	50
We needed to have our online resources accredited by our regulator.	47
We did not get immediate clear guidance from our regulators.	47
We did not get proper guidance from our governing council.	13
We did not have an eLearning platform in place.	28
We did not have the financial resources to invest on eLearning platform.	34
We did not have staff with the technical knowledge to guide us in the transition to online.	13
Most of our students lacked skills, internet connectivity, equipment to transition to eLearning.	63
Most of our staff lacked skills, internet connectivity, equipment to transition to eLearning.	38
Most of our students were reluctant to move into eLearning.	46.9
Most of our faculty were reluctant to move into eLearning.	18.8
Other challenge	9.4

Table 4: Immediate challenges hampering transition into eLearning

To confront the challenges posed by the pandemic, HEIs instituted several measures to move the institutions forward. The initial responses are detailed in Figure 3. Besides the involvement of the key stakeholders in the suspension of in-person activities, most HEIs formed a COVID-19 crisis committee to chart the HEIs' next course of action.

On foreseeing the financial impact the pandemic was going to have on HEIs, several of the HEIs began to negotiate with suppliers for rescheduling of payments, while some took the drastic action of revising staff salaries downwards. Others began to train their students and faculty in readiness for transition into eLearning. Some, having identified the way forward as eLearning, went on to negotiate for data bundles to enable students and faculty to access eLearning.

While 39.13% of the private HEIs were able to transition into eLearning following the suspension of in-person teaching and learning, of 18.18% of the public HEIs were able to do so.

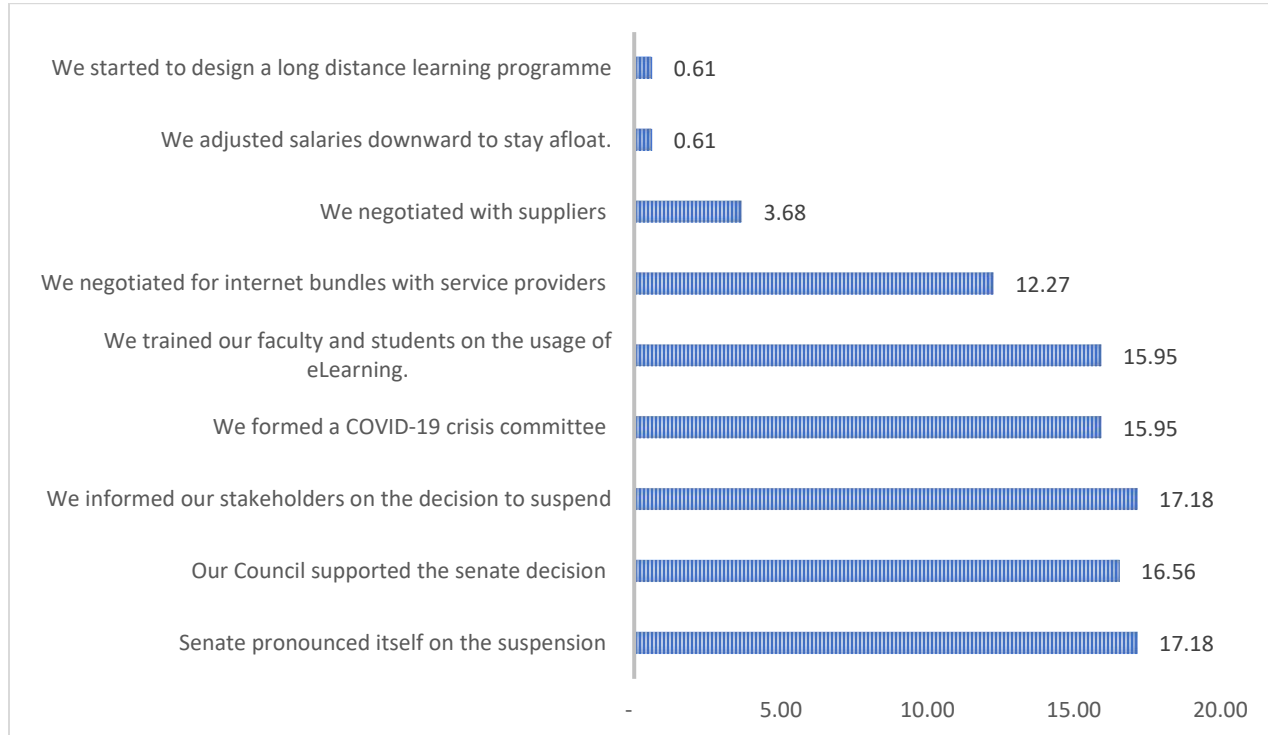


Figure 3: Response actions as reported by Head of HEIs

Some of the regulatory issues during the early days of the pandemic that HEIs faced were not just restricted to the HEIs; the Ministry of Education officials surveyed indicated that they lacked the competence to handle a crisis such as the one posed by COVID-19.

HEIs within the region have shown flexibility and resilience in the speed with which they were able to transition into virtual operations. For several of them, the transition was immediate. However, some, especially in countries that did not institute official lockdowns, did not transition to virtual operations. In a sense, then, for those who have managed to transition, the COVID-19 pandemic has presented an opportunity for them explore other ways of running their operations. Figure 4 illustrates the length of time private and public HEIs took to transition to virtual operations. An impressive 39.13% of the private HEIs and 18.18% of the public ones were able to transition immediately into eLearning.

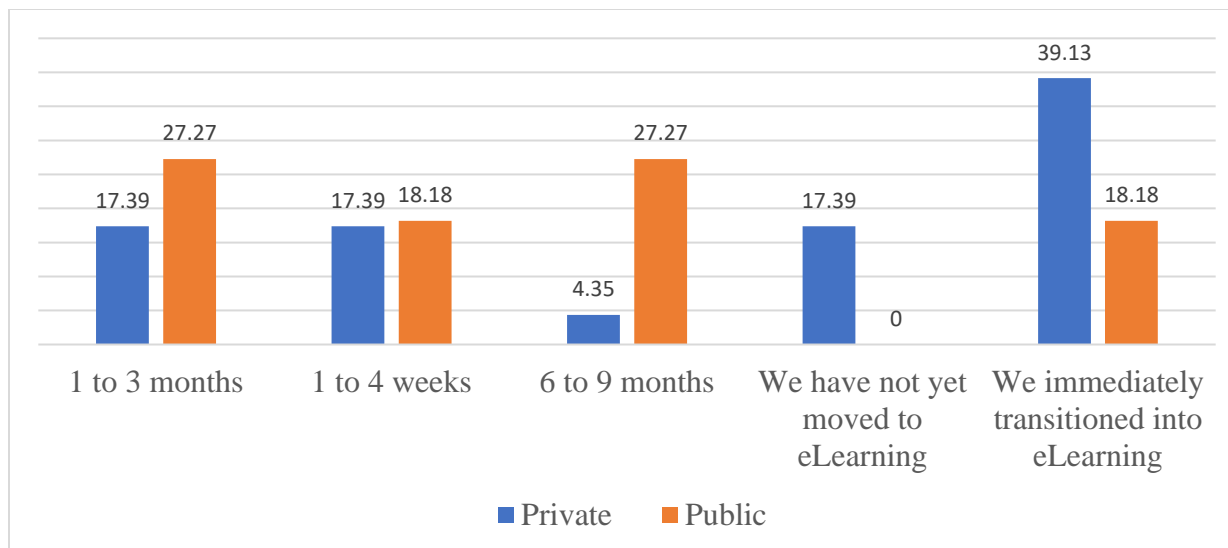


Figure 4: Time taken by private and public HEIs to transition to virtual operations

3.1.2 Proportion of academic programs and students transitioned into eLearning

This survey sought to document the proportions of academic programs and students that HEIs had successfully transitioned to eLearning. As indicated in Figure 5, by June 2021, 45% of the private HEIs had transitioned above 90% of their academic programs to eLearning, while only 20% of the public HEIs had transitioned their programs. This is impressive considering that at the onset of the pandemic, most HEIs did not even have an ODeL policy.

While 45% of the private HEIs had transitioned 90% of the academic programs eLearning while only 20% of public HEIs had done so.

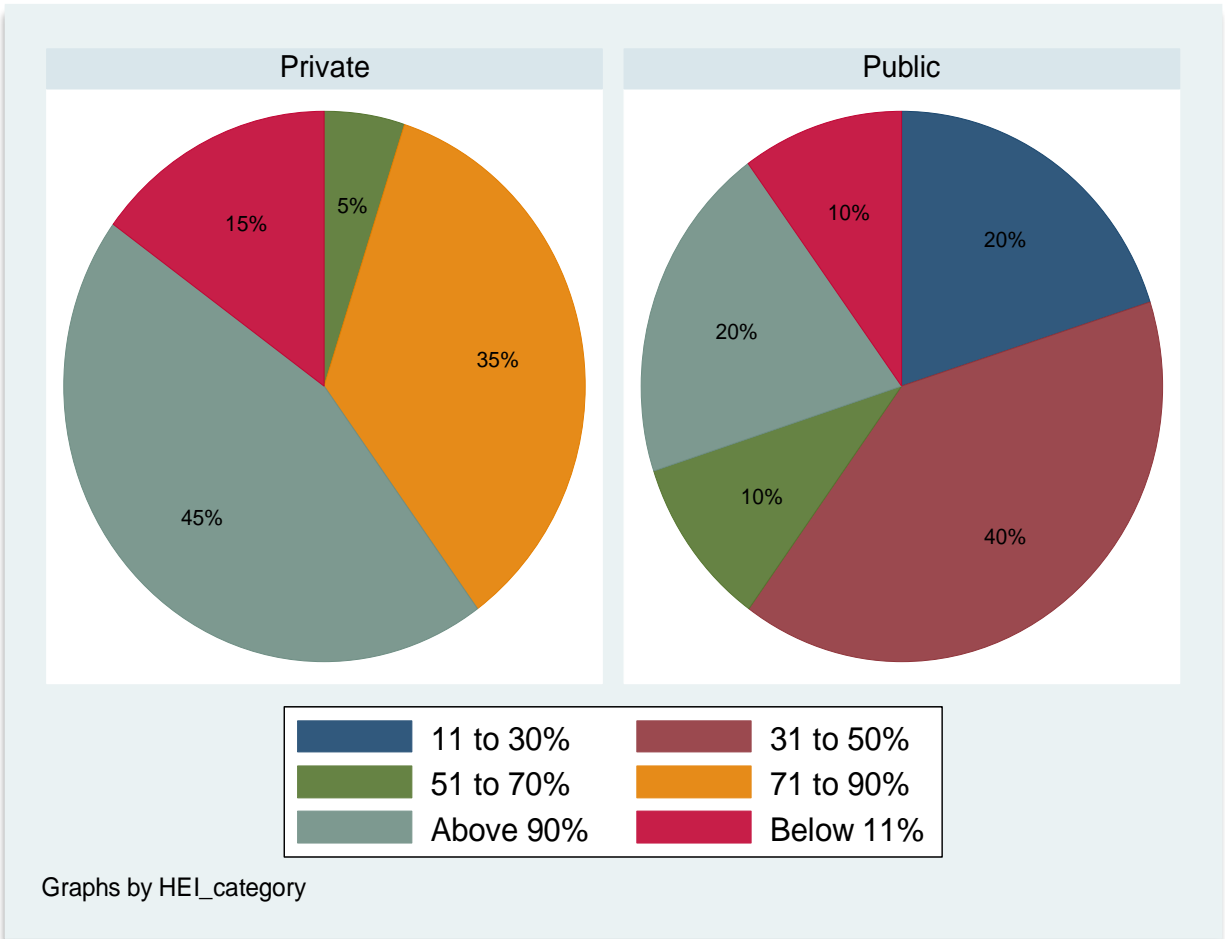


Figure 5: Academic programs that HEIs have transitioned to eLearning

In terms of student transition to eLearning, 36.36% of the private HEIs managed to transition over 90% of their students compared to 20% of the public HEIs. In total, over 68% of the private HEIs had managed to transition over 71% of their students to eLearning. As for public HEIs, only 20% had managed to transition over 71% of their students into eLearning. Figure 6 details student transition into eLearning by type of HEI.

While 68% % of the private HEIs had transitioned 71% of the students into eLearning compared to 20% of public HEIs had done so.

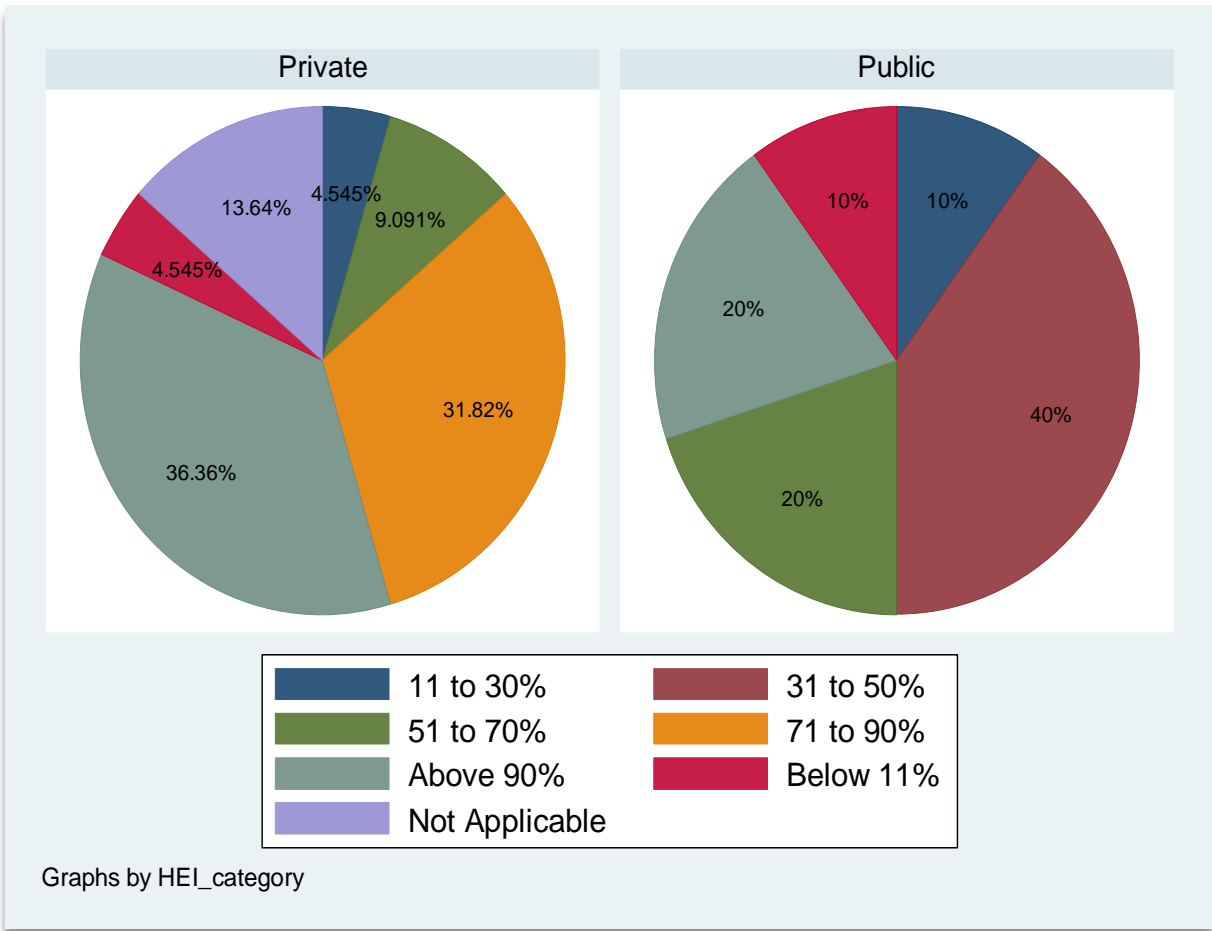


Figure 6: HEIs student transition to eLearning

3.1.3 HEIs' investment into eLearning

For HEIs to realize the level of eLearning transition we have described, they have had to make huge investments in ICT infrastructure. The Public HEIs have on average invested US\$ 140,500, while private HEIs have invested US\$ 51,520 on average. The difference is significant, with a p-value of 0.0486. Kenya leads in terms of investment into eLearning, while Burundi invested the lowest amount (US\$ 118,000 compared to US\$ 30,500). None of the HEIs in Tanzania and South Sudan responded to the question on the amount of investment in eLearning. The average investment into eLearning per country is summarised in Table 5.

Country	Average investment in eLearning (US\$)
Burundi	30,500
Kenya	118,000
Rwanda	70,000
Uganda	65,650

Table 5: Average investment in eLearning per country

3.2 Impact of COVID-19 pandemic on HEI operations

3.2.1 Student recruitment

Overall, the impact of the COVID-19 pandemic on student recruitment has been negative, with a majority of the HEIs reporting decreased number of new students. Figure 7 shows that over 48% of HEI have experienced a decreased number of students because of the pandemic. The decreased number of students plus the fact that the HEIs who have implemented eLearning have not managed to transition all their continuing students compromises the financial position of most HEIs. Even for the HEIs that have reported having maintained the same number of new students, their financial situation has been compromised by the inability of the students to pay fees on time if at all.

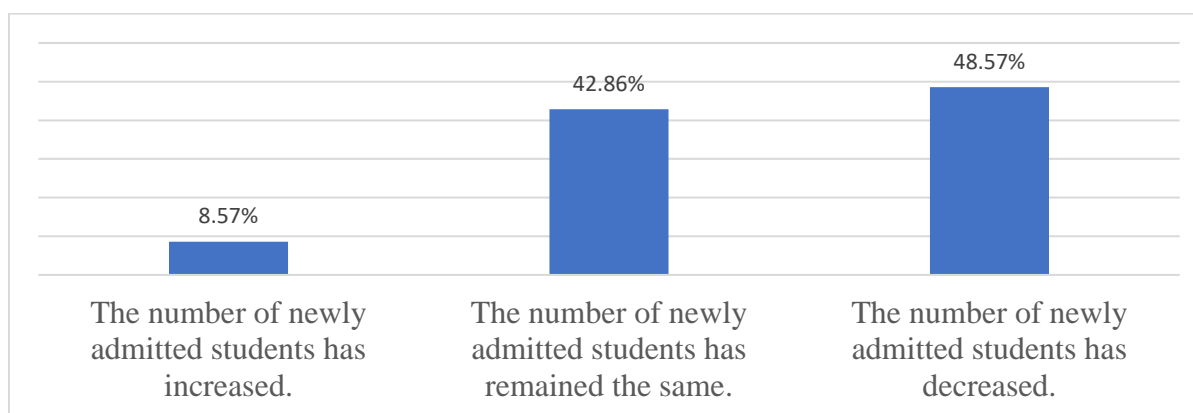


Figure 7: Impact of the COVID-19 pandemic on student recruitment

3.2.2 COVID-19 pandemic impact on HEIs' financial positions

Most HEIs have recorded a significant shortfall in their budgets arising from the pandemic. As displayed in Figure 8, over 35% of the HEIs reported a shortfall in their annual budget of 31-50%, while 17.86% reported a budget shortfall of above 50%.

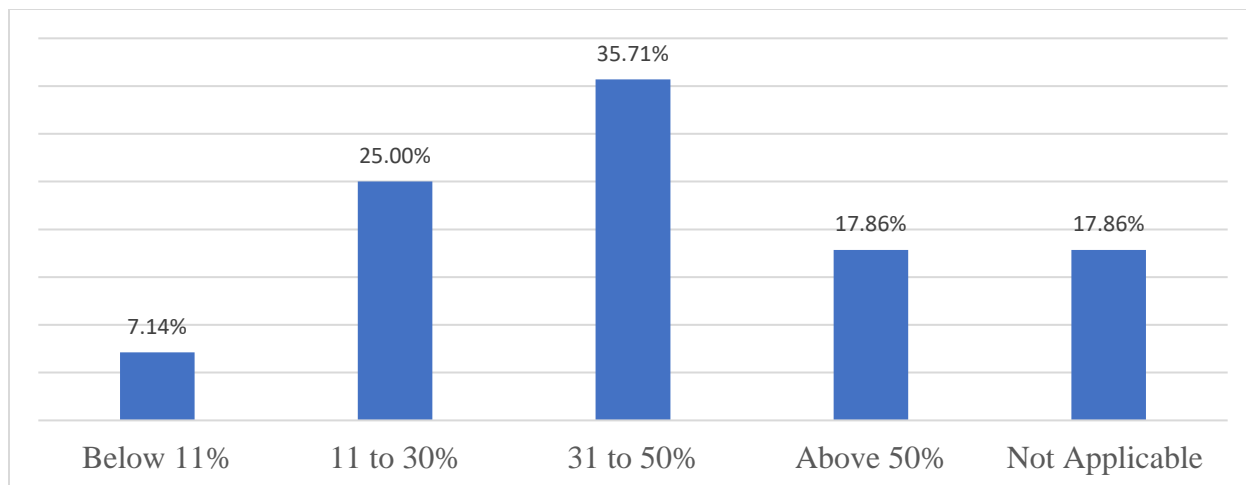


Figure 8: Assessment of HEIs budgets shortfall due to the pandemic

Several HEIs have reported being in some financial distress because of the pandemic. As figure 9 shows, whereas 10% and 3% of HEIs reported having financially thrived and maintained the same financial position to pre-COVID-19, respectively. Twenty-six percent (26%) reported being in great financial distress, while 61% reported to be in slight financial distress.

61% of HEIs are in great financial distress due to the pandemic

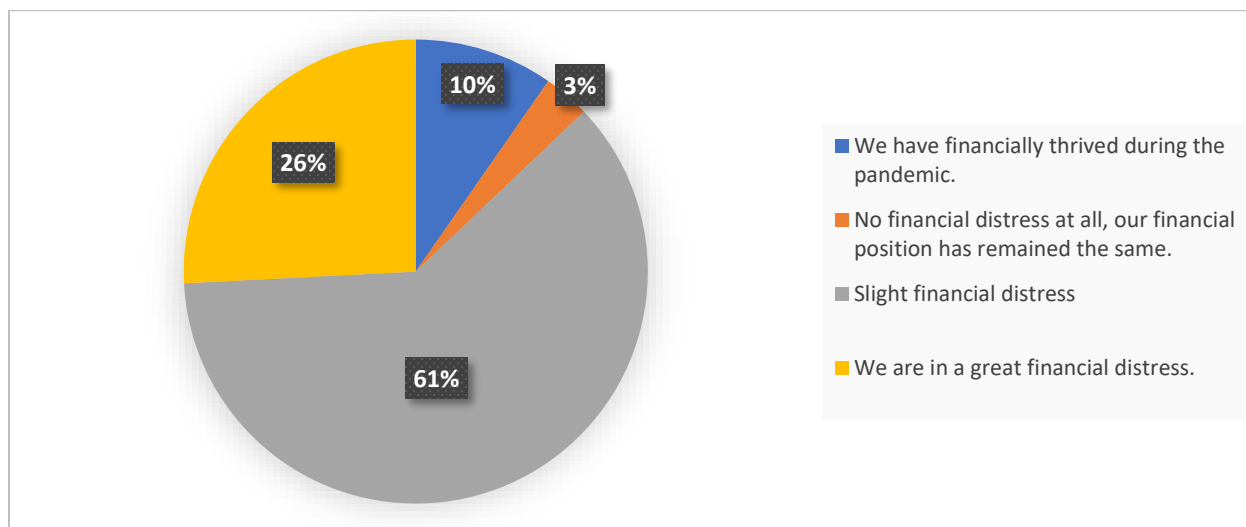


Figure 9: Assessment of HEIs financial position

The implications of the financial distress that HEIs have been through are many and varied. They include delayed payments to suppliers (51.61%), delayed salary payments (29%), and non-remittances of statutory deductions (35.48%), as shown in Figure 10. Only 22.58% of the HEIs have met their financial obligations on time during the pandemic.

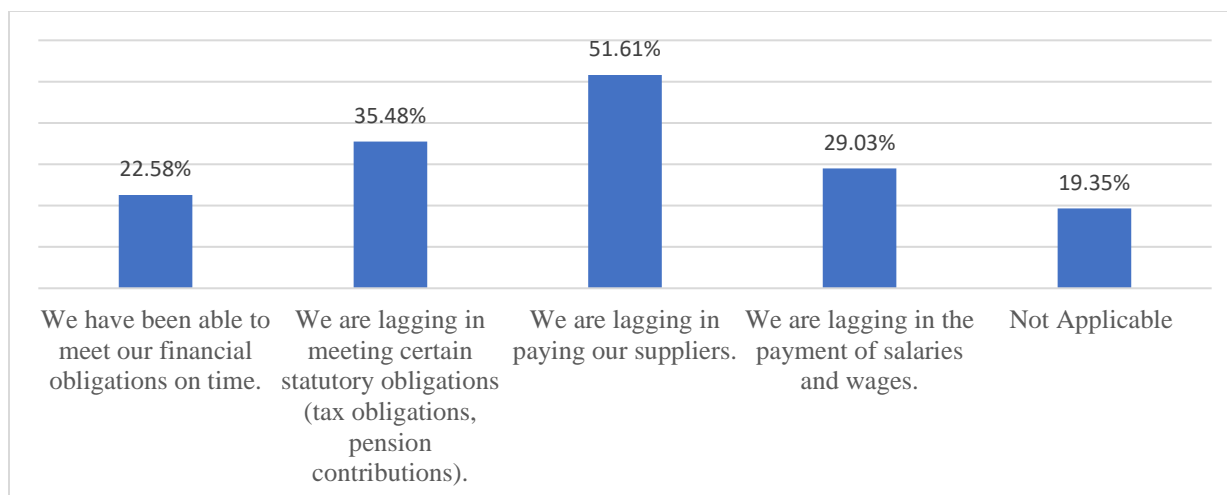


Figure 10: Implications of HEIs financial distress

The budget shortfall arising from the pandemic has forced HEIs to have a retrospect on their budgets, infrastructural development plans, and strategic plans. As Figure 11 demonstrates, on all the three components, HEIs have had to do slight to major revisions downwards.

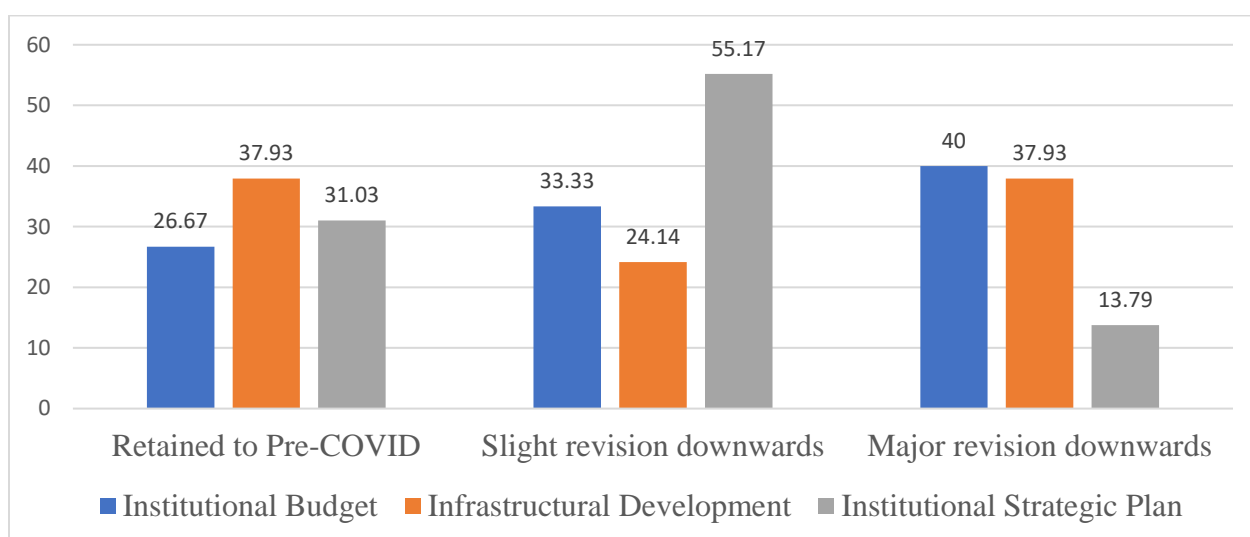


Figure 11: Actions taken by HEIs to mitigate for budget shortfall

In addition to revising their budgets, HEIs have undertaken short-term cost-cutting measures to keep the institution afloat. Table 6 shows that most HEIs (43.3%) have instituted salary cuts, 40% have suspended hiring, and a similar proportion rescheduled their loan repayments.

Cost-cutting measures taken by HEIs	Percentage of HEIs
We have increased the teaching workload for our academic staff.	30
We have allocated teaching workload to some of our non-academic staff.	20
We have sent some employees on leave on reduced pay.	23.33
We have sent some employees on leave without pay.	16.67
We have suspended some employees' benefits.	36.67
We have laid off some employees.	13.33
We have suspended hiring.	40
We have suspended staff promotion.	26.67
We have suspended sponsorship for staff development.	36.67
We have instituted salary cuts.	43.33
We have rescheduled our loan repayments.	40
We have suspended all capital expenditure	36.67
We have not instituted any cost-cutting measures	20
Not Applicable	6.67

Table 6: Cost-cutting measures taken by HEIs

3.3 COVID-19 driven eLearning and inequity in access to quality education

The transition to eLearning created inequities along several lines. In the students' opinions captured in Figure 12, the greatest divide in terms of access to education was created by the difference in accessibility to internet connectivity. Other factors contributing to the digital divide are ICT skills, affordability of ICT gadgets, and the courses a student is registered for. Science-based courses are certainly more difficult to transition to eLearning.

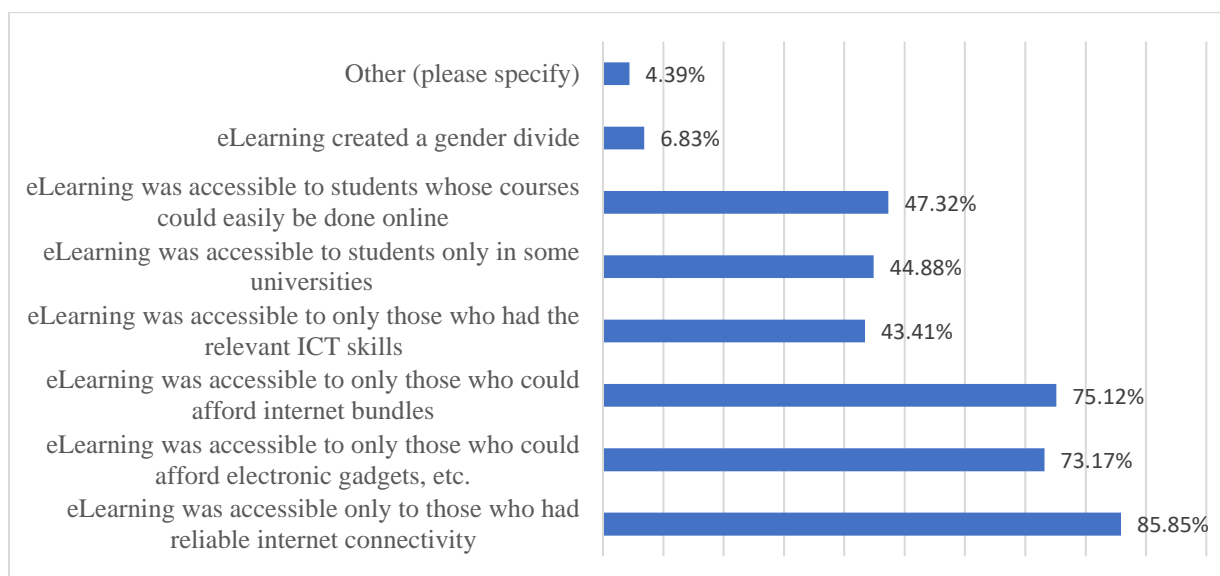


Figure 12: Inequities caused by the transition into eLearning

The digital divide created by the transition to eLearning mode was not limited to students but was also experienced by faculty. In the opinion of the faculty, as captured in Figure 8, digital divide arose from differences in internet accessibility, ICT skills, and affordability of ICT gadgets. The faculty also perceived the digital divide as arising from the difference in the ownership of HEIs. As we pointed out earlier, public HEIs took more time to transition to eLearning. This difference was occasioned by the difference in speed in making decisions; private HEIs are much more flexible in this aspect.

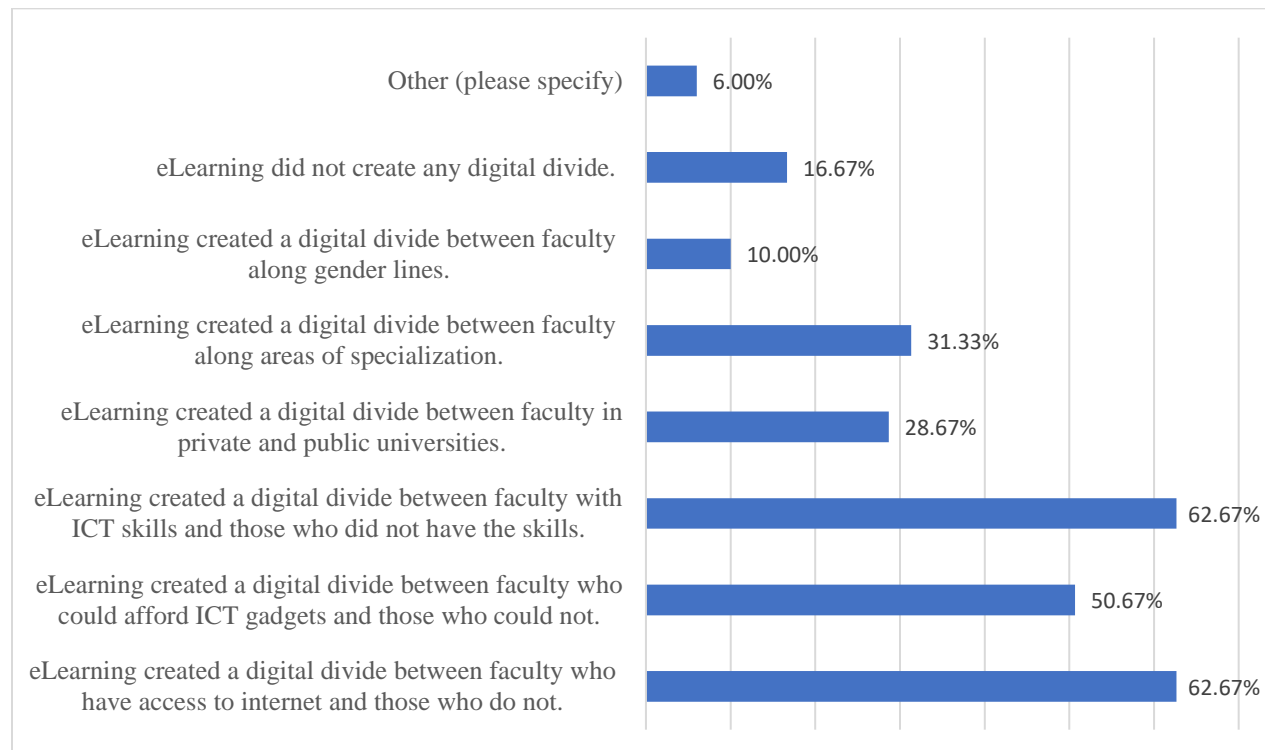


Figure 13: Digital divide among faculty created by eLearning

For both students and faculty, the main cause of the digital divide is social and economic. For most students, the home environment is mainly rural, which largely lacks not only reliable internet connectivity but also electricity. As Figure 14 shows, 47% of the students in the EAC are drawn from rural areas, a further 25% are drawn from semi-urban areas, and only 28% living in urban areas would have access to reliable electricity and internet connectivity. In addition to the social is the economic difference in the sense that some students and faculty are unable to afford ICT gadgets and internet bundles. Inadequacy of ICT skills was pointed out as a major cause of the divide. To address the digital divide, one must address the root cause of the divide.

The pandemic has created a digital divide along with access to the internet as well as faculty who have ICT skills and those who do not.

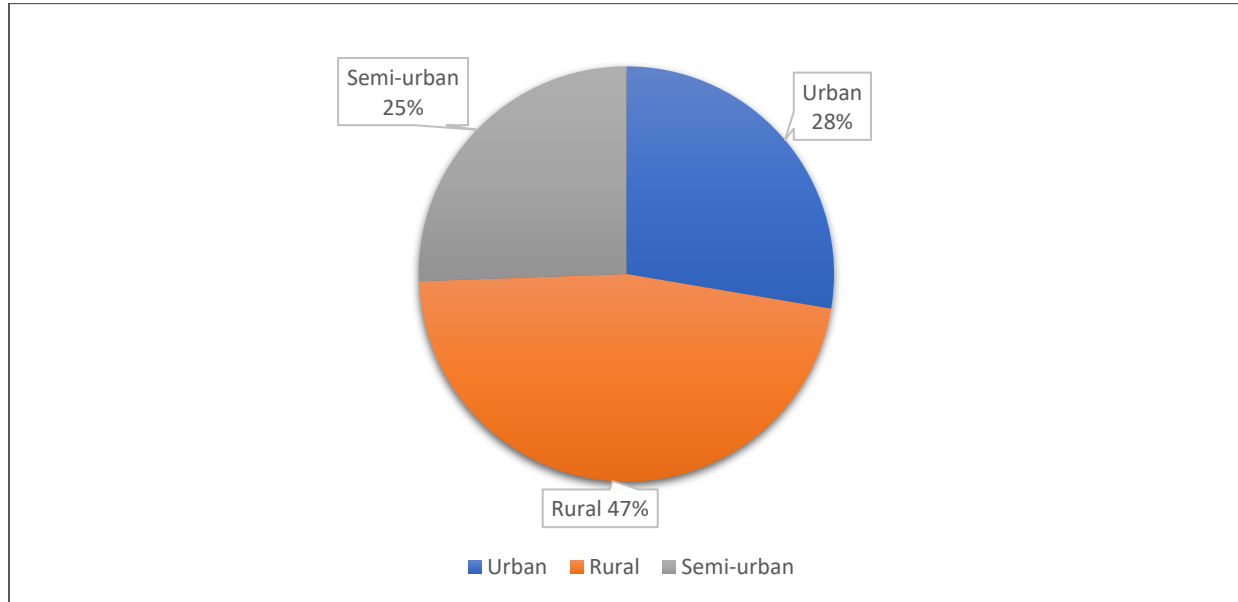


Figure 14: Students home environment

3.3.1 COVID-19 created gender divide

The COVID-19 pandemic has had a gender implication not only for students but also for the public. The gender divide emanates from the distinct role that each gender plays in society. Among the students, 21.89% consider COVID-19 to have disadvantaged female students compared to males, while only 3.98% of the students viewed the pandemic to have negatively affected male students more than female students. Most of the students (68.66%) were of the opinion that the pandemic's impact does not have a gender divide. Figure 15 summarises the gender impact of the pandemic on students.

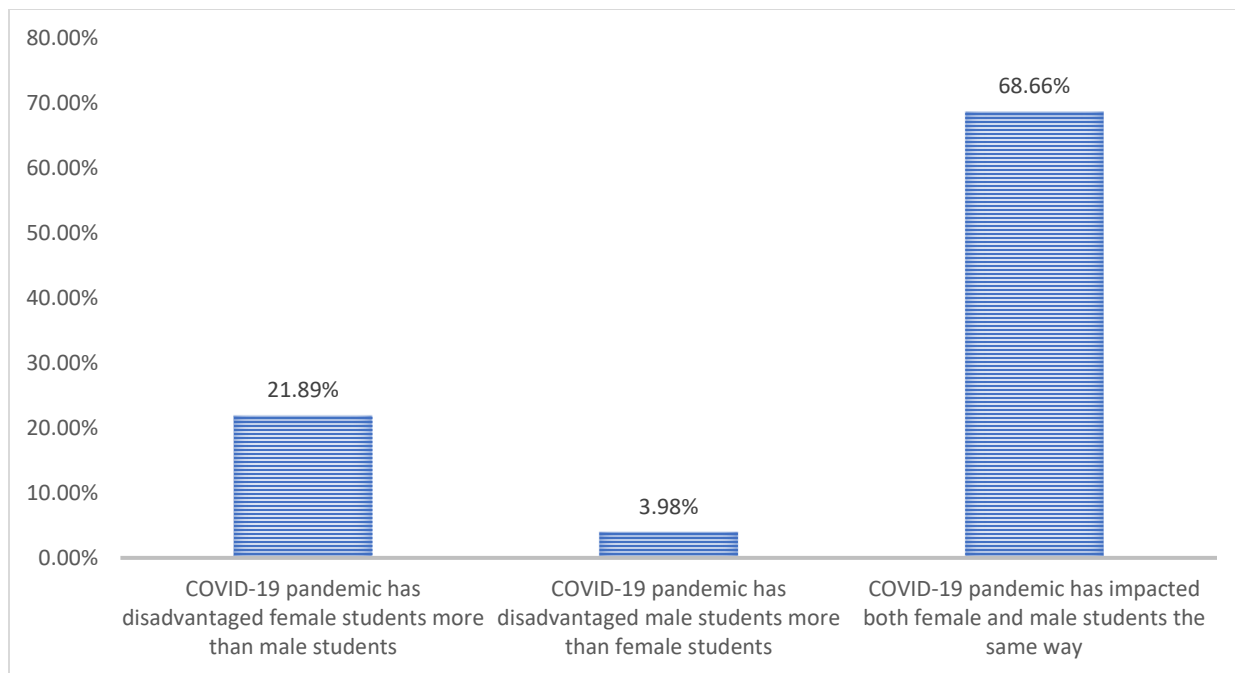


Figure 15: COVID-19 pandemic impact on students along gender lines

As indicated in Figure 16, the main challenges posed by the pandemic to female students are mainly social (unwanted pregnancies, early marriage, and drug use). The prolonged stay at home also meant that female students engaged more in household chores that seemed to have disrupted their engagement in education. Another 41.79% of the students opined that the female students' participation in economic activities posed a challenge to their participation in education.

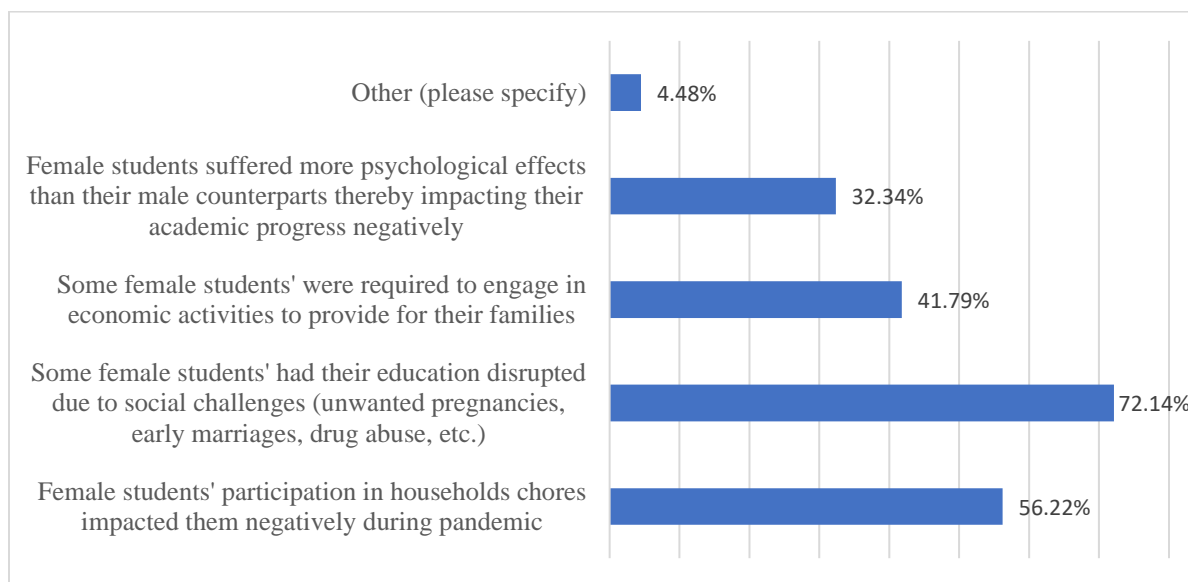


Figure 16: Impact of the pandemic on female students

As for the male students, their participation in education during the pandemic was largely disrupted by their participation in economic activities, followed by social challenges, such as early marriages and drug abuse. Figure 17 summarises the impact of the pandemic on male students.

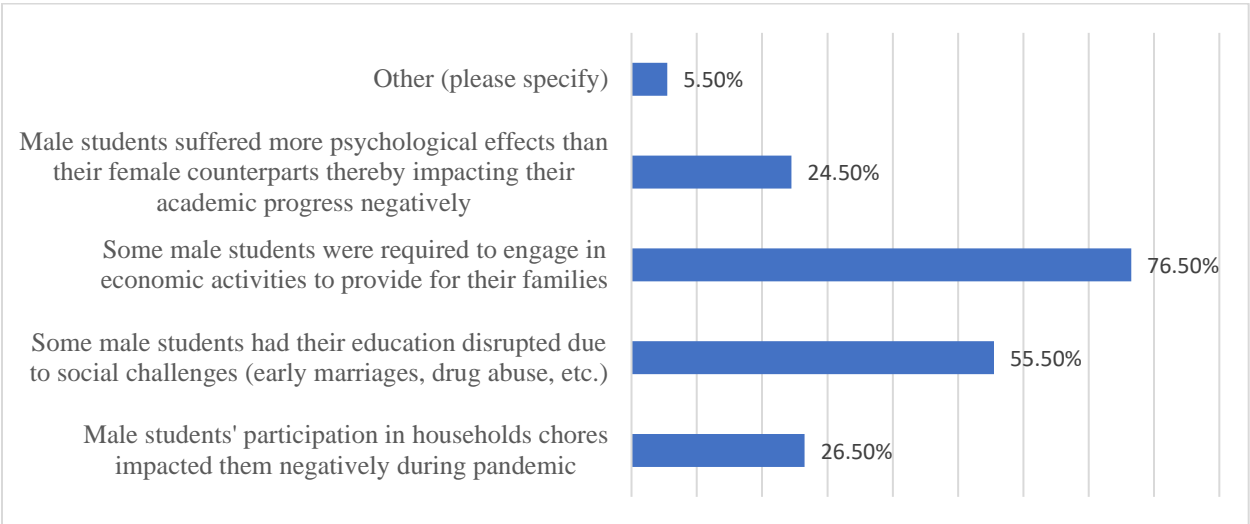


Figure 17: Impact of the pandemic on male students

For both female and male students, the pandemic has had a psychological impact that has affected their academic activities negatively. As demonstrated in Figure 16, 32.34% of the students considered the pandemic to have psychologically affected the female students more than their male counterparts. Additionally, 24.5% of the students considered male students to have suffered more psychological effects than their female counterparts (see Figure 17). These psychological effects have caused HEI students to result in drug use, attempted suicide, and other mental health issues, as shown in Figure 18.

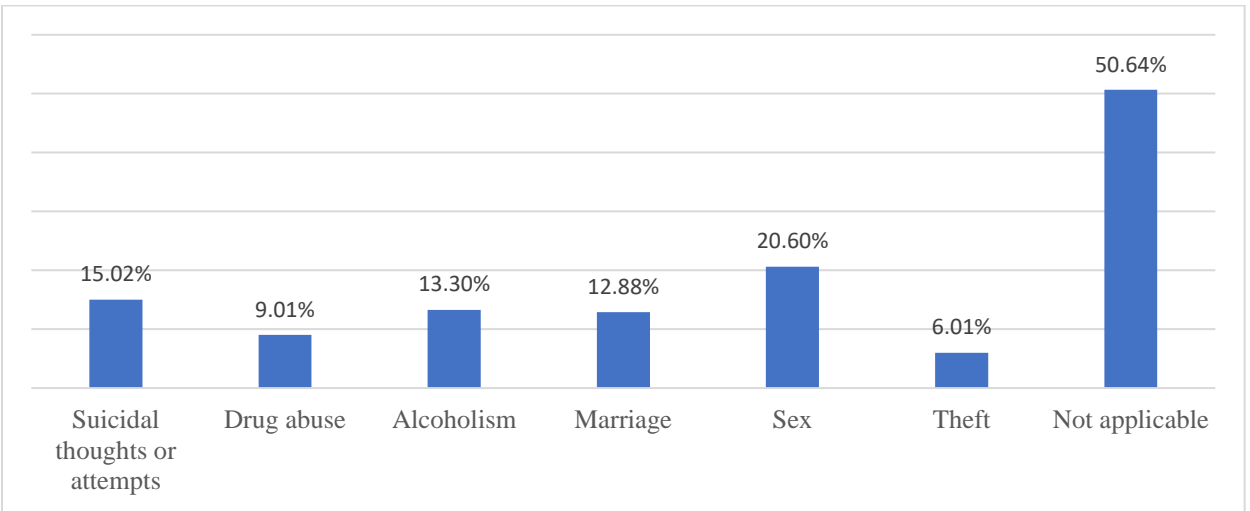


Figure 18: Psychosocial impact of the pandemic on students

Regarding the faculty, the gender divide in academic participation created by the pandemic is less pronounced than for the students. As figure 19 shows, 70% of the faculty do not consider a gender divide in their academic participation arising from the pandemic. Perhaps due to the engagement of the female faculty with their families during the pandemic. Nonetheless, 11.33% of the faculty considered the female faculty to be at a disadvantage in academic participation compared to their male counterparts.

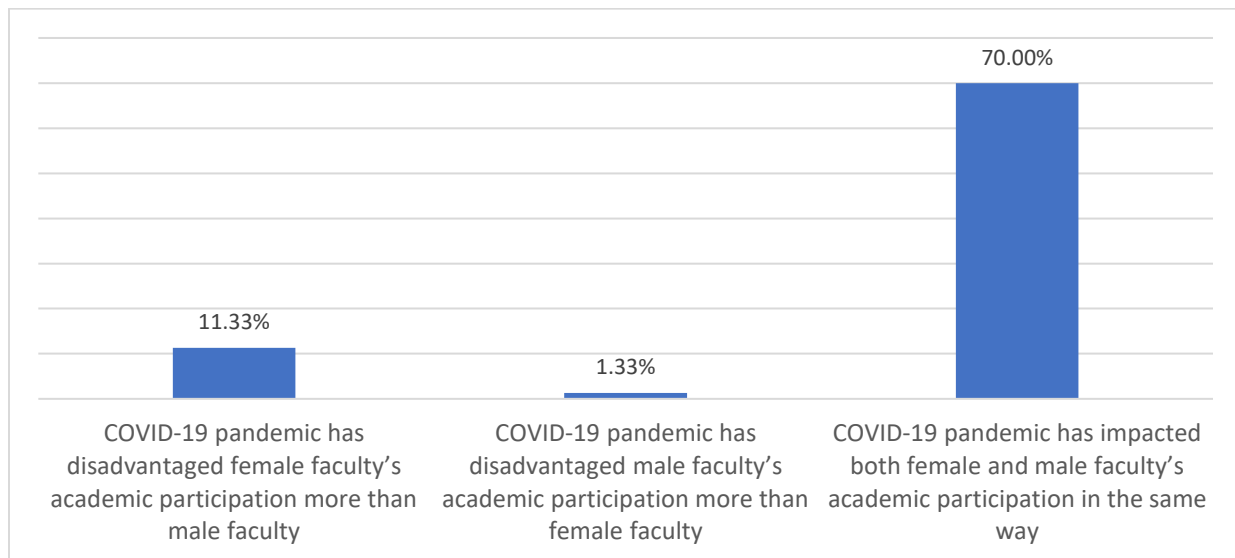


Figure 19: Impact of the pandemic on faculty's academic participation along gender lines

3.4 Impact of the pandemic on research output

The pandemic has had a mixed effect as far as HEIs' research activities are concerned. On the one hand, HEIs have entered new areas of research occasioned by the pandemic, while overall, research output from HEIs has reduced. In this survey, we sought responses from faculty, students, and research directors.

As shown in Figure 20, travel restriction and the transition to eLearning seems to have caused a major setback to research activities among faculty members. Increased teaching load during the pandemic, which is one of the strategies used by several HEIs to manage cost and reduced research funding, compromised faculty's involvement in research activities.

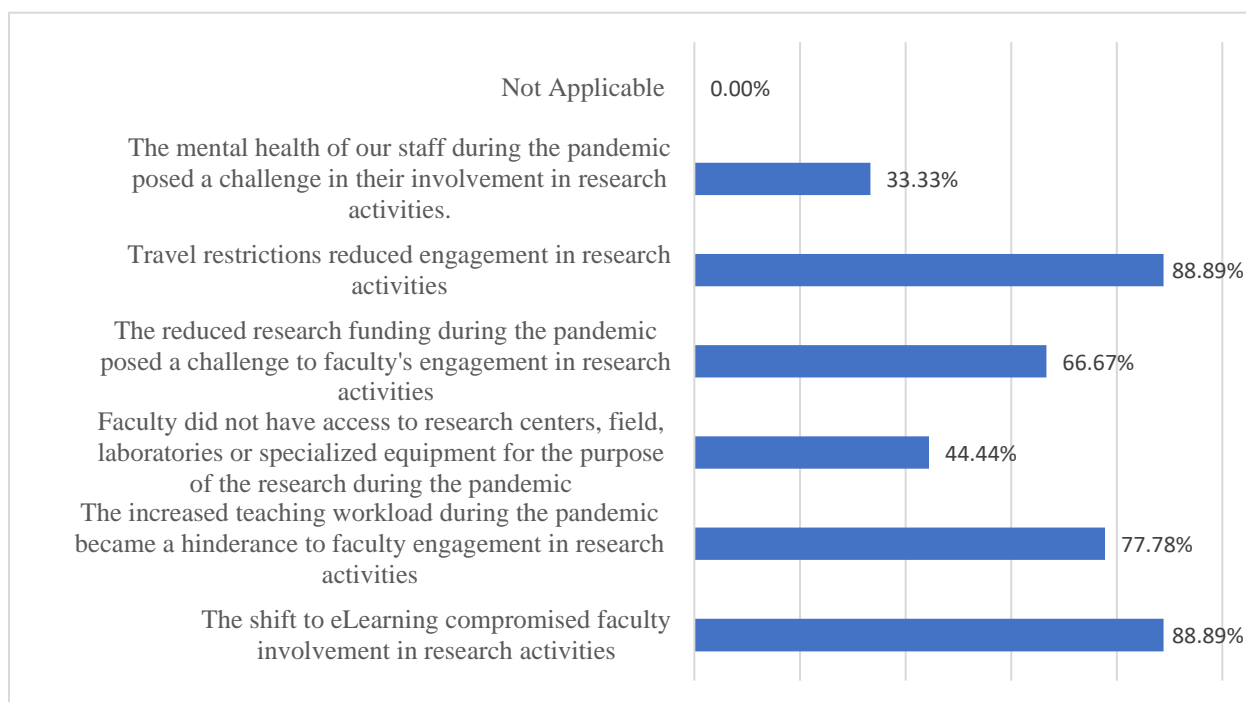


Figure 20: How the pandemic has impacted faculty's participation in research activities

Only 18.18% of the HEI research directors reported an increase in the number of research publications. Most HEIs (72.73%), as shown in Figure 21, indicated a reduction in research publications, yet research publications contribute significantly to a university's ranking besides being the basis for faculty's promotion.

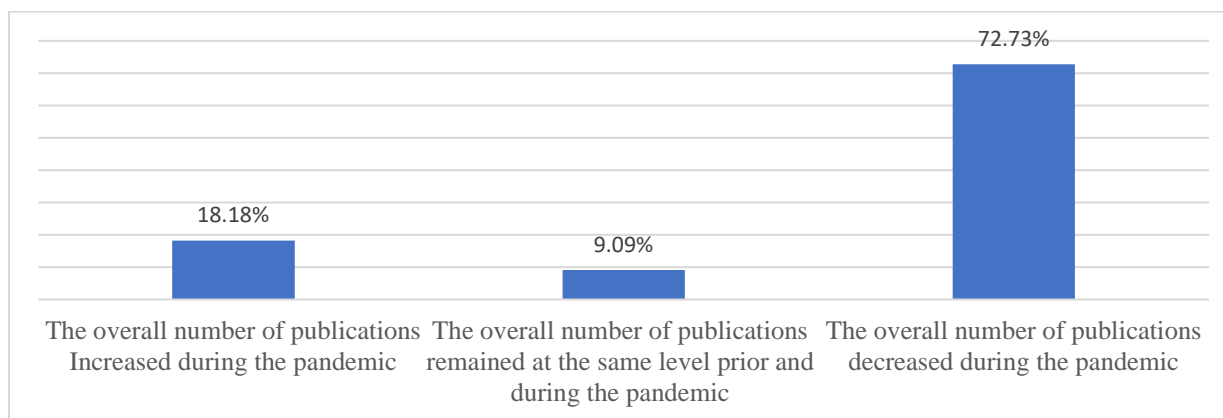


Figure 21: Effects of the pandemic on HEIs' publications

The survey sought to determine how faculty's research activities have been impacted by the pandemic. While 9.15% of the faculty members indicated an increase in their research activities during the pandemic, most (49%) reported a reduction in research activities. Unfortunately, the pandemic has led to a complete halt of research activities for 13% of the faculty members, as shown in Figure 22.

Only 9% of the faculty in HEIs reported an increase in their research activities during the

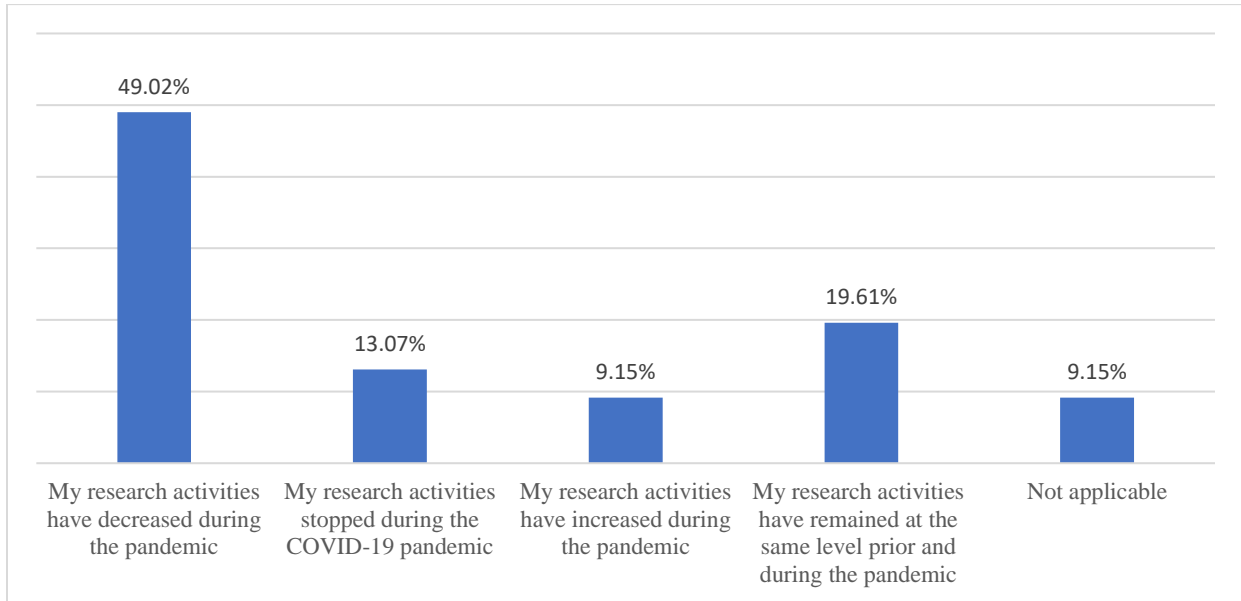


Figure 22: Effects of the pandemic on Faculty's research activities

The consequence of reduced research activities is manifested in the reduction of publications. As demonstrated by Figure 23, 31.8% of the faculty reported a reduction in publications during the pandemic, while only 13.6% reported an increase in the number of publications during the period. Besides, 24.7% of the faculty did not publish during the pandemic period.

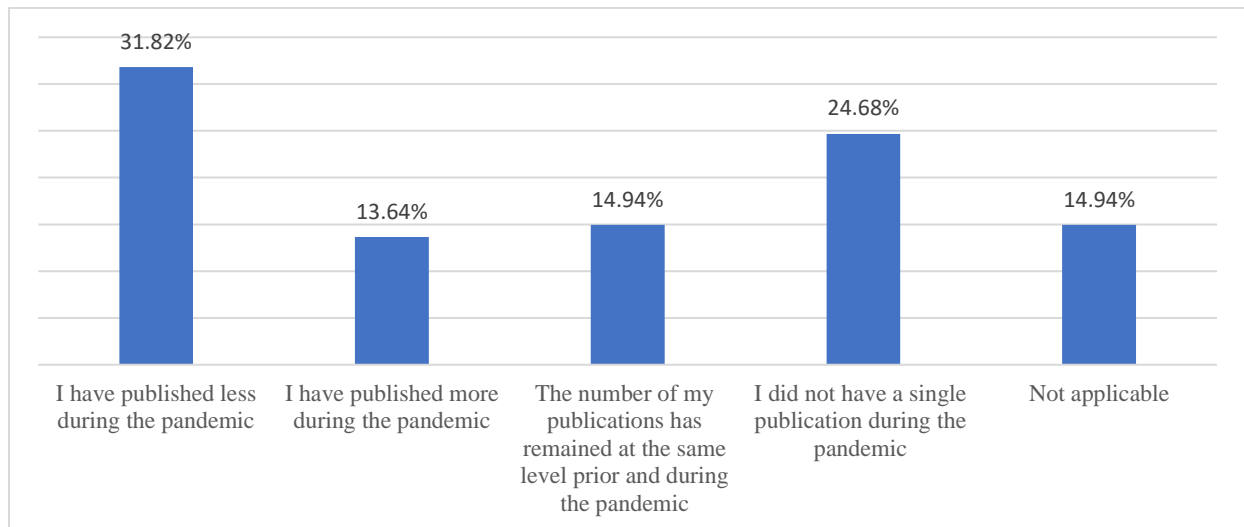


Figure 23: Impact of the pandemic on faculty publications

Just like the faculty members, most HEI students reported reduced research activities during the pandemic, with only 5.7% reporting increased research activities. Most (34.3%) of the students did not find the research question applicable to them. Figure 24 summarises the impact of the pandemic on the students' research activities during the pandemic.

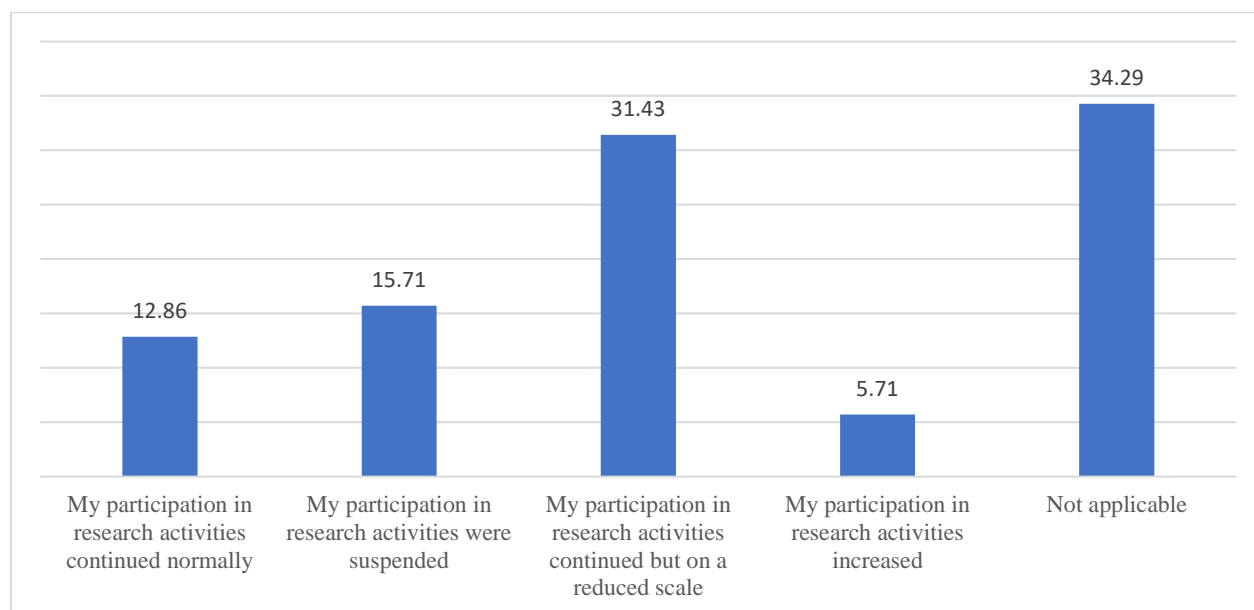


Figure 24: The impact of the pandemic students' research activities

At the national scale, the national research commission officials attested that the pandemic has resulted in more than 30% reduction in research activities in the EAC region. In general, and besides the effects of the pandemic, officials in the national research commissions blame the low research output in the region on a scarcity of research mentors, low funding, and low demand for research by policymakers.

3.5 Effects of the pandemic on innovation

Whereas universities concentrate on the publication of research output, there should be efforts for HEIs to contribute to innovation and the registration of intellectual property rights (IPRs). The survey sought to determine the impact of the pandemic on innovation in HEIs. Data reported here was gathered from faculty, students, and the IPRs national offices. As figure 25 illustrates, only 14.3% of the students reported an increase in their participation in innovation and inventions during the pandemic.

The pandemic has resulted in a 30% reduction in research activities in the EAC region

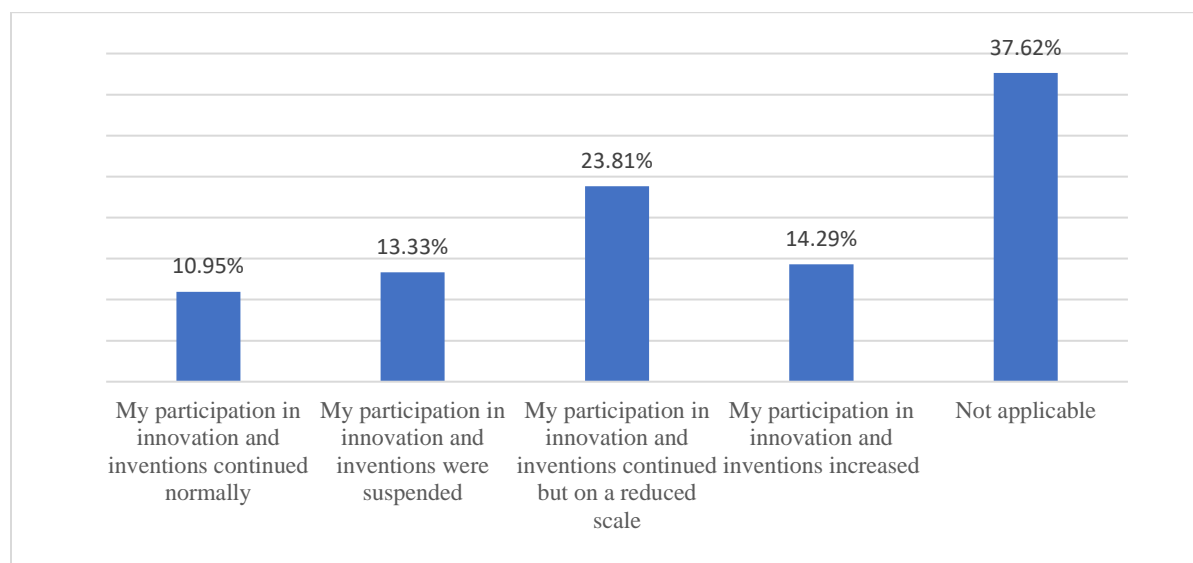


Figure 25: Effects of the pandemic on HEI students' innovation

The students' experience as far as innovation is concerned during the pandemic is repeated among faculty members, with 31.8% of the faculty reporting less innovations. A further 22.5% of the faculty have not had any innovation during the pandemic. Figures 25 and 26 show a rather gloomy picture as far as innovations in HEIs is concerned.

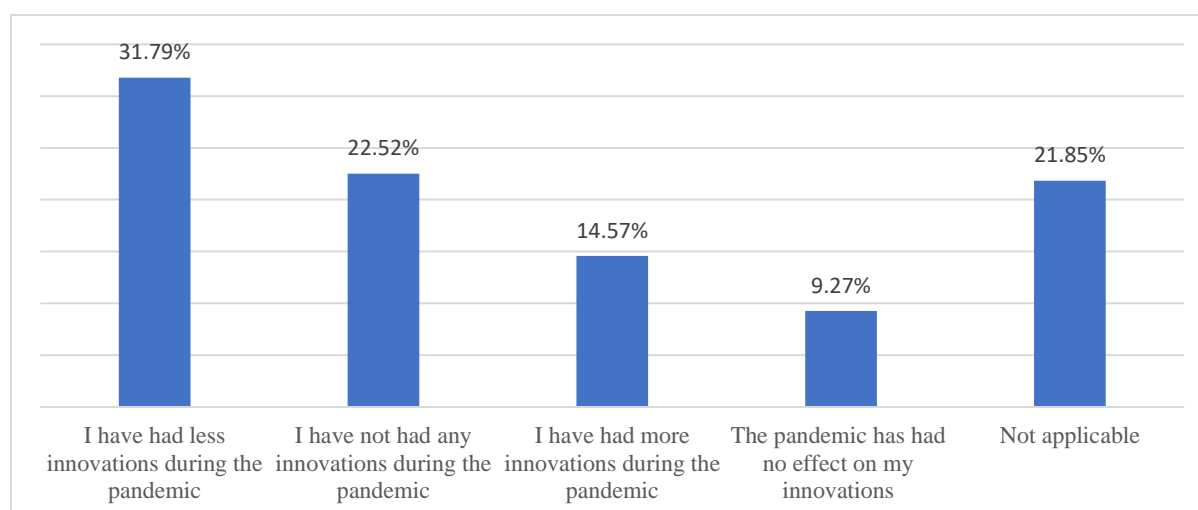


Figure 26: Effects of the pandemic of faculty's innovation

The issue of low innovation in the HEIs is collaborated by the national IPR offices, who recorded a reduction in some IPRs registration. In Tanzania, for example, between 2019 and 2020, there was a 2.6% reduction in trademarks registration and a 27.5% increase in the registration of patents. The information gathered from IPR offices indicates that out of the IPRs registered nationally, very few of them come from HEIs.

Out of the registered IPRs, the contribution from HEIs is very low

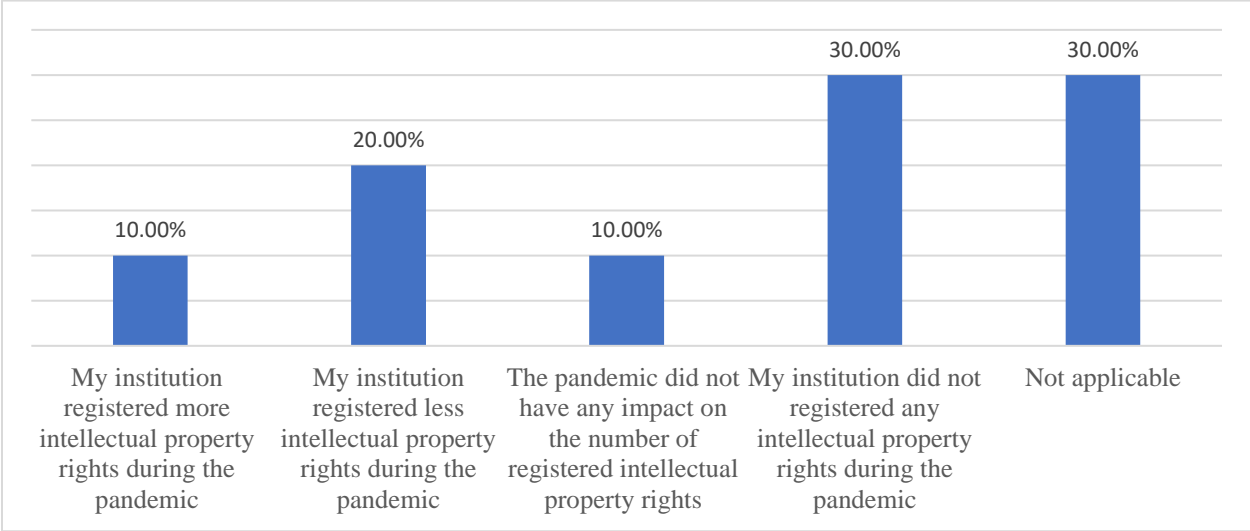


Figure 27: Effects of the pandemic on IPR registration

It should also concern policymakers that 67% of IPRs registered are from foreigners, with only 33% being from the locals. Part of the challenge may be the structuring of the education curriculum, which currently lacks the harnessing of innovative ideas. The low registration of IPRs at the institutional levels, as captured in Figure 27, manifests a low level of innovation. Thirty percent (30%) of the HEIs indicated that they did not register any IPR during the pandemic, while only 10% indicated an increase in the number of IPRs registered.

3.6 The effects of the pandemic on HEIs-industry linkage

The need for HEI-industry linkage plays a critical role in ensuring that HEIs are equipping students with industry-relevant skills. In turn, this linkage ensures faster absorption of graduates into the job market and increased growth of the economies. This survey sought to assess the effects of the pandemic on HEI-industry linkage from several respondents, including the internship/career placement officers, the students, and faculty. As captured in Figure 28, 58% of HEIs recorded a reduction in the number of students taking internship programs in the industry. A further 38% of HEIs indicated that they had suspended their internship program during the pandemic.

58% of HEIs experienced a reduction in having their students engaged in internships while 38% of HEIs experienced suspended internship programs during the pandemic

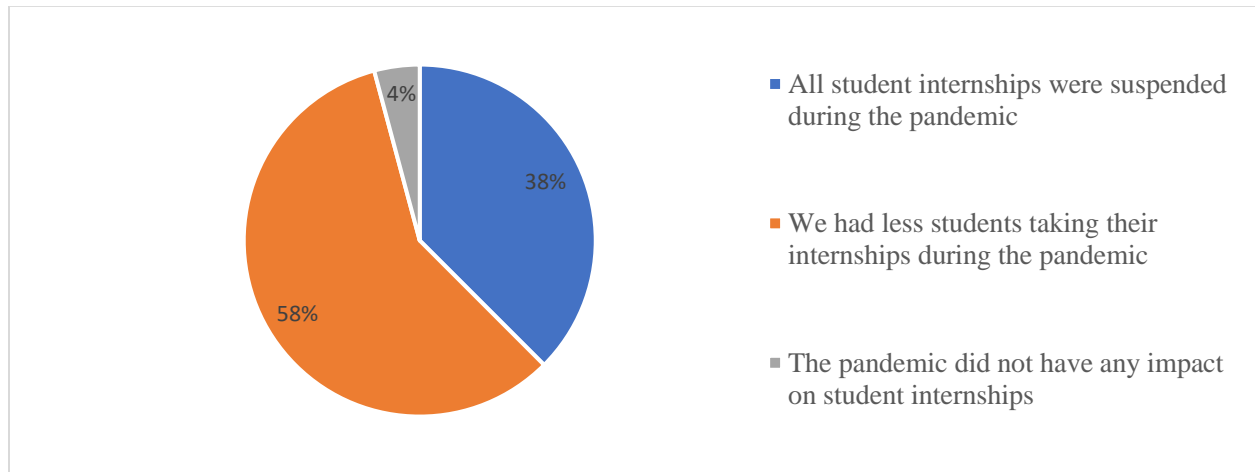


Figure 28: Effects of the pandemic on students' internships

As a result of the reduced uptake of student internships, faculty members experienced a reduction in their supervision of internships and attachments during the pandemic. As shown in Figure 29, 40% of the faculty reported having supervised fewer internships and attachments during the pandemic. A further 24% of the faculty were not involved in the supervision of internships and attachments.

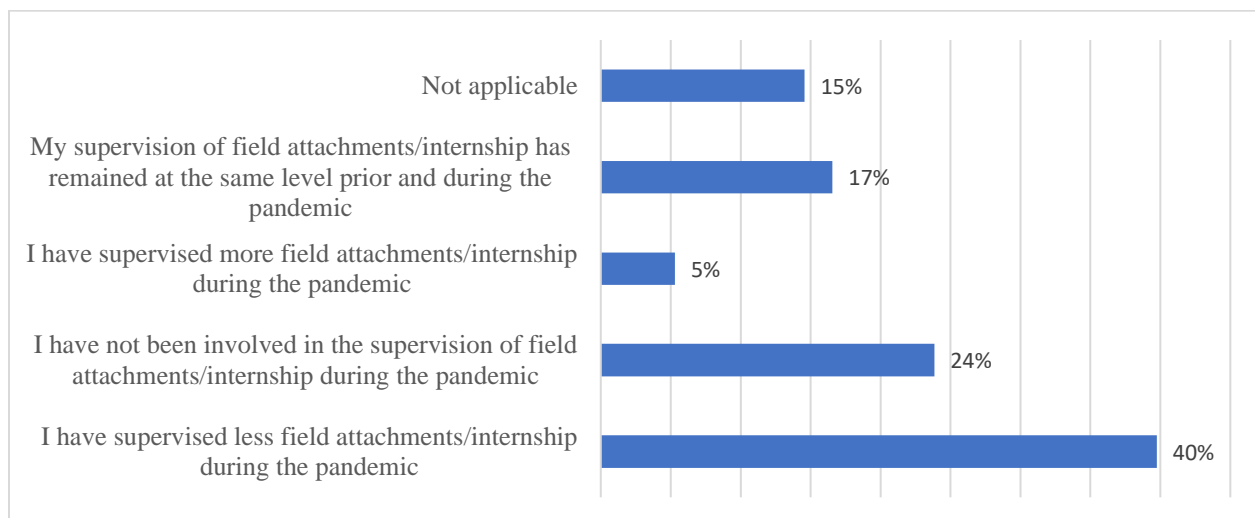


Figure 29: Faculty's involvement in internship and attachment supervision during the pandemic

Sixty-seven percent (67%) of the HEIs indicated that, during the pandemic period, they experienced a reduction in the number of signed partnerships agreements between HEIs and corporate organizations. As demonstrated in Figure 30, only 4% of HEIs indicated an increase in the number of new partnerships signed with corporates.

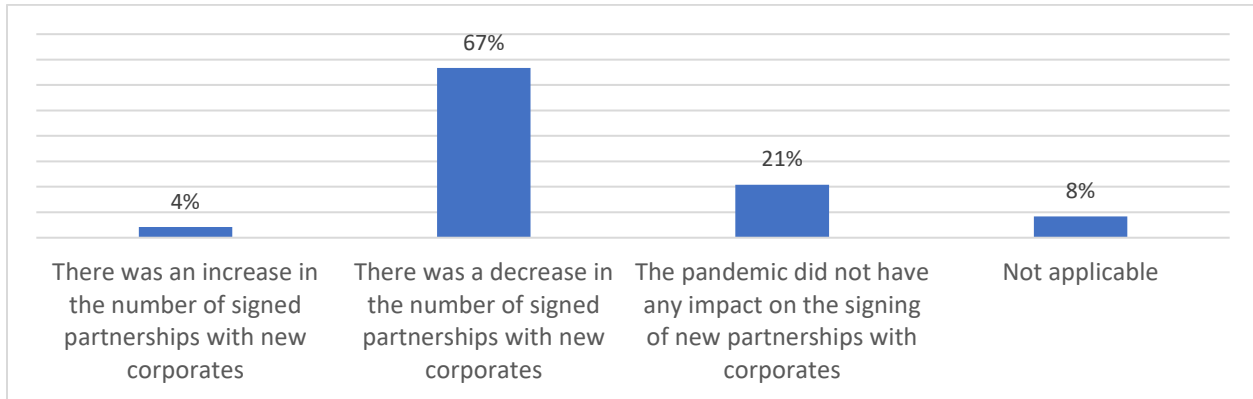


Figure 30: Effects of the pandemic on the newly signed partnerships between HEIs and corporate organizations

Interestingly, over 17% of the students were able to undertake their internships and attachments during the pandemic. Figure 31 summarizes the students' experience regarding internship and attachment during the pandemic. Students faced other challenges during the pandemic are the closure of organisations offering internships and mental issues that would not permit one to take up an internship.

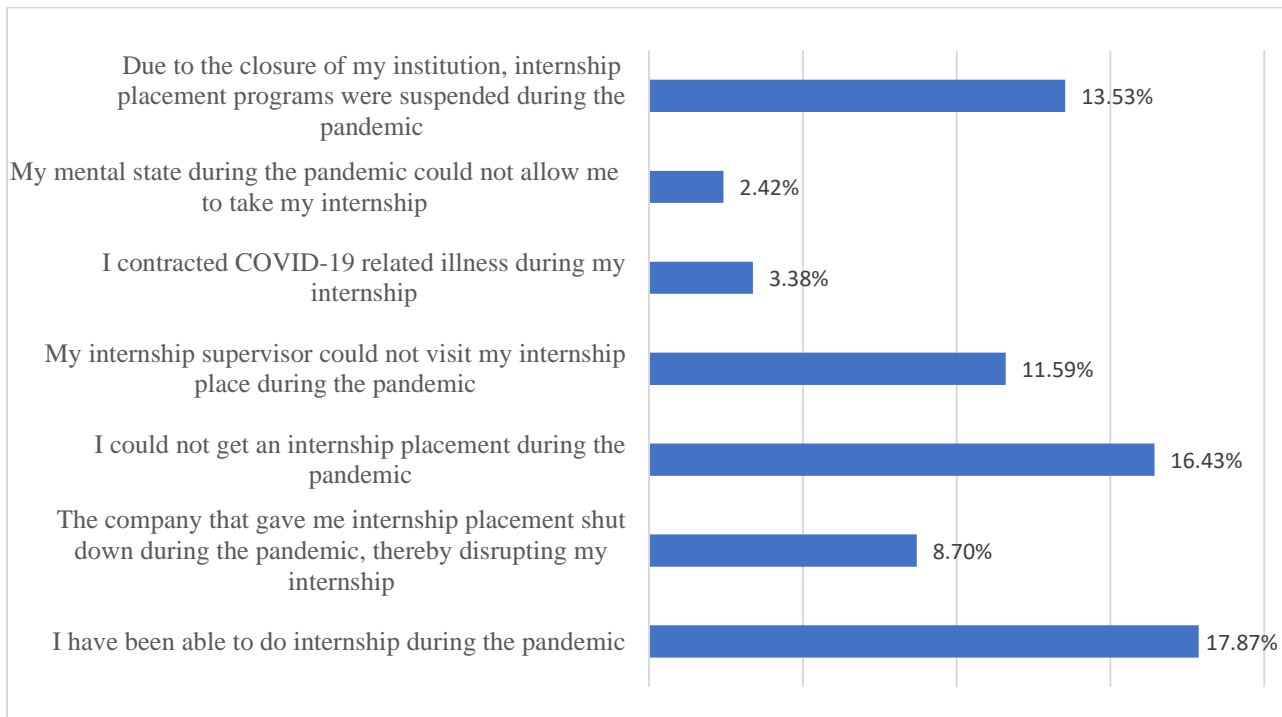


Figure 31: Students' internship experiences during the pandemic

Other ways of HEIs-industry linkage include faculty engagement of industry experts in their teaching (guest lecturer engagements), consultancies, and corporates participating in exhibitions in HEIs. On the consultancy assignments with the corporates, 46% of the faculty did not participate, while 36% had less engagement with corporates as consultants. Only 9% of the faculty reported increased involvement with corporates on consultancy basis. Figure 32 summarizes the faculty's consultancy engagements with corporates during the pandemic.

Only 9% of the faculty have offered more consultancy services to corporate organizations during the pandemic

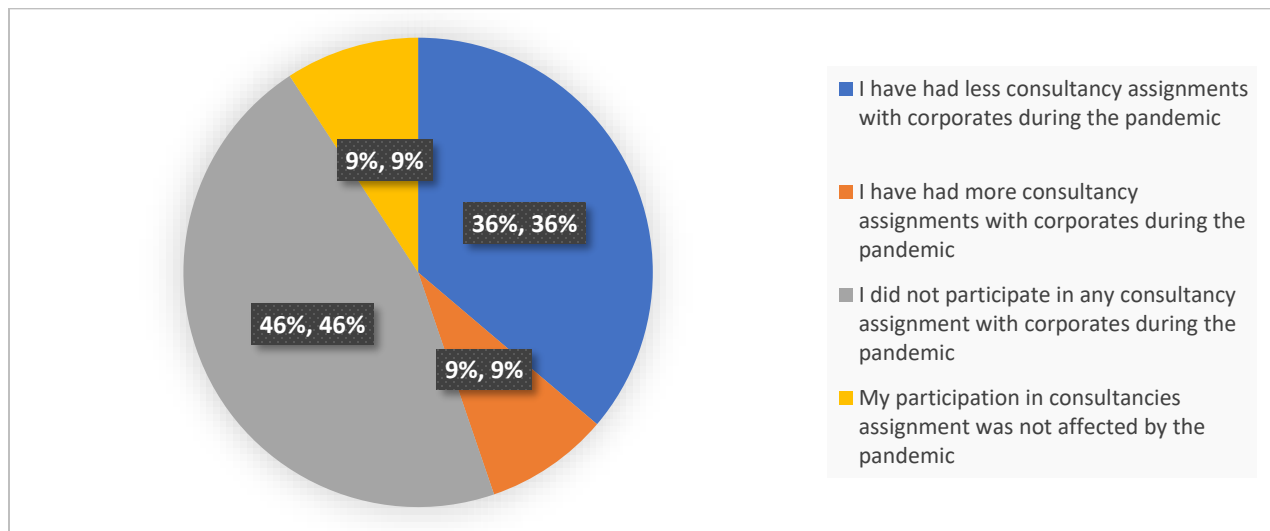


Figure 32: Faculty consultancy engagement with corporates during the pandemic

The other point of interaction between HEIs and the industry happens when members of faculty invite corporate leaders into their classes as guest lecturers. Sixty-three percent (63%) of the faculty reported that, during the pandemic, they did not invite any guest lecturers from the industry, while 27% reported a reduction in the number of guest lecturers they invited during the said period. The data captured in Figure 33 indicates that only 3% of the faculty reported having invited more guest lecturers from the industry.

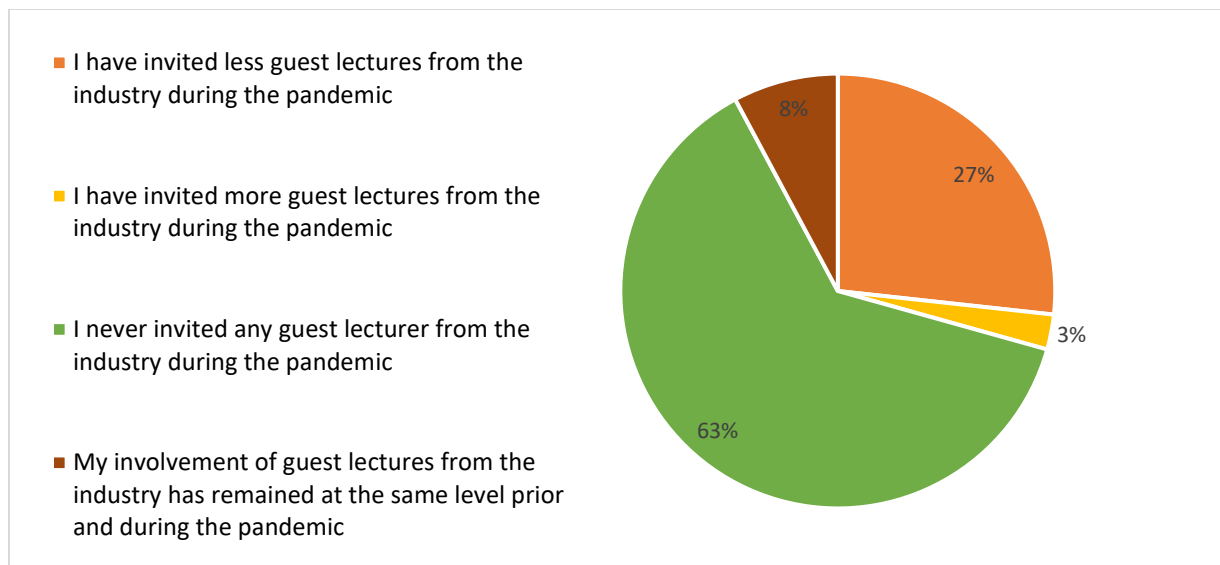


Figure 33: Faculty's involvement of guest lecturers from the industry during the pandemic

The final aspect HEIs-industry linkage we consider is corporate exhibitions through which corporate institutions showcase their products and processes to university communities. Only 4% of the HEIs reported an increase in corporate exhibitions in their institutions. For the other HEIs, either the exhibitions did not occur, or there was a reduction of the same. Figure 34 shows the effects of the pandemic on HEI exhibitions in HEIs.

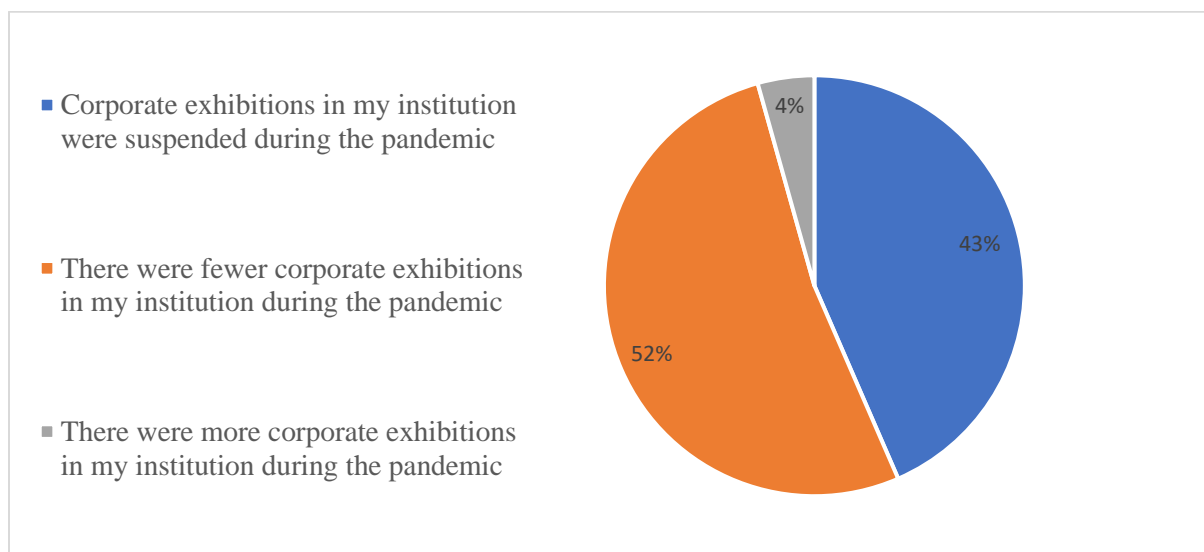


Figure 34: Effects of the pandemic on corporate exhibitions in HEIs

3.7 The effects of the pandemic on HEIs collaborations

The restricted mobility of persons due to the pandemic has negatively impacted the collaborative initiatives among HEIs. Some collaborative programs with overseas institutions were suspended during the pandemic, as indicated by 42% of the HEIs (see Figure 35). For regional collaborations, 26% of HEIs indicated to have suspended such collaborations, while for both overseas and regional collaborations, 46% and 61% of HEIs indicated a decline in the number of students enrolled in collaborative programs, respectively (see figures 35 and 37)

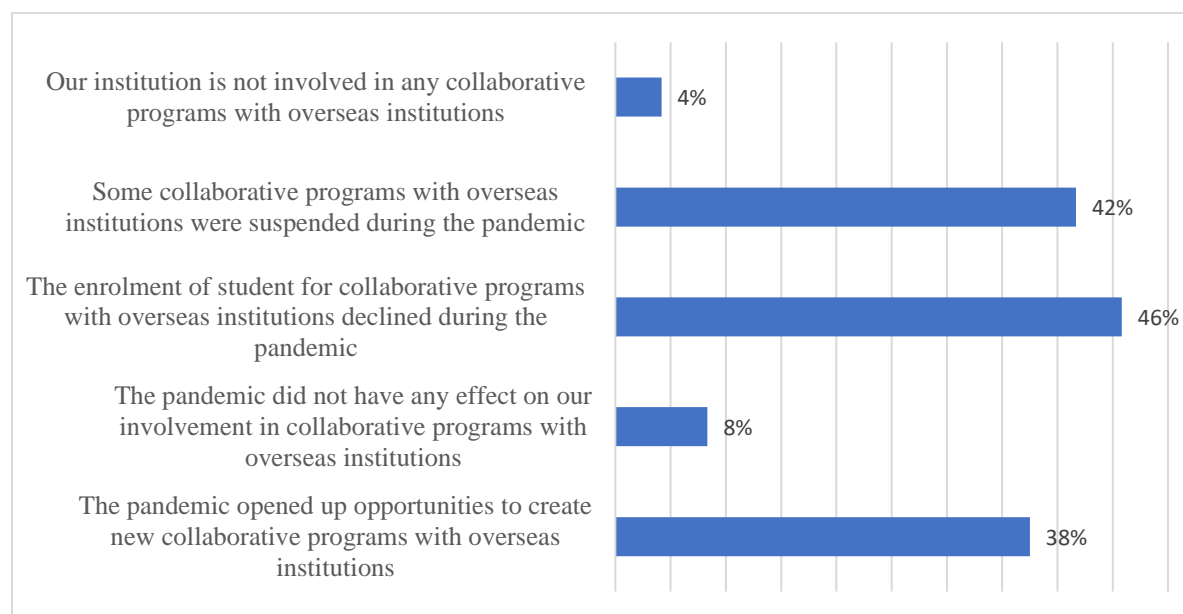


Figure 35: Effects of the pandemic on collaborations with overseas institutions

Figure 36 shows the impact of the pandemic on the number of students involved in in-person exchange programs. For the HEIs involved in collaborations, 25% reported having suspended in-person exchange programs, while 46% reported a reduction in the number of students on in-person exchange programs (46%).

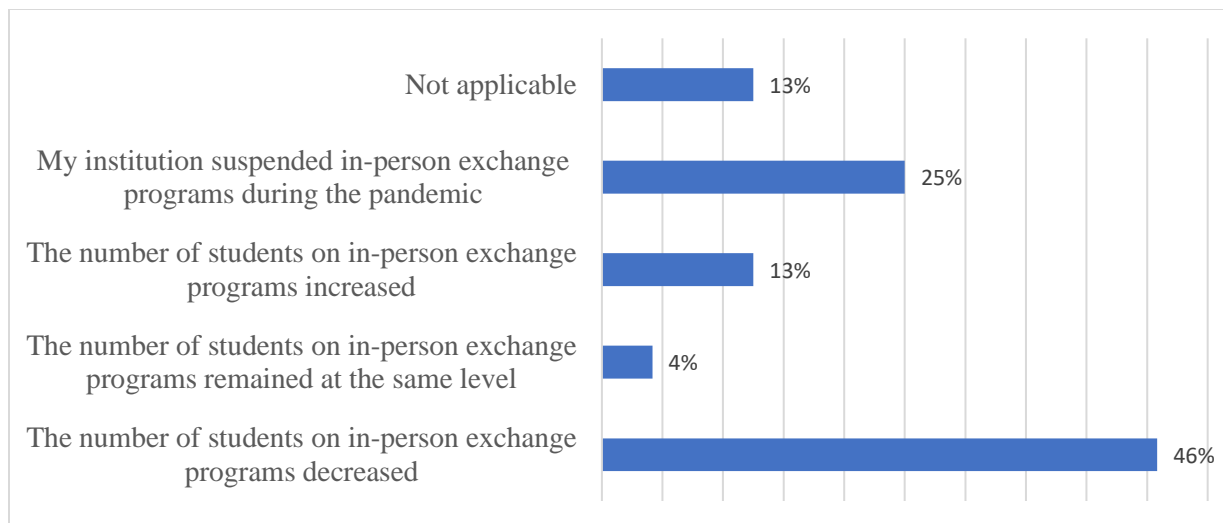


Figure 36: The impact of the pandemic on the number of students involved in in-person exchange programs

On a positive note, 38% and 30% of HEIs indicated that the pandemic had opened new opportunities for collaborations with overseas and regional institutions, respectively (see figures 35 and 37).

Some (4%) HEIs indicated that they were not in collaboration with other institutions, whether overseas or regional (see figures 35 and 37)

Figure 37 summarizes the impact of the pandemic on collaborations with regional institutions.

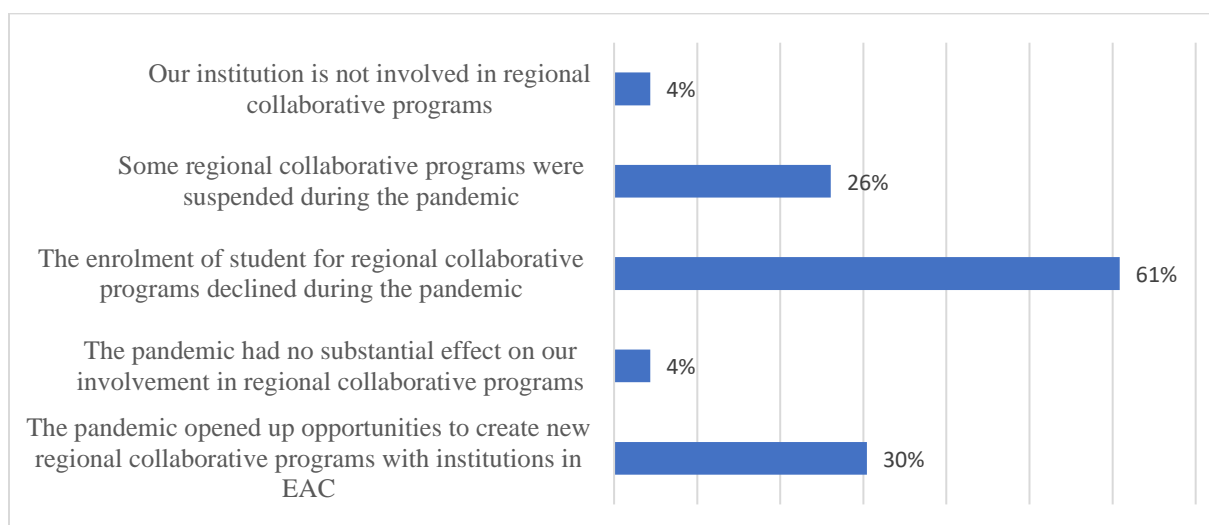


Figure 37: Effects of the pandemic on collaborations with institutions in the EAC region

3.8 The effects of the pandemic on HEIs' business incubation, business startups, and commercialization of business ideas

As a way of entrenching entrepreneurship among students, several HEIs in the region have started business incubation centres that serve as centres for business mentorship. The pandemic has not spared such centres. Figure 38 shows the various stages in business development that the centres sampled are involved in.

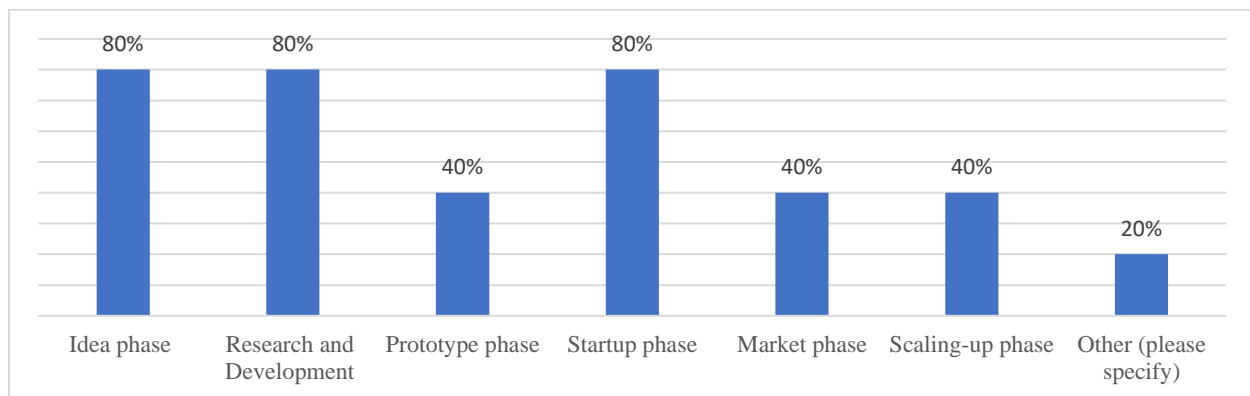


Figure 38: Various stages of business development that the centers are involved in

The pandemic has forced the HEIs' business incubation centres to conduct their activities virtually. Figure 39 shows the impact of the pandemic on the activities of the centres.

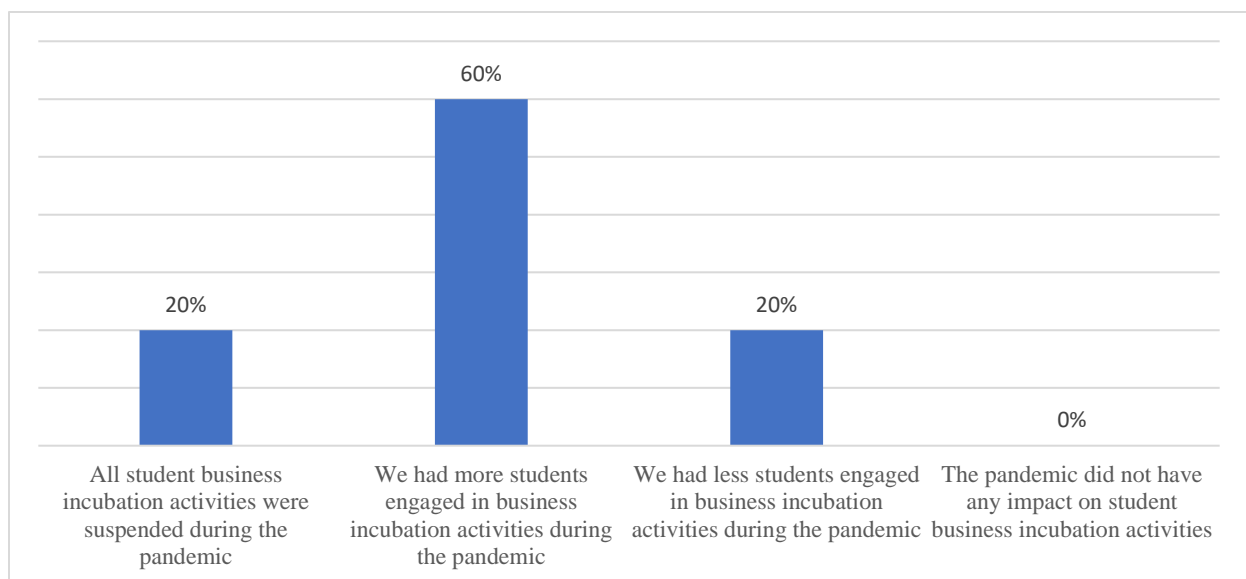


Figure 39: Impact of the pandemic on incubation activities

Whereas 20% of the incubation activities were suspended during the pandemic, 60% of the centres had more students involved in incubation activities during the pandemic than pre-COVID period.

Concerning the number of partnerships between the incubation centres and the industry, the data shown in Figure 40 demonstrates that most (60%) of the centers have witnessed a decrease in the number of partnerships signed with the industry. On the other hand, only 20% of the centres have witnessed an increase.

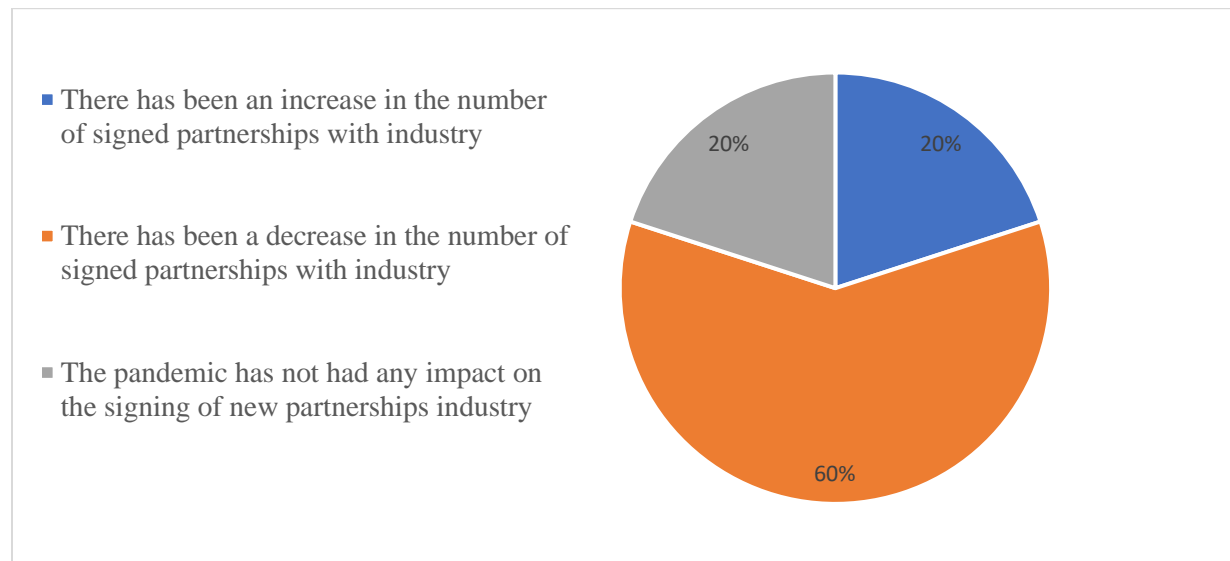


Figure 40: The impact of the pandemic on signed partnerships between incubation centers and the industry

Reduced partnerships between the business incubation centres and the industry have negatively impacted the number of student business ideas linked to the industry. As displayed in Figure 41, while 20% of the centers reported having managed to link student business ideas to the industry during the pandemic, 60% reported reduced linkage on the same during the same period.

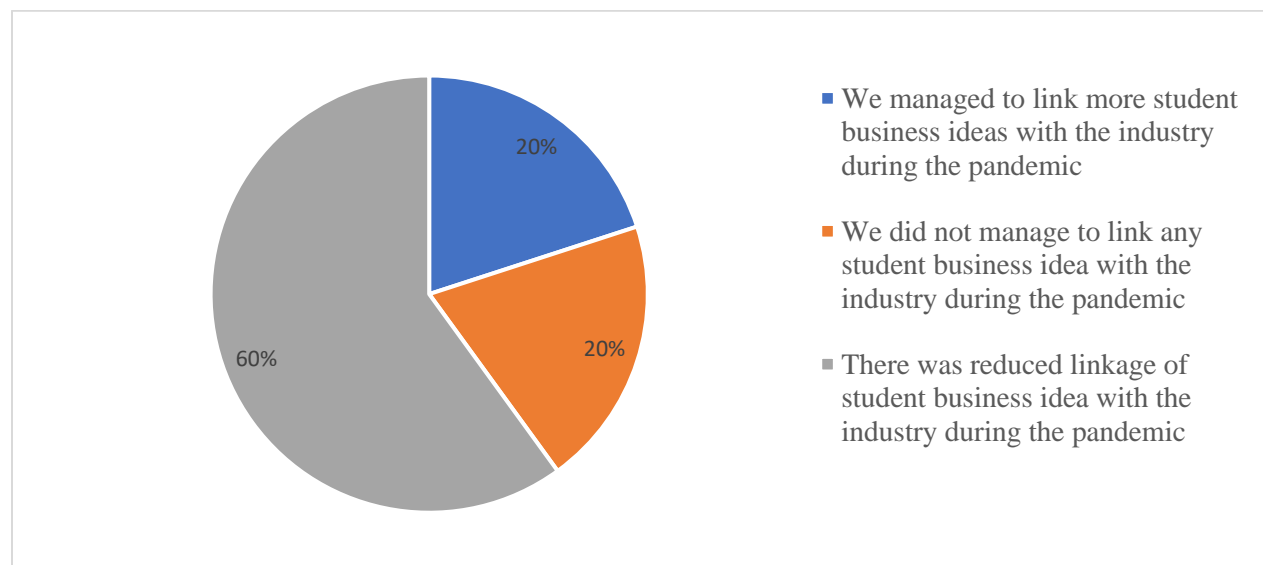


Figure 41: Impact of the pandemic on linking student business ideas to the industry

The pandemic impacted the commercialisation of student business ideas negatively. Most (80%) of the centres reported fewer student business ideas having been commercialized. On the other

hand, 20% of the centres reported the commercialization of more student business ideas during the same period (see Figure 42).

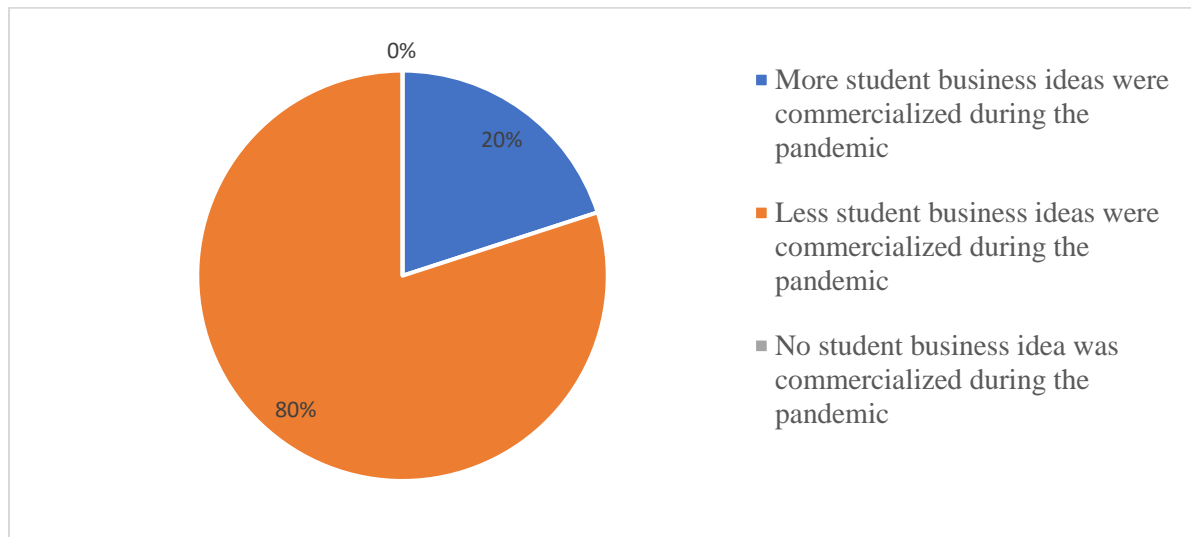


Figure 42: The impact of the pandemic on the commercialization of student business ideas

For most HEIs students, the prolonged closure of the institutions gave them (students) time to try out business ideas. The data captured in Figure 43 shows that 60% of the business incubation centers had more business startups during the pandemic.

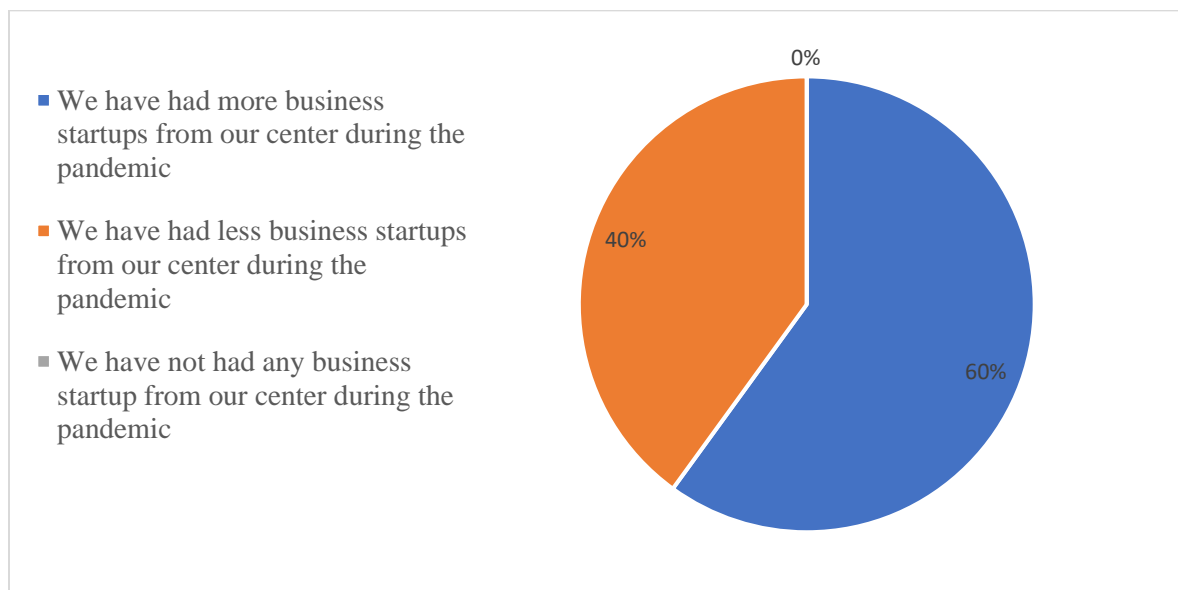


Figure 43: The impact of the pandemic on business startups

On the performance of the business incubation centres during the pandemic, the data reveals mixed fortunes. Forty percent (40%) of the centres recorded an increase in student business ideas, 20% recorded more external funding, 40% reported reduced internal funding, while another 40% recorded a reduction in business mentors willing to help students with their business ideas (see Figure 44).

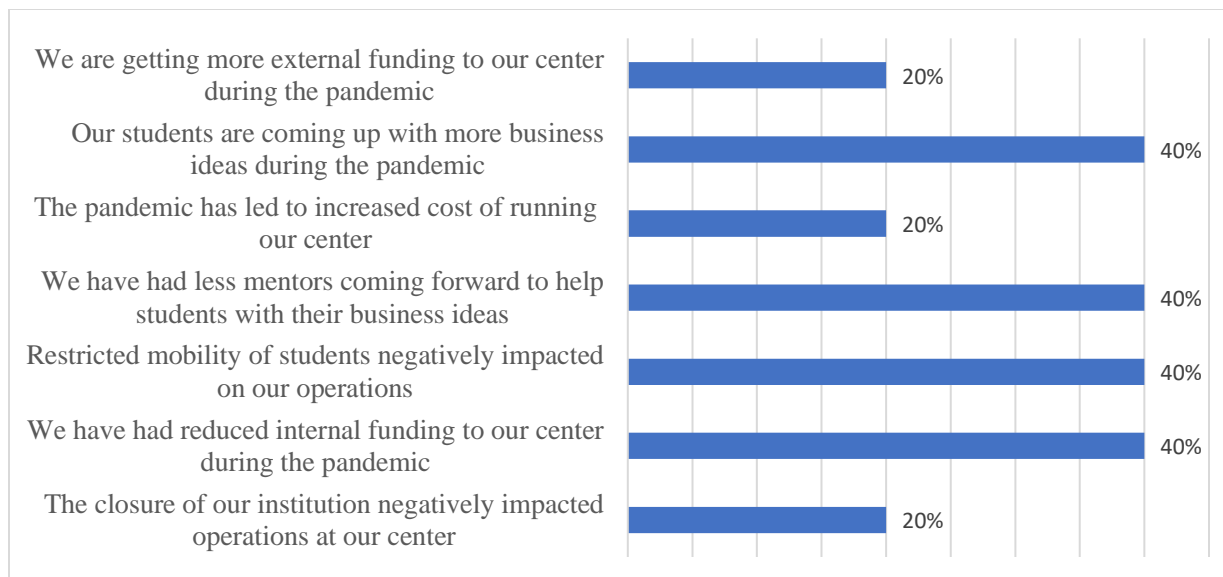


Figure 44: How the incubation centers have performed during the pandemic

There is a need for HEIs in East Africa to relook at their curricula towards incorporating entrepreneurship in the academic programs. As shown in Figure 45, 80% of the incubation coordinators would wish to see their HEIs seek more partnerships with corporate organizations. Other interventions that the incubation coordinators would wish to see their HEIs do are enhancing business enterprise among students, providing more funding to the centers, and developing business mentorship programs for students.

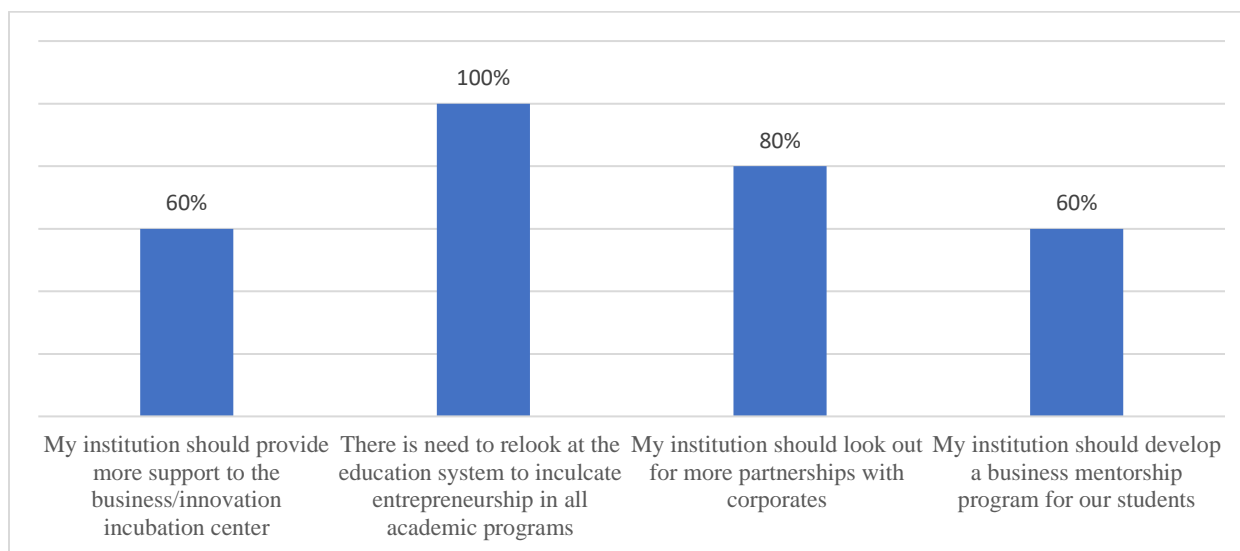


Figure 45: What business incubation center coordinators would wish to see their institutions do to enhance student entrepreneurship

4.0 IMPLICATIONS OF THE FINDINGS AND THE PROPOSED MITIGATION MEASURES

This study sought to determine the effects of the pandemic on the following:

- a) HEIs operations and their responses to the pandemic
- b) COVID-19 driven eLearning and inequity in access to quality education
- c) Research output
- d) Innovation
- e) HEIs-industry linkage
- f) HEIs collaborations
- g) HEIs' incubation, business startups, and commercialisation of business ideas.

Table 7 highlights the objectives and findings of the study, the implications of the findings, and the proposed mitigation measures. It is evident from the findings that the solutions to the effects of the COVID-19 pandemic with regard to HEIs will be multipronged and multisectoral.

Table 7: Study objectives & findings, Implications of findings, and proposed mitigation measures

Objective	Findings	Implications	Proposed mitigation measures
1) HEIs operations and their responses to the pandemic	Most HEIs in the region were caught unprepared to fight the effects of the pandemic	<ul style="list-style-type: none"> a) Several HEIs in the region are in financial distress and are unable to meet their financial obligations b) Several HEIs have either increased teaching load for teaching staff, allocated teaching load to non-teaching staff or both c) Several HEIs have instituted salary cuts d) The pandemic has exposed and or exacerbated mental health issues HEI students and workers 	<ul style="list-style-type: none"> a) Continued rationalization of HEIs operations to weed out non-core operations b) Encouraging HEIs to diversify their revenue streams c) Continued appeal to government and the international donor community to offer economic stimulus package to HEIs, especially private ones that largely rely on tuition to finance their budgets d) HEIs should invest in the provision of services to ensure timely handling of mental health issues among HEI community members
	With basic ICT infrastructure, several HEIs have transitioned their academic programs into eLearning	<ul style="list-style-type: none"> a) eLearning has been introduced without adequate quality assurance policies in place b) eLearning has created digital divide in terms of internet accessibility and ICT skills c) Digital divide arising from affordability of ICT gadgets d) Students in science-based programs requiring laboratory sessions have not 	<ul style="list-style-type: none"> a) HEIs should work towards the passing relevant standards and policy to safeguard the quality of education offered through eLearning b) HEIs should continue to equip both students and faculty with the necessary ICT skills to bridge the skills gap.

		<p>made as much academic progress as those who can be easily taught through eLearning.</p> <p>e) Transition into eLearning has opened the intensity of competition for HEIs students</p>	<p>c) HEIs should negotiate with suppliers of ICT gadgets to make sure that each student and faculty has access to adequate ICT gadgets to facilitate participation by all</p> <p>d) HEIs should negotiate with relevant government bodies and ministries to ensure wider internet coverage</p> <p>e) For the HEIs to survive the competition brought about by eLearning, there is a need for them to continuously improve on the quality of education</p>
2) COVID-19 driven eLearning and inequity in access to quality education	The pandemic has caused inequity in terms of access to education along social and gender lines	<p>a) Students from poorer backgrounds as well as those from rural areas with poor internet coverage have suffered more than those from richer backgrounds and with better internet coverage.</p> <p>b) Female students have had more disruption to their education than their male counterparts.</p> <p>c) Students in science-based programs requiring laboratory sessions have not been able to make as much academic progress as those that</p>	<p>a) HEIs should negotiate with internet providers to provide internet bundles to students and staff to bridge the social divide</p> <p>b) HEIs should continue to invest in better ICT systems to facilitate teaching and learning of science-based academic programs.</p>
3) HEIs' research and innovation	Restricted human mobility and reduced research funding due to the pandemic has had negative impact on research,	<p>a) The reduced research activities not only impede faculty academic progress and promotion but also affect the HEIs' ranking</p>	<p>a) HEIs need to allocate more funding for research</p> <p>b) HEIs should reduce workload for members of faculty involved in research</p>

	publication, and innovation among faculty and students	b) The reduced innovative ideas coming from HEIs have the impact of reducing the HEIs' relevance in providing solutions to societal challenges. c) Reduced research activities have the impact of slowing down students' pace of graduation and entry into the job market	c) HEIs need to organize more online conferences for dissemination of research findings d) There is need for researchers in HEIs to come up with practical innovative solutions to societal challenges to demystify the notion that HEIs engage in theoretical research that has very little relevance to challenges facing society. e) Researchers in HEIs should be encouraged to register their Intellectual Property Rights (IPRs)
4) Effects of the pandemic on HEIs-industry linkage	a) Most HEIs students have not been able to take their internships b) Most faculty have not been able to offer consultancy services to the industry c) Most faculty have not been able to invite industry experts into their classes as guest lecturers d) Most corporates have not been able to do exhibitions in HEIs	Disconnection between HEIs and the industry	a) Transition some of the internship programs into virtual mode b) Encourage continued interaction between the industry and HEIs through online guest lecturers c) Develop systems through which industry-HEI exhibitions can be conducted virtually
5) The effects of the pandemic	Most in-person regional collaborative programs have	Challenged progress in the integration of education system within the EAC region	Encourage HEIs to develop online collaborative initiatives among regional HEIs. Such initiatives

on HEIs collaborations	been suspended during the pandemic		have the added advantage of sharing the limited regional expertise
6) The effects of the pandemic on HEIs' incubation, business startups, and commercialisation of business ideas	<ul style="list-style-type: none"> a) There have been more students' business startups during the pandemic. b) There has been less linkage of students with business ideas to the industry during the pandemic c) There has been less commercialisation of students' business ideas. d) There has been less internal funding to business incubation centers 	Even though students are coming up with more business ideas during the pandemic, such ideas have lacked mentorship and funding, thus stifling entrepreneurship among students	<ul style="list-style-type: none"> a) Develop systems to ensure continued student enterprise mentorship during the pandemic b) Encourage business incubation centers to seek external funding outside of the already dwindling HEIs' funds

5.0 CONCLUSION

The COVID-19 pandemic has undoubtedly presented a challenge to most sectors of any economy. HEIs have particularly been hit by the pandemic. Most of the HEIs in the EAC region are in financial distress to the extent that some cannot meet their financial obligations. Some have implemented salary cuts and increased workload for their staff as a way of cutting costs to keep their institutions afloat. Amid the challenges, HEIs in the EAC region have shown remarkable resilience in that most of them successfully transitioned into eLearning with basic ICT infrastructure.

The pandemic has caused or exposed several inequities in terms of access to quality education. These inequities are along socio-economic as well as gender lines. The COVID-19 driven eLearning has also caused several divides, including digital ones - access to the internet, affordability of ICT gadgets, and ICT skills. Mitigation measures taken by the government, HEIs, or any other body to address the negative impact of the pandemic should consider the social, gender, and digital divides created by the pandemic.

The pandemic has had a negative impact on HEIs' research activities mainly because of restricted human movement and reduced research funding. The reduced research activities have an implication on HEI rankings. Collaborative initiatives with both the industry and other institutions of higher learning have also been negatively impacted by the pandemic. Reduced collaborations between HEIs and the industry have the implication of continued isolation of the two sectors, which ordinarily should have a symbiotic relationship if each is to play its rightful role in national development.

On a positive note, the pandemic has seen an increase in the number of HEIs students venturing into business. Unfortunately, the pandemic has also led to a reduction in the number of students' business ideas being linked with the industry. At the same time, due to the pandemic, there has been a reduction in the internal funding of business incubation centres and in the number of business mentors willing to help students develop their business ideas.

It is apparent that HEIs will require support in all the areas that this study focussed on, namely research and innovation, collaborative initiatives with the industry and other institutions, the inequities that the pandemic has created, and students' business enterprises, among others.

REFERENCES

- Agyapong, e. a. (2020). *Learning in Crisis: COVID-19 pandemic response and lessons for students*,. Africa: Education Sub-saharan Africa.
- Agyapong, S; Asare, S; Essah, P; Heady, L; Munday, G. (2020). *Learning in Crisis: COVID-19 Pandemic response and lessons for students, faculty and Vice Chancellors in Sub-Saharan Africa*. Education Sub-Saharan Africa (ESSA).
- Faraj, G. (2020). *COVID-19 in-depth Analysis*. Retrieved from Accord:
<https://www.accord.org.za/analysis/the-impact-of-covid-19-on-universities-in-africa/>
- IAU. (2020). *The impact of Covid-19 on higher education around the world*. Paris, France: International Association of Universities.
- IMF. (2020, August 6). *IMF NEWS*. Retrieved from IMF:
<https://www.imf.org/en/News/Articles/2020/08/06/na080620-rwanda-harnesses-technology-to-fight-covid-19-drive-recovery>
- International Association of Universities. (2020). *The impact of Covid-19 on higher education around the world*. Paris, France: International Association of Universities.
- IUCEA. (2021). *The impact of COVID-19 on Higher Education, Its Business Implications and Proposed Recovery Strategy*. Unpublished Report: IUCEA.
- Jensen, T. e. (2021). IAU Global Survey on Impact of COVID-19 on Higher Education around the World. *The 1st International Conference on Open, Distance, and eLearning* (p. 6). Nairobi, Kenya: Daystar.
- Kenya Education Network. (2022, January 14). *KENET SUPPORT FOR RESEARCH AND EDUCATION DURING COVID-19*. Retrieved from Kenet: <https://www.kenet.or.ke/covid-19-support>
- Makerere University. (2020, September 2-8). *The Observer*. Retrieved from Makerere University:
<https://rif.mak.ac.ug/wp-content/uploads/2020/09/Mak-RIF-in-the-Observer.pdf>
- Makerere University. (2022, January 14). *A Collaborative Effort spearheading the Development of an Open Design Low Cost Ventilator*. Retrieved from Corona Resource Centre Makerere University:
<https://coronavirus.mak.ac.ug/articles/20200315/collaborative-effort-spearheading-development-open-design-low-cost-ventilator>
- Mawazo Institute. (2020). *The Impact of COVID-19 on Africa's Higher Education System*. Nairobi, Kenya: Mawazo Institute. Retrieved from <https://mawazoinstitute.org/publications>
- Miliszewska, I. (2007). The Case of Fully-Online Provision of Transnational Education. *Journal of Information Technology Education* , 514. Retrieved from
<https://jite.org/documents/Vol6/JITeV6p499-514Miliszewska261.pdf>
- Moeti. (2020, October 29). *Reliefweb*. Retrieved from Reliefweb:
<https://reliefweb.int/report/world/covid-19-spurs-health-innovation-africa>
- Mohamedbhai, G. (2020, April 9). *University World News*. Retrieved from Africa Edition:
<https://www.universityworldnews.com/post.php?story=20200407064850279>

- Mtebe. (2021). Virtualization of science education: A lesson from the COVID-19 pandemic. *Journal of Learning and Development*, 383 -397.
- Mtebe, F. e. (2021). COVID-19 and Technology Enhance Teaching in Higher Education in Sub-Saharan Africa. *Journal of Learning for Development*, 8(2), 383 -397.
- Muoki, C. (2020, May 8). *KNH*. Retrieved from Kenya News Agency:
<https://www.kenyanews.go.ke/jkuat-unveils-innovations-to-fight-covid-19/>
- Nairobi Garage. (2020, April 28). *Nairobi Garage*. Retrieved from Nairobi Garage:
<https://nairobigarage.com/the-great-covid-19-innovation-challenge-kenya/>
- Nawangwe. (2021). *Reflections on University Education in Uganda and the COVID-19 Pandemic Shock: Responses and Lessons Learned*. Michigan: Michigan State University Press.
- Nshimiye. (2020, October 23). *University of Rwanda*. Retrieved from University of Rwanda carries on online teaching services despite lockdown: <https://ur.ac.rw/?UR-carries-on-online-teaching-services-despite-lockdown-over-COVID-19>
- Pravat. (2020). Impact of COVID-19 pandemic on education in India. *International Journal of Advanced Education and Research*, 31(46), 142-149.
- Segun, O. (2021, February 4). *Africa Edition*. Retrieved from University World News:
<https://www.universityworldnews.com/post.php?story=20210201045446705>
- Shazia, a. S. (2020). Impact of COVID-19 on Higher Education and Research. *Indian Journal of Human Development*, 10. Retrieved from doi:<https://doi.org/10.1177/0973703020946700>
- Srivastava, R. &. (2020). Virtualization of science education: A lesson from the COVID-19 pandemic. *Journal of Proteins and Proteomics*, 77-80.
- UNESCO. (2020, June 3). *UNESCO*. Retrieved from COVID-19:
<https://en.unesco.org/covid19/educationresponse>
- University of Ghana. (2020, April 11). *University of Ghana*. Retrieved from University of Ghana:
<https://www.ug.edu.gh/news/news-release-university-ghana-scientists-sequence-genomes-novel-coronavirus>
- Uwizeyimana. (2021). *The University of Rwanda response to COVID-19*. Kampala, Uganda: Research-publishing.net.
- Waithima, A., Kuria, J., Ayoo, P., Agyapong, S., Karau, J., Eglantine, J., & Waithima, C. (2021). COVID-19 Driven eLearning: The Digital Divide's Impact on Access and Quality in EAC. *The 1st International Conference on Open, Distance, and eLearning*. Nairobi, Kenya: Daystar University.
- Waithima, A., Kuria, J., Ayoo, P., Agyapong, S., Karau, J., Eglantine, J., & Waithima, C. (2021). COVID-19 Driven eLearning: The Digital Divide's Impact on Access and Quality in EAC. *The 1st International Conference on Open, Distance, and eLearning*. Nairobi, Kenya: Daystar University.
- World Health Organization. (2020, October 29). *RW COVID-19*. Retrieved from Reliefweb:
<https://reliefweb.int/report/world/covid-19-spurs-health-innovation-africa>



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