

# Exploratory Investigation for Some Universities' E-Learning Systems during Covid-19 Pandemic

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## Abstract

COVID pandemic has reshaped the world as it has been known to us and the education system is one of the most affected by it. Due to social distancing, quarantines and isolations have made it impossible for the knowledge transition to the masses using conventional methods. For cope with pandemic, the only other way available for some of the fortunate countries is the use of E-learning having somewhat the same traditional teaching method. This paper is concerned with the study of the preparedness of the learning system in some Sudanese universities due to the impact of the COVID-19 pandemic. Critical analysis has been performed to evaluate the current developing scenario, usage of the facilities available in open-source platforms, and the interaction of the universities folks with e-learning systems. The impact of such measures has been thoroughly investigated in this

paper for Sudan which is already deprived of a proper education system. The investigation shows that the interact of the staff and the students with the system was acceptable where more than 85% of those enrolled to the system were interact properly and efficiently. The lecturers conducted through the platform were attended with more than 75% of the students. We also found that most of the lecturer were avoid to exam students by utilize the platform; where only 45% of the uploaded courses were conducted exams over Moodle platform. As Moodle is an open source and still need to be improved to be used for high examination credibility.

## Keywords:

*COVID-19, E-learning, Information Technology, Assessment methods, social media*

## I. INTRODUCTION

The coronavirus (COVID-19) outbreak is unquestionably going to have a lasting mental and emotional influence on health workers [1-3]. Actions are needed to mitigate the impacts of COVID-19 on mental health through the protection and promotion of employees' psychological health during and after the epidemic. Effective assessment and recognition of COVID-19, which should be reflected in promoting a better health system through community engagement, are of great significance for Sudanese [4].

Many countries are evaluated for their perspective on the COVID-19 pandemic. Some of the main reasons making the African continent one of the most exposed to the global pandemic include an elevated prevalence of infections, weaker health services, hunger, and general flu at the onset of the winter season in South Africa. 22 of the 25 countries that are most sensitive to infectious diseases include the African region, as per the Infectious Disease Vulnerability Index (IDVI) 2016 [5]. Whom Africa reported that infected people in Africa for HIV 26 million, tuberculosis 2.5 million, hepatitis B or hepatitis C 71 million, and malaria 213 million in Africa [6].

Some of Africa's main health-related issues are the lack of testing capability and the necessity for skilled personnel for diagnostics as well as having fewer emergency facilities with inadequate ventilation considered necessary to accommodate serious COVID-19 cases [7-8]. Furthermore, a lack of personal protective equipment (PPE), and the lack of funds for healthcare workers are other important area that needs to be evaluated and improved.

The global economic instability triggered by Covid 19 has particularly affected poorer countries, particularly in Africa, driving an estimated 100 million people into severe economic suffering in 2020 and undoing the 20-year progress made towards restoring economic stability [9]. The economic implications for Africa due to the COVID-19 pandemic using the Nigerian economy as a case study presented. Following the IMF, Oxfam International also predicted in its 2020 survey that the COVID-19 pandemic will plunge half a billion people in Nigeria into poverty [10-11]. Government health expenditure in many

African countries is relatively limited.

The COVID-19 outbreak governments entail considerable additional expenses. Decreased economic growth may have a significant impact on the government's wealth generation, in particular on fiscal revenues (both direct and indirect taxes) [12]. Even with constrained public funds, the effects of crowding can arise as excessive funding on public well-being to resolve the COVID-19 global epidemic may lower financing for other serious public health concerns, such as malnutrition and bacterial infections.

Recent research conducted explored the involvement of academic libraries in teaching curriculum design of African Nigerian universities as a consequence of the COVID-19 outbreak and in emerging technological modifications [13]. The designing and adaptation of an interactive library website are recognized as the best measures to protect bookkeeping in Nigeria in the context of the significant changes in teaching methods following COVID-19 [14] and adopting the integrated librarian paradigm and utilization of social media platforms as a possible maneuver for long-distance learning due to current scenario.

## II. RELATED WORKS

E-learning initiatives throughout the developing world needed to be established. In Sudan, the e-learning program is still in its development stages. It continues to grow its Internet access levels and accessibility. Although, it is necessary to increase both the standard of students' and professors' awareness and capability [15]. The achievement of the National University of Sudan in implementing a comprehensive e-learning management framework for all college courses, such as the pharmaceutical and medical laboratory, shows that a great deal can be achieved through careful planning and firm commitment [16]. Many universities, including the National University of Sudan, have yet to leverage the lucrative side of e-learning.

Students of the National University of Sudan believed that they have the required knowledge and resources to accommodate E-learning service, although a survey conducted also illustrated that there was hesitation on the matter of resources (Add

Presentation reference here). A study is done with the assistance of medical students at the Faculty of Medicine in the Gezira University of Sudan performed from 10 to 25 May 2020 with an online based questionnaire designed to understand the best action to deal with the current closure of educational institutions [17]. The results suggested that the majority of the students prefer university closure and termed it as a critical judgment to manage COVID-19 infection transmission while 64% regarded E-learning as the safest option during the pandemic [18]. A similar study is also done in Uganda at Makerere University with the same approach of survey i.e., an online questionnaire. The results showed that out of 221 participants approximately 50% perceived E-learning to decrease the standard of transmitted information.

Beginning in the second semester of the 2020-2021 academic year, Napata College used Moodle as an E-learning tool for education purposes in five academic programs that include surgery, dentistry, medicine, medical laboratories, and nursing having 160 staff members participating in online teaching [19]. Over the 14-week duration of each term, each teacher is observed by the number of times and duration of online lectures, as well as events including activities, debates, quizzes, tasks, and so on, which are all computed automatically. Students are also asked to fill out a student-staff feedback survey. The elements on the survey are afterward rated on a five-point Likert scale. Students demonstrated considerably higher levels of satisfaction with online classes than with face-to-face learning, and their academic performance improved substantially [20-21].

Although, there is attraction towards E-learning, and another research found that several Malaysian universities even can provide the technology to conduct online teaching, at the same time the finding shows that certain students met with hindrances studying at multiple universities because they live in the countryside and depend on their cell phones for accessing the Internet [22].

Furthermore, the physiological side effects of the pandemic are much more significant than the materialistic consequences, around 72.9% of participants accepted that their mental state is compromised due to the lockdown even with E-learning [23]. Multiple solutions are provided to tackle many of the new emerging problems associated with E-Learning most

prominently face-to-face support [10], still, there are many obstacles before this form of education transmission can be made universal. Nuha and Nizar [24] provided a timely map of the intra-period higher education reactions to COVID-19 throughout eleven universities.

The study achieved that the higher education institution's reaction through social separation policies on site and fast syllabus re-development for entirely online teaching. The study found that there are important prospects to study from the educational changes of other institutes [25]. The paper also dealt with the reality of e-learning in Sudan for some Sudanese education institutions and addressed the recommendations that led to the study.

The typical classes require less modification than tutorials or Labs as the classes still comprise the same acquainted mechanisms of "talk and chalk". A tutorial would, normally, requires a higher level of communication between instructor and students including a larger broad dissertation and small group work but is still attainable over changing the current components to suitable technology materials being utilized. Lab depends on the focus area, may well show to be impracticable, or requires advanced out-of-the-box solutions that may comprise multiple technology components [26]. The nonattendance of visual and perceptible indications causes more constrained interaction with the tutors providing the tutorial activities having the extra burden of trying to get the student to talk and cooperate online.

Ian in [27] discovers the influences required to make the evolution to supporting students' online classes straightforward. Ifijeh and Yusuf [28], studied the goal of the academic public library in developing model change in education procedures in Nigerian institutes because of the epidemic of COVID-19. It x-rayed the existing worldwide movements in online teaching and the important roles that libraries can perform. Receptive library website adoption and design, implementation of mixed librarianships design, and usage of social networks among others were recognized as best practices to implement and secure a role for Nigeria's libraries in the face of the distinguished transformation in education procedures after COVID-19 [29].

This article suggested vitality in libraries services delivery, and earnestness in the innovative expertise sets acquired by Nigerian academic librarians, while also working on appropriate

stakeholders and investors to offer suitable funding schemes for libraries to be capable to arrange appropriate ICT infrastructure desired to sufficiently support virtual learning and education environment. Gismalla et al., [30] assessed medicinal students' observations regarding employing virtual e-learning during the pandemic of COVID-19 and to highpoint complications of adopting virtual teaching in medical institutes for instance scarcity of setting resources.

### III. THE METHODOLOGIES

For this research, two methodologies are used, the first is a survey, which is conducted for comprised of a questionnaire aimed at understanding the extent of the application used in the

distance education system of Sudanese universities in the light of the Corona pandemic [31]. This questionnaire is designed to assist in the collection of data necessary for the evaluation process. The second method is to evaluate the activity of the Sudanese researchers, and student and staff engagement through online E-learning. The Sudanese research and education network (SudREN) provides internet services for online searching and education needs in Sudan. The SudREN has 100 members distributed in Sudan and the data rate reached more than 600Mbps in 2017 through fiber optic communications, as shown in figure 1. SudREN enables open access to scientific journals, making video conferences, and digital libraries integration.

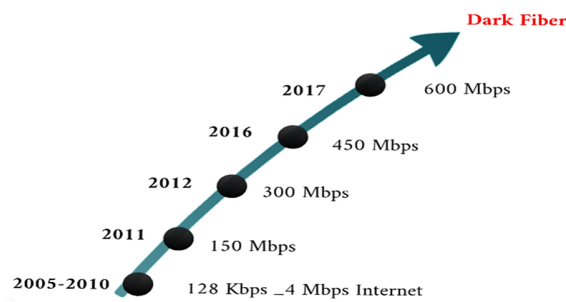


Figure 1. Sudanese research and education network (SudREN) Internet bandwidth Allocation

For the questionnaire, a total of 9 university individuals participated in the study as shown in Figure 2, out of which most of the participants who took part in the survey were from the University of Khartoum (UofK), Omdurman Islamic University (OIU), University of Medical Science and Technology (UMST) and Sudan University of Science and Technology (SUST). A

large percentage of the participants belonged to engineering, medical, and business administration colleges/ departments. Most of the participating students were between the start and almost half of their respective academic programs i.e., second academic level, third academic level, and fourth academic level, as shown in Figure 3.

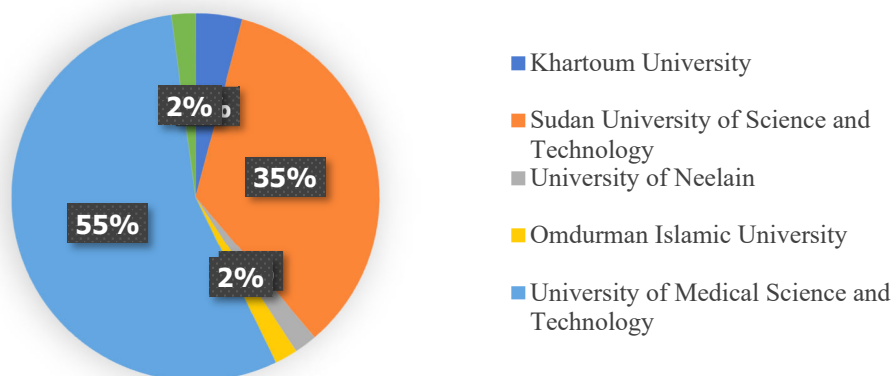


Figure 2: Universities participating in the sample study

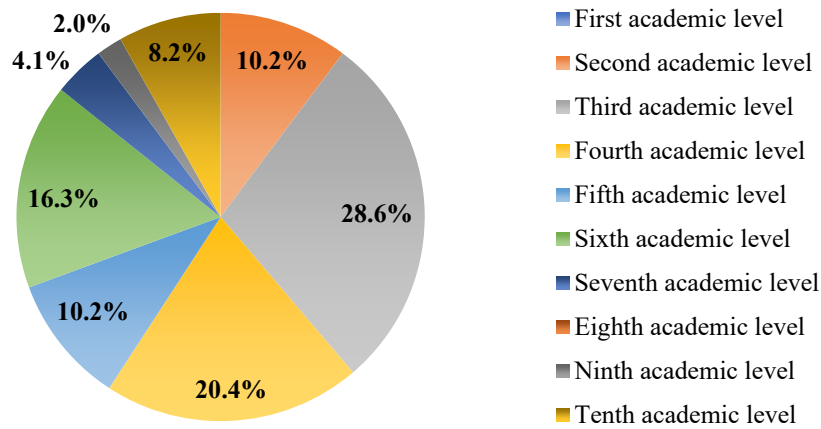


Figure 3: Academic level of Participating students

The survey included more male participants than female participants, as shown in Figure 4. Most of whom were between 20 and 23 years of age. The majority of the participants of the sample study about 98% were living in the Khartoum State (77.6%) and Red Sea State (20.4%). It is well known that the

results of the survey can be highly influenced by the device used by the participants due to the technology used in it. Therefore, to mitigate the ambiguity in the survey, the user is inquired about the device they were using or the most used device at the time of participation [32].

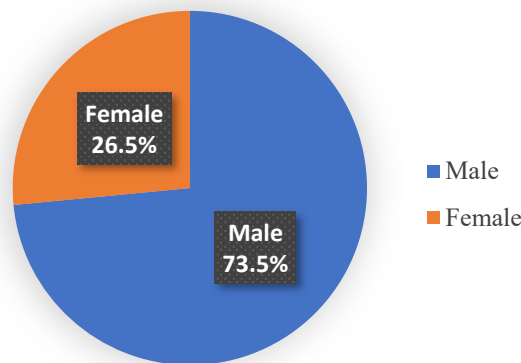


Figure 4: Gender distribution of the sample

#### IV. RESULTS AND ANALYSIS

According to these methodologies, the results will take place in two categories, questionnaire, and SudREN analysis.

##### A. A Survey

The survey showed that most of the participating individuals use mobile phones (75.5%) to access the internet and through laptops (only 20.4%) as shown in figure 5. The amazing trend

that is discovered in the survey is that the use of a desktop computer or PC (4.1%) is declining and most of the internet-related work is done on portable devices which don't require sitting on a chair behind a desk.

Most of the participants, agreed more or less that they had a positive experience in using their communication device to access the internet. Although the device showed no problem the majority of the participants were not satisfied or very less

satisfied with the internet speed available to them. Out of 49, only 6 participants acknowledge that they have good internet speed. Participants also reported having bad connection during telecommunication, although this trend is inconsistent in all participants, the reason is the location from where they access the internet and more importantly the time of access as there is high usage of internet traffic during certain hours of the day and

it also has increased in recent days due to the pandemic. The other problem common among the participants was the interruptions in internet connection encountered during remote lectures, an astounding 41 participants indicated this as a problem, and 24 of them fully agree that this is a matter of concern as shown in figure 6.

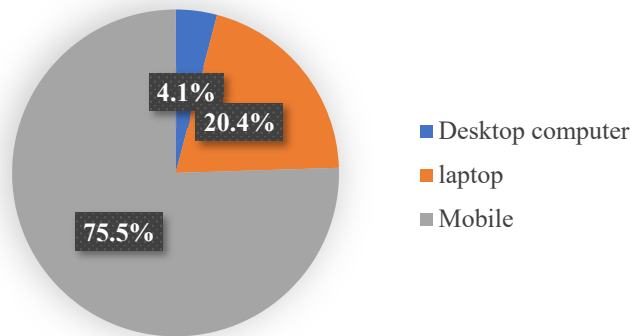


Figure 5: Device preference on accessing the internet

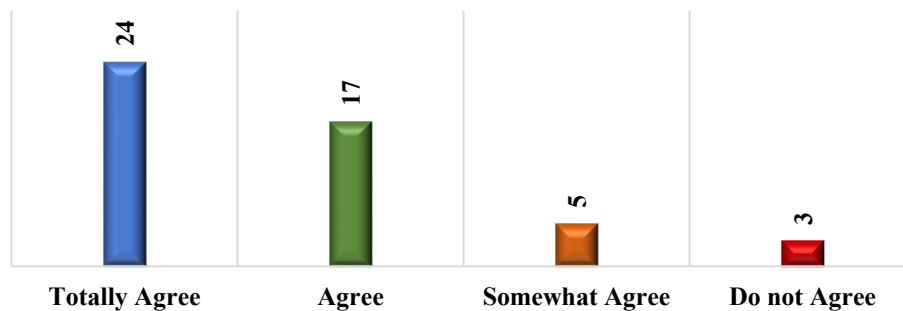


Figure 6: The internet connection drops during remote lectures poll

The 400 participants agreed that in comparison to their family income, the internet is expensive. Through this survey, another astonishing fact emerged that aside from the internet connection, all of the participants with exception of 2 do not even have constant electricity in their homes, which in present times is a nightmare because most of the newest equipment's/appliances needs electricity to run. University closure and online lectures due to the pandemic, most of the participants have to self-study to maintain their learning curve in their respective disciplines.

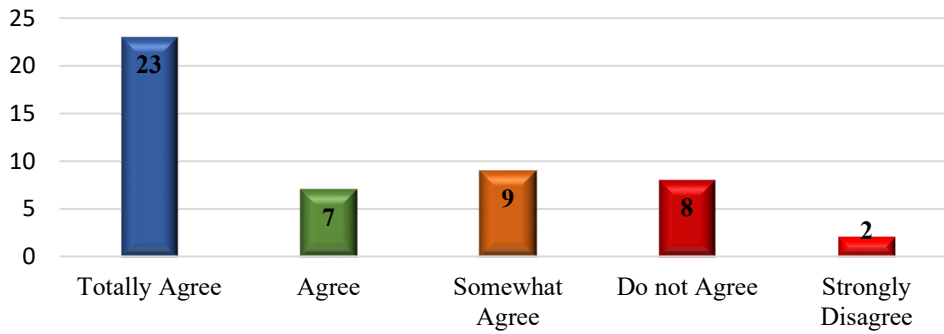


Figure 7: Negative physiological effect on students

The pandemic negatively affected the physiological well-being of the individuals described in the survey, as 23 of the participants were 100 % sure that they were affected by the pandemic, while 16 believed that they were somewhat affected by the pandemic as shown in figure 7. There was obscure consensus across the board among the participants on whether to open the universities with SOPs or not however, the trend has also shown that it is weighing toward the opening of universities with distance protocol under the specified SOPs.

The reason is genuine and mostly due to the tuition fees they pay even after the university is closed, thus reducing the effectiveness and increasing the cost-to-benefit ratio. The parents are ready to modify their lifestyle and the surrounding environment for the sake of their children so that they can receive online lectures in the most optimal condition. Although there were some discrepancies found, which reasons are from economics to the unwillingness to change their smooth living lifestyle.

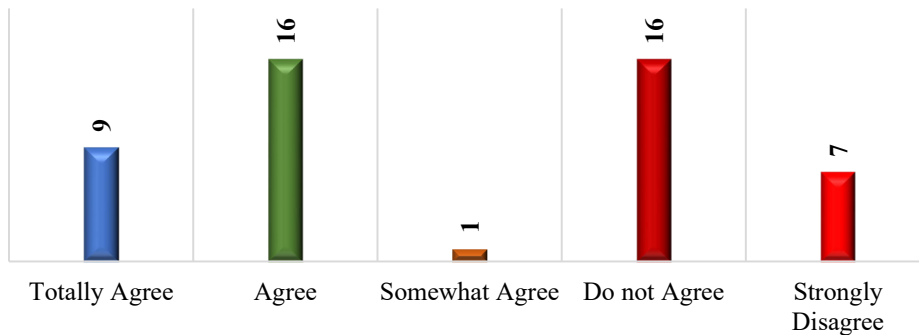


Figure 8: Degree of occurrences where students have attended online classes poll

The sample of the study consisted of both types of participants who are taking online courses for the first time (23 participants) and who have at least experienced it once (26 participants). The majority of the participants (37 participants) reported that they don't have an online e-learning system in place at their respective universities and the system can cause errors on its first run.

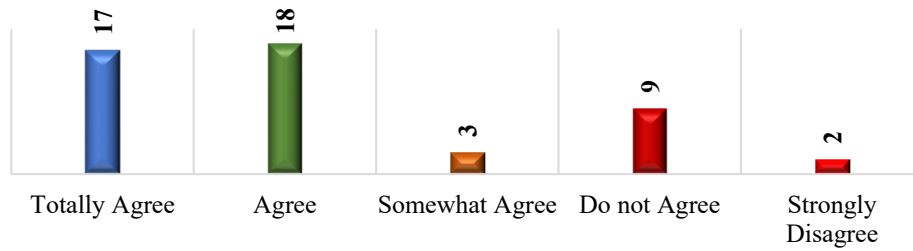


Figure 9: Record lecture capability in e-learning

The foremost advantage of e-learning as recognized by the 38 participants is the ability to save the lectures given by professors for offline reference, although they also observed that there is significance in learning through this method as compared to the traditional way. 33 participants believed that e-learning has reduced their studying and learning capacity as compared to their customary practices because it is a new way and neither the teacher nor the student is fully capable of using such a system to its maximum potential. Participants acknowledged that they could get in touch with the professor through email but also find it hard to have smooth contact with the professor for feedback or questions related to the subject.

On the other hand, the teaching faculty find it quite easy to get

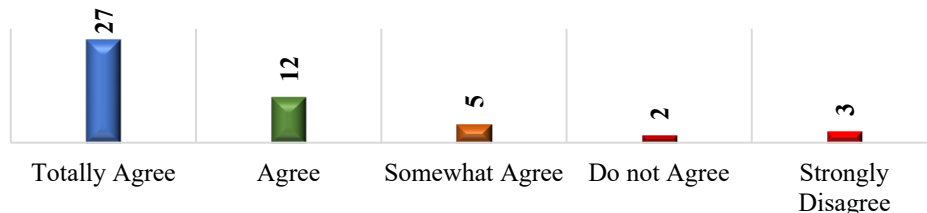


Figure 10: Consensus on allowing examination in university halls with SOPs

The proposal that students should at least be allowed to take their exams in university halls rather than online has been fully recognized by 27 participants while 17 participants agree with it but are skeptical about it because of the protocols that would be followed as safety precautions during the examination (see

**B. SudREN Analysis**

The online academic staff, researcher, and student activity through online access are shown in the following figures. Figure 11 shows the number of interactions that take place online access.

in contact with students either through email or mobile phone because they can transmit messages whenever they find a student’s feedback email at the time of their choosing and for obvious reasons, students need to be vigilant of any information relayed by the professors. during the implementation of the distance education system, the majority believed that it would be difficult to transfer from the traditional system and that many challenges needed to be faced. Similarly, the majority of participants also believed that if there is going to be a lockdown and closure of universities then at least students would be permitted to take their exams in university halls rather than online.

figure 10), whereas only 5 participants expressed their dissatisfaction of this proposal and prefer to opt for digital examination. This is a legitimate request by the respondents as no matter how much the home surrounding is modified, it can never replace the examination environment and its atmosphere. All the universities used the open-source Moodle platform, as can be shown from the figure that the number of exams conducted successfully was about 45% of the whole uploaded and about 90% of the courses conducted in the Moodle system.



The record of university programs, courses, and classroom online engagements is shown in Figure 12. The Figure also verifies that the growth of the courses in the universities under study is too higher than the available classrooms, which will lead shortly to a scarcity of class resources.

And the record of academic staff and students' online engagements is shown in Figure 13. This figure shows the academic staff rate to the students' number is less than 0.01

which is considered very weak compared to the standard (i.e., ABET) that specified by about 0.2. This is also an indicator of the need for online courses that may relax this rate due to the ease of communication/consultations between the students and the staff. The figure also shows that the students that enrolled in the Moodle system are still less than 20% of the total students, this can be justified due to more Moodle training being needed for the academic staff, especially for humanities-related faculties.

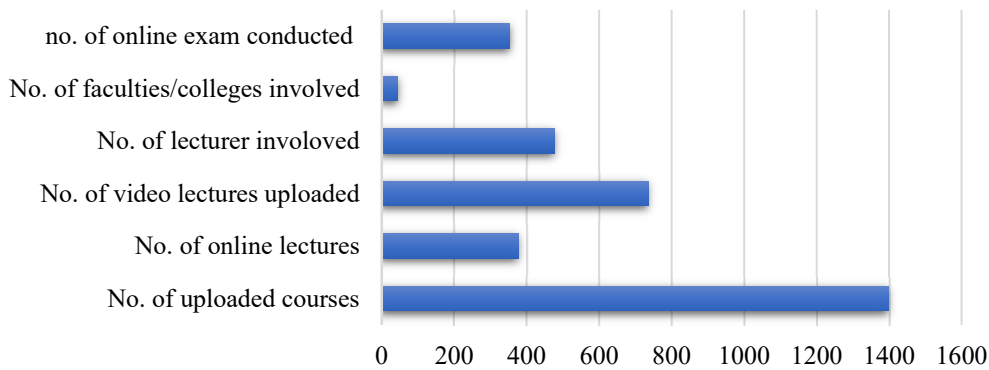


Figure 11. Record online Involvements

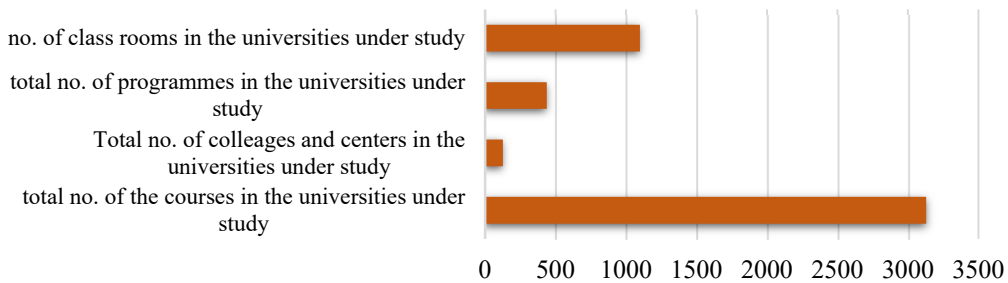


Figure 12. Record university Programs, Courses, and classrooms Online Engagements

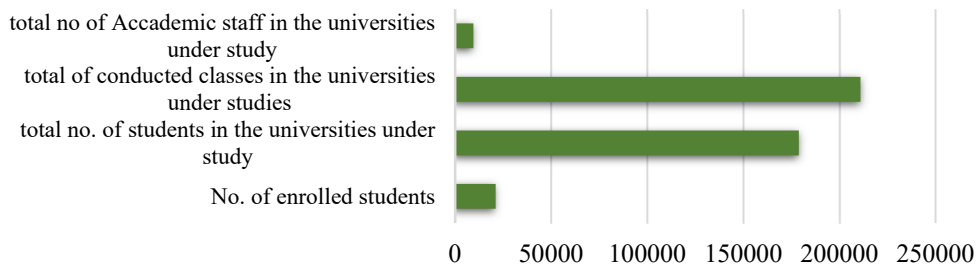


Figure 13. Record Academic Staff and Students' Online Engagements

## V. CONCLUSION

Technology is vital to maintaining that everybody is socially educated, working from home, and keeping entertained in the continued lockdown due to the COVID-19 disease outbreak. Although there are some drawbacks as this system is being implemented on such a scale for the first time such as electricity and internet speed and traffic issues which makes it impossible to ever pay attention or attend the lecture. These barriers can be mitigated through suggestions and learning from regions where it is already implemented. For example, instead of live online lectures, they can be recorded offline and then sent to the students to be watched whenever their surrounding situation allows them to (within a possible period proposed by the teacher). Similarly, courses can be developed so teachers can be trained and have a clear understanding of how to use the app. Also, to increase interaction during lectures Universities can launch their servers and operate them on their sites, this will enable each student registered on the site to enter and view the courses.

Whatever the case all citizens must be digitally educated and rely on technology. By necessity, it is important to sustain this optimism and to focus on all developments during the lockdown for the future in terms of E-learning transformation. This will allow the work to be continuously transformed. While the impact of coronavirus continues to be felt from both a psychological, economic, and social point of view, the World Bank is actively collaborating with dozens of ministries of education from different countries to offer support to their efforts towards improving access to education. With the developing E-learning technologies, universities are challenged to become more innovative in producing and preparing individuals that are sufficiently and adequately equipped to function in the evolving global job market.

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