Immediate Actions to Minimize the Impact of COVID-19 on Education

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Abstract— *The coronavirus impact has created the most significant collapse of global education in history. The closure of schools and other learning institutes has impacted the vast majority of the students, especially in low and lower-middle-income countries—the crisis exacerbates conventional education systems' disparities by reducing many opportunities for most students. The technical, engineering, and technology stream students face severe challenges due to a lack of practical experiences, field visits, and laboratory experiments to gain their knowledge through physical involvement. Moreover, international students' mobility has been totally on hold due to the prevailing situation. On the other hand, the crisis has stimulated innovations and inventions within the technology field. The possibility of starting a physical educational system, improving classroom facilities, and necessary immediate & vulnerable actions to accelerate the lessons delivering efficiency to all students are discussed. Some of the recommendations are significant to address as soon as possible to prevent a learning crisis without creating a generation catastrophe.*

Keywords— *Corona Pandemic, Educational Impact, Technologies, Online Learning, University Education.*

I. INTRODUCTION

On December 29, 2019, four people with pneumonia were admitted to a hospital in Wuhan, and all four were identified as having worked in the Huanan Seafood Wholesale Market. The hospital reported the incident to the Local Center for Disease Control (CDC), where CDC investigators found additional patients connected to the market, and on December 30, Hubei Province health authorities reported the bunch to the CDC in China [1]. As of January 2020, 201 cases of pneumonia have been confirmed in China. A professional team from the National Health Commission and the China CDC conducted epidemiological and etiological tests. On January 3, 2020, scientists at the National Institute of Viral Disease Control and Prevention (IVDC) identified the first complete genome of the novel β genus coronaviruses (2019-nCoVs) from bronchoalveolar lavage fluid (BALF) samples

taken from a patient. Based on the result of a combination of Sanger sequencing, Illumina sequencing, and nano pore sequencing, Three specific strains have been identified [2]. This sequence was submitted to the Global Initiative on Sharing Avian flu Data (GISAID) (accession number EPI_ISL_402124).The novel coronavirus 2019 (2019-nCoV) was named by the World Health Organization (WHO) on January 12, 2020 [3], and was officially designated on February 11, 2020, by the WHO as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [4].

The death toll from SARS-CoV-2 continues to rise. The virus is transmitted mainly by the inhalation of respiratory droplets. Fever is considered the first sign of this respiratory illness. Most COVID-19 patients have a series of minor illnesses coursing several episodes; Moreover, it causes a severe illness with a 20% higher risk of death and is associated with aging and immunosuppressant [5]. As a result, the mortality rate from the disease is considerably increased. Also, the disease has been characterized by a mean incubation period of 5.2 days (95% confidence interval (CI), 4.1 to 7.0) [6].

The new coronavirus has spread rapidly to 222 countries and continents around the world. On March 11, 2020, the WHO declared COVID-19 an epidemic, saying that it was spreading rapidly in Asia and Europe and that China was not the leading country in confirming COVID-19 cases and lethality. Several factors influence the transmission of this virus, and quick action should be taken to flatten the curve. In this sense, measures such as early diagnosis, testing, isolating affected persons, and mobilizing health responses to the virus are critical [7]. Most countries around the world are in action to prevent the spread of disease. Due to the active action, each nation has been identified with unique patterns of COVID-19 breakdowns; However, the entire world population is in risk of infecting with COVID-19. Every government is still looking

into the new death toll, new cases, and the number of people who have been vaccinated.

Since COVID-19 became a global epidemic, on May 24, 2021, at 10:32 CEST, 166,814,851 COVID-19 patients have been confirmed, and the 3,458,905 deaths have been reported the WHO. As of May 21, 2021, 1,448,242,899 vaccine doses have been administered [8]. Furthermore, according to the COVID-19 weekly status report in the Southeast Asian region, there were 25,570,776 reported cases of COVID-19, with 309,528 deaths as of May 14, 2021in 11 countries, including Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, and Timor-Leste. After the Americas region (63.5 million cases) and the European Region (52.8 million cases), WHO's South-East Asia Region (SEAR)

remains the third most impacted WHO Region with 25.5 million cases. All WHO Regions except SEAR have reported a decline in new cases during this timeframe, with a 5.0 percent decline in new cases globally between epidemiological weeks 17 and 18 in 2021 [9].

Figure 1 depict a similar situation in Sri Lanka, May 26, 2021, there was a considerable rise in the number of newly reported COVID-19 patients. According to the COVID-19 weekly status report of the Southeast Asian area, the number of new cases in Sri Lanka has increased by 36% (n = 14 153) between 17 and 18 weeks in 2021 [10]. As a result, it is crucial to examine the effects of the COVID-19 outbreak on Sri Lanka, given that the education sector is one of the most important.

Fig. 1. Daily new confirmed COVID-19 cases in Sri Lanka

A. COVID-19 Impact on Education

As the world becomes a global village together interconnected with each nations, the corona pandemic has not stopped at the national borders. It has so badly effect affected on international trading, occupations, education, traveling as well as for the day to day normal lifestyle. The educational impact must be addressed as that will directly link to the future of any nation. The lockdown procedure in response to COVID-19 has interrupted conventional schooling around the world. Not just for students, teachers also had to change their delivery modes due to prevailing situation instantly without having a prior training.

However, the most marginalized groups, who don't have access to digital learning platforms & lacking proper facilities to engage with digital learning on their own, are at risk of leaving behind unattended. This is not a simple issue as learning loss will directly lead to skill loss of the country and produce soilless graduates for the country's productivity. It is not clear when the schools or universities will be back to an average functional level. If schools are slow to return to normal, definitely the economic growth also would be in higher risk in future.

The exponential growth of infected patients and severe cases of the COVID-19 pandemic have overwhelmed hospitals and health professionals, keeping away the awareness of educational priorities. As governments grappled with controlling virus spreading by closing down the entire economic sector, including schools, universities, and technical colleges, it later increased the second wave of economic development with skillful people. At the moment, the public has also not been happy with the educational expenses as health expenses have taken control.

The COVID-19 pandemic impact on higher education as universities resulted with closing their premises and countries shut their borders for international student mobility in response to lockdown measures. Although higher education institutions were shifted to online learning, these closures affected learning and examinations as well as the legal status of the quality of the degree in their country. Most importantly, the crisis will raise a most important question: the value of university education, which includes networking, technical hand experiences, and social opportunities, together with industrial experiences.

Some selected COVID-19 responses worldwide, mainly

related to the shutdown of schools due to Coronavirus, are highlighted. In the United States of America, most schools were closed down due to the pandemic situation. At the same time, scheduled tests and examinations were also canceled to maintain the health guidelines [11]. Moreover, in Spain, more than 11 million students face problems with school closures after the virus affected the country so badly.

In many countries, the situation is common, either partly closed, fully closed, or postpones the exams, or conducting online classes and online assessments. However, the quality of the assessment methods is questionable because of sudden shifting to online mode from standard procedure. However, third world countries are the main issue as many rural area students do not have proper access to the internet or online facilities. According to UNESCO, around 1.6 billion students have been impacted due to the coronavirus spreading since 2019 March worldwide [12].

However, even with the online education system, most students are likely to be well behind in their online learning, especially mathematics, science, and languages. Moreover, it is not just theoretical subjects, sports, interpersonal skills, practical experiences, and laboratory works that will also be lacking with the online education system. Some students especially need careful attention physically to improve their knowledge to understand mathematics and scientific explanations. However, many of the students leave behind unattended with the online education system due to the lack of student-teacher interaction. Moreover, physical interaction between teacher-student and the student-student is highly important to gain social learning, which is the foundation to behave in society. Beyond cognitive learning, that kind of social learning is highly important with the school's physical education system, which will teach students; how to listen, how to answer, how to communicate, and how to respect each other, not just for educational matters, which also for life lessons. Therefore personal development during the schooling time is vital for creating the backbone of the child. Otherwise students starts feeling isolated, distracted, and selfish with the online learning system if that continues for a longer period.

Not just the lacking of knowledge, students will start to suffer from additional stress and anxiety. Once parents also start work at home simultaneously with distance learning for students, the situation gets worse. There will not be parental guidance as well for the healthy educational system and leave behind unattended. This will eventually create a stressful student who does not respect even their parents. According to research findings, students in isolated areas or confined at home with their parents may feel more stressed and anxious and suffer acute stress disorder, adjustment disorder, and grief [13].

When their parents are daily wages people, the economic condition will also arise together with the stressful isolation. For most families, the economic state will collapse with the lockdown situation, resulting in insufficient financial support for distance learning, such as the supply of internet facilities, laptops, or any other devices. All of this will add psychological and emotional consequences to students worldwide and eventually create a failure product for future

development. Those impacts will potentially lead to back-to-school time once the pandemic situation is settled .

Closing schools will not impact all students equally, especially in Asian countries. Most girls will face the situation so severely due to extension time remaining at home. The main problem is many girls are contributing some amount of time for household work such as cleaning, cooking, and childcare. Primarily this will be among teenage girls. Most girls will be likely to see a disproportionate increase in the amount of work they have to do at home, leaving them less time available for academic studies. At the same time, homeschooling will lead to malnutrition among third-world countries as well. Most of the third world countries students, such as around 320 million students worldwide depend on the daytime meal provided by their college, which the government offers, NGOs, or organization developed together with parents, staff, or any other partners. For many, this is the main meal for the entire nutrition portion of daily nutrition supplement for many low-income household students. These meals provided massive support for the low-income families, especially since they have to feed multiple children at home.

One of the most important topics which we have neglected is children with special need and care. Due to the online learning platform, many will lose their regular education pattern as they are not ready to adapt to digital schooling or online learning. Students with special needs or disabilities are suffering unless assisted technologies are promptly arranged to adjust to a new working environment.

The student's parental support may also affect their online learning as this is an entirely new system for any nation. Those who are having parents with less advantaged backgrounds have less time to spend with their children to support educational matters as they are busy with works or due to the inability of working at home. Students from less advantaged backgrounds sometimes lack the proper internet facility or device to continue their home learning. Students from higher socio-economic backgrounds are probably significantly more likely to have their laptops to use for day-to-day learning activities. In contrast, others do not even have a smart mobile to continue their education.

B. COVID-19 Impact on Vocational Training

The use of online platforms for delivering industrial training, laboratory practicals and workshop activities are useless. Hands-on experiences are essential for Technology, Engineering and Technical College students to apply theoretical knowledge into reality. Some industries also remained closed due to partial lockdown and still rely on online technologies. Therefore, many students are at home without proper industrial training due to insufficient training vacancies. Most laboratory practicals are recorded at the laboratory by the lecturer and delivered as an online practical session. However, trial and error approach hands-on experiences with physical practicals are a vital part of quality education. Moreover, field visits or industrial visits are crucial to visually experience the production process and manufacturing practices and the occupational health and hazard practices and labour management skills to improve the

required knowledge for a future career. However, due to the COVID-19 pandemic, field visits and industrial visits are completely suspended with the health guidelines.

C. COVID-19 Impact on International Student Mobility

Would COVID-19 harm the international education and mobility of students? The COVID-19 pandemic since early 2020 has dramatically affected higher education in various areas, including transferring face-to-face teaching into online teaching and learning, cancelling physical events and activities, and being formed of higher educational "normality" [14]. While the COVID-19 has impacted with many challenges to higher education in teaching, education, research collaborations, and institutional governance, it also offers various stakeholders an excellent chance to rethink and even restructure higher education with a risk-management plan to enhance the sustainability of this sector. This crisis is forcing stakeholders in the higher education sector to reconsider the role of ICT, particularly in higher education, online learning. Although online learning is considered a cure for several learning problems, such as the costs of teaching, students and teachers have raised many negative concerns about the effectiveness of learning and interactions during the pandemic.

As internships as co-operative training enable students to understand their profession better, they also improve their trust and motivation. Studies abroad programs and work and travel programs also benefit student mobility agencies' international education and expertise. While these short-term study programs abroad offer international experience, they help developing intercultural awareness and skills on transforming social networks into opportunities for the future career of these students [15].

In international higher education, particularly student mobility, the influence of the COVID-19 pandemic has increased. Due to travel and campus closure limitations, many students have changed or revoked their study plans abroad. In this sense, in significant destination countries such as the US, the UK, and Australia, higher education institutions (HEIs) have anticipated a considerable decline for incoming international pupils during the next six months. Based on the Institute of International Education study, approximately 90% of US schools and universities expected a reduction in international student registration. A recent study published in April 2020 by the British Council shows that 39% of Chinese students are unsure about cancelling their plans as the most significant source of international students in the UK. In the coming school year, the Australian HEIs will face a loss of approximately 150,000 Chinese [14].

Although the adverse effects of the COVID-19 pandemic have been well known on international higher education and student mobility, some scholars still hold the optimistic view that global mobility of students will remain strong after the pandemic, as will SARS in 2003 and the 2008 economic crisis [14].

The most significant losses will suffer in countries like Australia, Canada, the United Kingdom, and the US that rely heavily on international students paying different fees. For example, in Australia, Canada, and the United States, public institutions charged more than USD 13,900 more per annum to international students than national students in 2017-2018 on average [16]. Global student inflows are an essential source of income for tertiary institutes in these countries, given many international students. In Australia, the estimated revenue from tuition fees for international students is over one-quarter of the total tertiary education expenditures.

Perhaps most importantly, the crisis has highlighted universities' value proposition. It is unlikely that students will spend significant quantities of time and money online. Students go to university to meet great people, talk to faculty, work with laboratory researchers and experience social life on campus. Therefore universities will need to reinvent learning environments to expand and complement digitize, but not substitute student-teacher relations. Students require a partial reimbursement of tuition fees. Many institutions have already provided room, board refunds on behalf of the institutions, or students are already asking for partial reimbursements. It will be compromised and cut to the bottom of universities affect not only their essential education services but also domestic students' financial support and activities for research and development [16].

The pandemic has profoundly affected the global higher education sector, especially international mobility for students, although it is still in a hot context about whether the pandemic COVID-19 will end higher education internationalization. Because of the travel restriction, the campus closures and consideration of health and safety by students and families, the pandemic will increase significantly lower international student mobility. The COVID-19 pandemic has reconstituted the factors when students consider studying abroad compared to the typical pull-push factors for international student mobility.

II. COVID-19 IMPACT ON SRI LANKAN HIGHER EDUCATION

The purpose of this online questionnaire survey is to collect data about the COVID-19 impact on higher education all over the world. We have targeted all the students from different countries who are pursuing their higher studies. The questionnaire included 20 questions in 5 different sections. Section 1 included personal information, section 2 included institutional information, section 3 included student enrolment during the pandemic times while section 4 included technical and financial availability for distance education, and finally, section 5 included student comments for distance education. This analysis is based on 2000 responses from 13 different countries all over the world.

The bar chart shows in Figure 2 illustrates the number of males and females' responses, and overall, more females completed the questionnaire (1070 responses-54%) in comparison to males (930 responses- 46%). A large proportion of the students have participated from Sri Lanka.
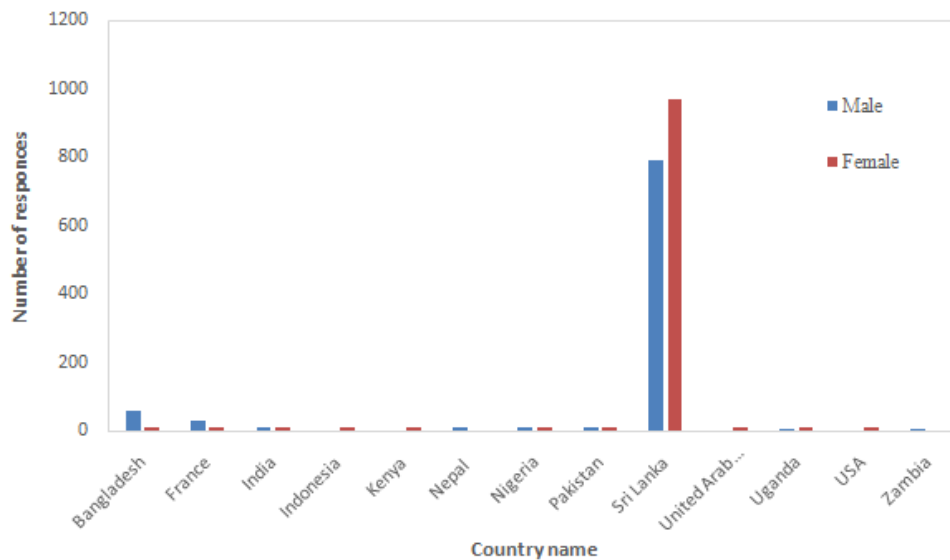
Fig. 2. Questionnaire responses by gender

However, 1490 participants (74%) are under the age range of 20-25 years, while 19% (370 participants) are in between the range of 25-30 years. Furthermore, 4% of students are under 30-35 years while the rest of the people are below 20 years old. 79% of students are following their education in public institutes, and the rest of the people continue their studies in private sector institutes.

Then, the next question was addressed to determine the students' education programs. The pie chart shows in below Figure 3 evident that the majority of participants (1610 responses) following their bachelor degree (81%), and only 10% of people (200 participants) following their Master/Ph.D. degrees. The rest of the people following diploma and other higher education programs are 6% (130 responses) and 3% (60 responses) respectively.
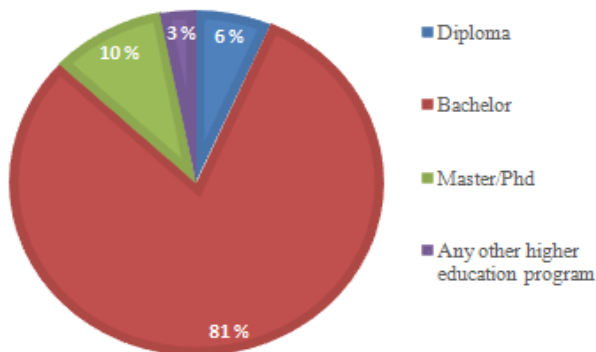

Fig. 3. Questionnaire responses by education program

Then, question 7 was addressed to determine the education methods conducted in the institute before the pandemic. According to the chart in Figure 4, it is clear that 66% (1410 responses) of students are engaging in on-campus learning before the pandemic times. However, 7% (150 participants) students experience the blended learning system, especially from foreign countries.
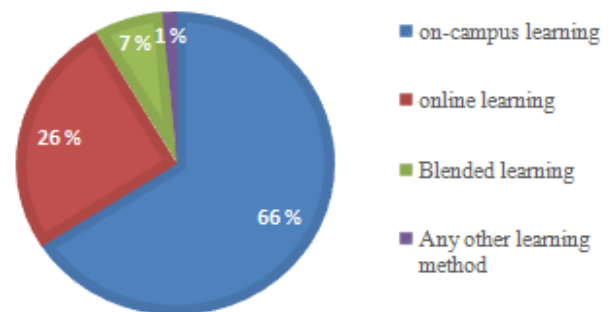

Fig. 4. Questionnaire responses by education methods before the pandemic

Figure 5 more closely shows that a significant portion of students (1630 students) have online lectures during pandemic times, and 18% of students mentioned that they are given only lecture materials without any explanation. However, a reverse situation was found with 12% of students who mentioned that their all works stopped for several months because of the pandemic. Moreover, 4% of students mentioned no proper regular contribution for their higher education, especially those from Bangladesh, India, and Sri Lanka.

Then, the next questions were addressed to determine the student's enrolment during the pandemic time, and 74.5 % of participants mentioned that they have internet connection failures and signal issues during the online classes while 23.5% of students do not have proper devices for e-learning, especially those are from Sri Lanka. Therefore, we should pay closer attention to develop a solution. Moreover, Figure 6 illustrates students from different countries have been equally experiencing some issues, including hardware failures of devices, health concerns with electronic devices, lack proper home environment for online learning, and finally, financial difficulties for paying internet bills.
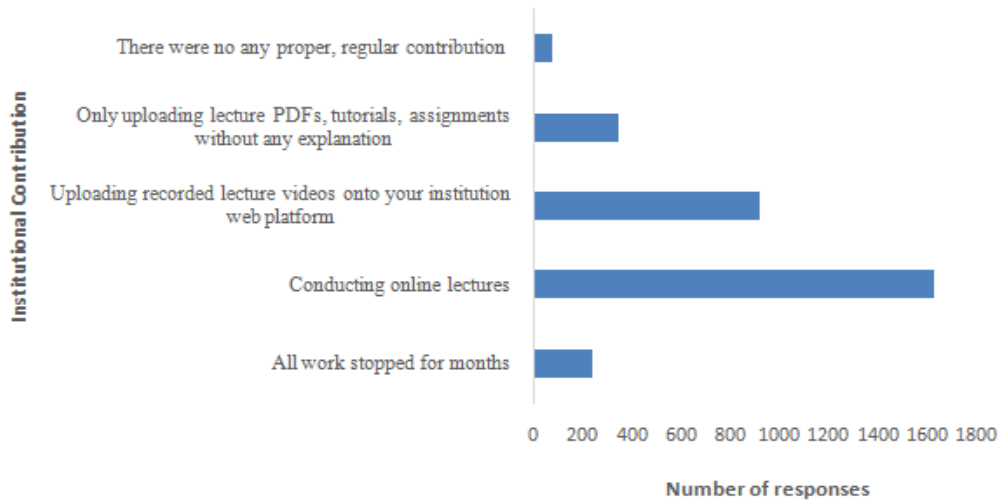
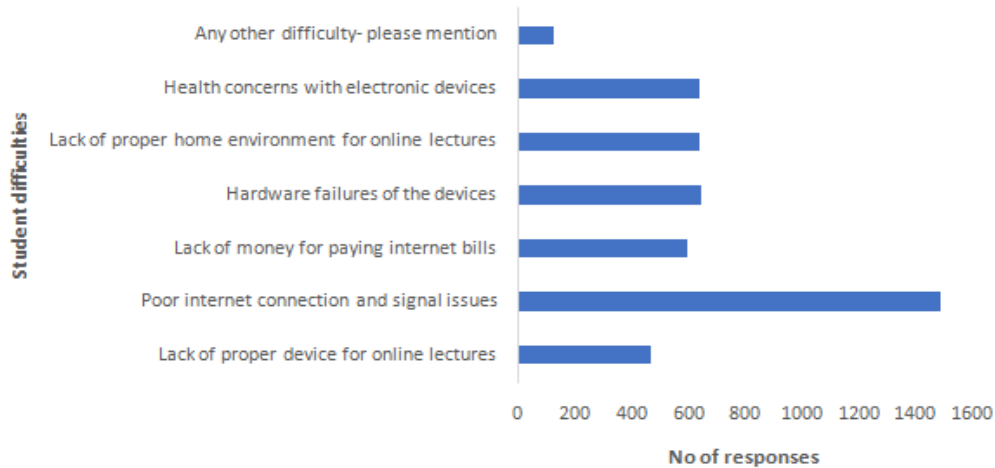Fig. 5. Institutional contribution on the higher education

Fig. 6. Student difficulties during the pandemic period

Furthermore, over half of the students (1110 participants- 56%) said that sometimes they could understand online lessons, and 38% (750 participants) confidently said that they could understand the online lessons, while 40 participants have disagreed with that. In conclusion, there should need to have a proper teaching system for distance learning. Figure 7 shows the student's preferred learning method during the pandemic, and we can see that on-campus learning was the most preferred method as 67% of students voted for that. However, the second-most preferred method was the blended learning concept, which combines an on-campus and online learning concept.
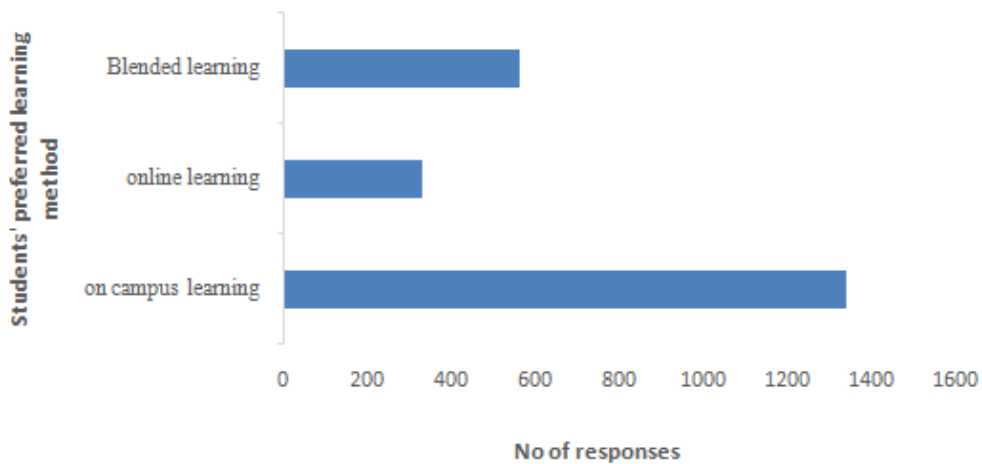

Fig. 7. Questionnaire responses by students' preferred learning method

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Udara S.P.R. Arachchige, K.L.T. Sathsara, Probodhi Preethika, K.A. Viraj Miyuranga, R.K.M.D Supun Harshana, Siriwardena M.B.D.K, Chiran D.M.O. Ranaraja, Dissanayaka D.K, and Jayathilake S.A.P.U.M, "Immediate Actions to Minimize the Impact of COVID-19 on Education," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 4, Issue 2, pp. 25-34, 2021.

Furthermore, question 14 was addressed to determine the students' experience in COVID-19. A larger portion (77%-1550 participants) mentioned that they do not experience either a quarantine period or any virus infection. But 23% of students have that experience, although 36% of students said they have a hard time with online education. We found 41% (820 students) of students struggling financially due to COVID-19, especially they can't bear the cost of internet bills.

Figure 8 shows the online survey results in which students were asked about their available devices for accessing the internet. The majority of participants (79%) have used desktops and laptops. Smartphone usage accounts for 70% of students' available devices, but 2% of students still use someone's device for their online classes, especially in Sri Lanka.
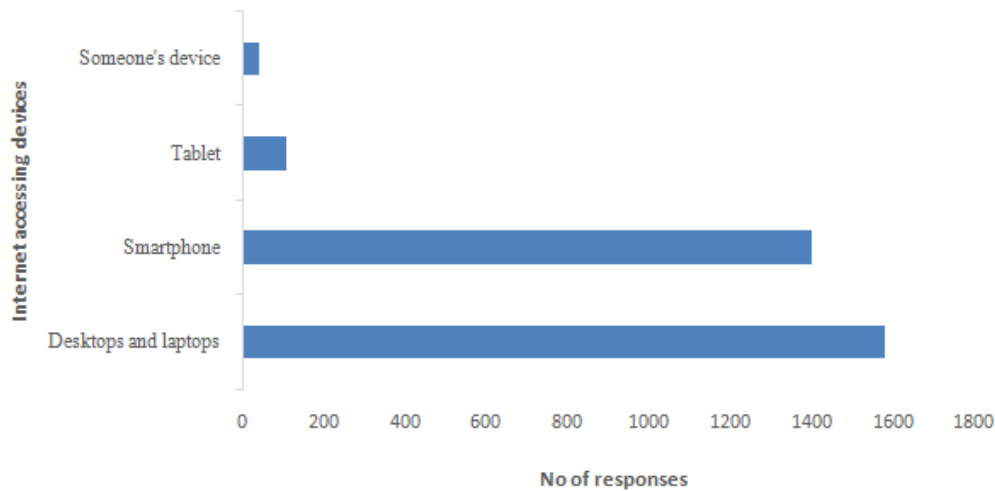

Fig. 8. Students' available devices for online learning

Furthermore, we addressed the next question to determine the student's data connection, which is illustrated in Figure 9.
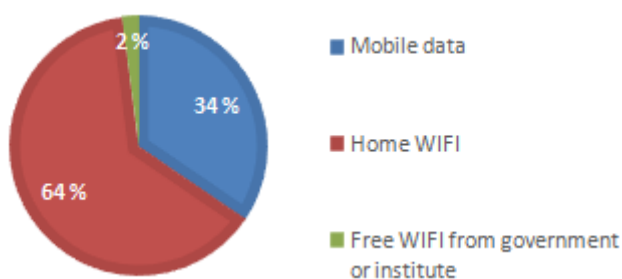

Fig. 9. Students' data connection

Most of them (64%) have home WIFI, and 690 students mentioned it was the mobile data connection. But, surprisingly, 2% of students have free WIFI from the government or institute during the pandemic time, especially those are from France. Therefore, we need to expect to see more and more students accessing the internet in the future without any hindrances.

Then, the last questions were addressed to determine students' comments for distance education. Most of the students have mentioned that they struggle with some issues, including practical module learning, collecting data, doing laboratory tests for research completion, lack of lecturer involvement for those areas, difficulties with online exam system, holding students' internship, poor internet connection, etc. Concerning that, students suggested some requests including to improve strong internet connection systems

throughout the country, change the way of conducting lectures, minimize long time lectures, give proper internet accessing devices, improve student self-learning skills, allocate some session to do practical after the pandemic, provide either free or cheaper internet facilities, help students to maintain their focus and to introduce in-house learning system for university students. Finally, some students request to introduce a new system which has less impact on students' mental and physical health.

With that broad overview, it was clear that all students were struggling with their higher education due to the COVID-19 pandemic. It has raised a significant challenge for the higher education community worldwide. Therefore, it is essential to have proper systems that can respond to the pandemic in the future.

A. The New Role of Educators During and after COVID-19

The students who do not possess the digital facilities for online learning have the risk of falling behind the level of other students. The COVID-19 pandemic is posing severe impacts on the university system in Sri Lanka and globally. University premises are closed for students, and online lectures are carried out for students without practical sessions. The examinations and convocations ceremonies are postponed delaying the graduation of batches and occupation opportunities.

This global crisis has provided time and a platform for learning new technologies, adapting to new learning environments and systems. With the worldwide pandemic, pedagogical adaptations have proven critical as the conventional lecturing in-person mode does not support the

remote learning process. The type of medium uses to transfer the knowledge is does not matter; teachers need to adapt their practices and creativity to keep the students always engaged with them as every household represent a mini classroom. Moreover, teachers should adjust the total time duration allocated for the subject not only for teaching but also for engaging with the students as they are not contacting face to face while administrating work to gain their attention throughout the time, as well as evaluating the portion they have grabbed with the previous lesson. Therefore, it is not just covering the syllabus on time; more than that, engaging with the students is critical to delivering the lesson effectively. Failure to do so, the majority of the students will fall behind without having proper knowledge.

The COVID-19 pandemic has been highlighting the need for flexibility and extra allocation of time for student-teacher interactions. For example, time scheduling and curriculum adjustment should be given to the teachers' control. They may have to allocate more time for the same lesson to deliver the teaching material effectively. In any case of extra support need for the student, there should be a toll-free telephone connection number to get the distance support from the education department. At the same time, educators should be ready at the department of education to answer and support such kind of student matters. Those should be immediately implemented. As it is toll-free, many students can join that facility without worrying about additional expenses.

Once the situation condition started to mild, it should move to the next level. Instead of low-tech online mode teaching, ensure students have access to paper-based learning material such as handouts, print out or textbooks. If they do not have facilities for those, schools should provide those and include home visits to monitor distance learning activities. Teachers can visit students' home on rotational basis and evaluate their education level and support them face to face on enhancing their level of knowledge.

Another needful action after opening educational institutes is the assessment of the learning loss by evaluating the stock of lessons to be taught. This assessment should consider how the students gained knowledge, and the extent of skill and competencies expected in the syllabus are lost due to online learning. Ministry of education should immediately reduce the administrative workload from teachers as they have to concentrate more on teaching and to interact with students to gain students back to the normal condition. Once everything back to normal, to build back a stronger teaching-learning system, the government should take immediate actions to those teaching initiatives that have proved to be effective during remote learning. At most, integrate the classroom facilities and enhance teachers' capability to handle new tech tools and types of equipment to face similar situations in the future. It is critical to empower teachers, invent technical skill development and capacity building programs to exploit the full potential.

B. The Future of the Classroom after COVID-19

Learning loss with online education will exacerbate inequality. The families who can afford new tech instruments

such as mobile phones, laptops, internet facilities, projectors will lead to another level of education. Some will be suffering at home without anything to join with the online teaching process. However, the government should initiate immediate programs to provide supplements for regular instructions and teaching materials to engage with difficult reach children and families, and to be better prepared for the coming crisis. During the pandemic, learning loss and implementing large-scale catch-up programs should be implemented as a top priority to gain all students back to the normal routine before starting physically. That can be done by providing physical materials, printouts, books and other printed documents by visiting their homes or with regular posts. Without doing prior actions now, it will be a disaster once it is open physically as many students will have many levels of understanding that they have covered with online teaching.

After pandemic, instead of continuing previous teacher model classroom lessons, students can be empowered to learn for themselves inflexible, more often in a collaborative way together with teachers and other students. The classroom should not be a barrier anymore to avoid touching the rest of the world with new technology. All classrooms should provide an internet facility, large digital screens, online videos with demonstrations altogether. If any student is absent, even they should be able to attend the lesson in real-time from their home. Those facilities which we have gained through the pandemic situation should be continued. One teacher, 30 student's classrooms not needed to practice and continue after the pandemic. It can be multiple teachers with multiple kids. They don't have to stay in the school during the lessons; instead, they can attend another event and listen and watch the previous studies later online. There must be accessible internet facilities for every school in the corner and free access for students to move with the rest of the world. Teachers should also be empowered with modern technologies to move together with the students. They can learn together with the students while teaching them. Teachers of the future may need to spend less time designing and developing cause contents and filling documents instead of exploring new knowledge and facts. Classroom lessons should not be limited to 40 minutes lessons, and they should be dynamic or assessment connected with the curriculum, where they can gather information through the internet.

C. When and How to Reopen Schools and Universities

Due to its long-term expansion of COVID-19, many countries are paying attention on how to continue education despite the pandemic. Therefore, we introduced a cyclical approach that assists in adapting and managing the global COVID-19 pandemic as well as any pandemic that may arise in the future (Fig. 10). It supports implementing a reference framework that helps decision-making processes in the higher education sector in all aspects.

Fig. 10. Proposed cyclical approach for education that responds to Covid 19

Preparation is the first phase of this cycle; it focuses on preparation for COVID-19 by preventing possible damage to the field of education, namely by identifying essential characteristics of Covid 19, how to respond and manage it. The mitigation phase focuses on minimizing the potential impact of COVID-19 on the education sector. The recovery phase mainly aims to return education to normal while coping expects to withstand the effects of COVID-19 on the field of education. For example, students can be provided physical equipment to continuously engage in educational activities and provide counseling.

Since society needs to live with COVID-19 for a long time and some nations have measured access to education while others are not. However, most models of school re-opening involve:
Reductions of class size.
- Increasing physical distance between students.
- Keeping students in defined groups with limited interaction between groups reduces the potential for wide-scale transmission within schools.

On the other hand, staying away from education for a long time raises many issues. For instance, the higher the risk of dropping out. Additionally, students who are out of school – particularly girls – are at increased risk of vulnerabilities. Furthermore, prolonged school closures interrupt and disrupt the provision of accessing, essential school-based services such as school feeding and nutrition programs, immunization, and mental health and psychosocial support. Therefore, a cyclical approach will be more critical in marking decisions in the field of education, going beyond the right of all students to education even in this pandemic and any pandemic that may arise in the future.

III. CONCLUSION

The major challenges faced by the higher education sector, vocational training, as well as the international student mobility has been addressed successfully. Even though, most of the nations have been taken several actions to reinstall the education back to normal, there are multiple areas to look into. Thus, this study recommends the following suggestions to implement in order to be prepared for future crisis.
- Once the situation gets mild its impacts, reopening schools and universities will bring unquestionable benefits to students and the society. There are several families interconnected with educational sector directly or indirectly having economic benefits with the educational sector reopening. However, economic benefits should be carefully weighed against the health issues as ultimate goal is to maintain the proper health. However, reopening universities and schools should be taken to manage several steps while maintain proper precautions to avoid being victim of the pandemic.
- Revising personal and attendance policies for universities, higher educational institute or for the schools should be considered as home schooling completely proved that maintaining attendance for lecture is useless.
- Students' hygiene protocols should be revised and apply to maintain proper health condition among others.
- Redesigning of lecture rooms should be taken into account with the online facilities for anyone to join even for the people not willing to attend physically.
- The financial allocations for the educational sector should be carefully handled as spending on education may be compromised in the coming years. The main reason will be public funds are directed for health and social welfare and minimized from the long-term public spending on education.
- The required technological support at the school level or university level should be considered for the institution as well as for the individual students. There are many students who really faced financial difficulties to join with online lecturing. Therefore, once universities start for physical functioning, those should be carefully implemented to face future incidents.
- The lockdown has exacerbated inequality among students as distance learning for those with lower level of income families creates additional stress. Therefore, not just for the students from those low-income families, their family members economic stability should be carefully analyzed as many of them may lost their regular jobs.

Finally, one thing should be highlighted. Schools is not just an educational institute which support theoretical knowledge to pass the exams but also it is the foundation for social learning beyond cognitive learning. The link between student and with teachers are vital for their personal development to face the society outside the walls. Students will eventually know how to listen others, how to respect each other, and how to manage co working, group working activities only during the schooling time. Many of those qualities are not mentioned in the book chapters to learn at home. Those will be learnt only with the physical interaction each other. The long-lasting isolation will create selfishness among the students as part of the society enjoying extra benefits with the availability of modern technologies. Even though, syllabuses will cover and having the exams to evaluate, their actual knowledge will remain far behind the expectation without having proper physical interaction, not having proper industrial training, and vocational training. Therefore, at the end, this will create unskillful graduates who doesn't fit for the economic development of the country. Even

after starting physical education, online platforms should run parallelly in order to face similar situations in future. Every government specially including third world countries should work with nongovernmental organizations to implement their technological facilities at the schools, universities to enhance the distance learning. Every student should need to have the access to proper laptop or any other mobile device with internet facilities to reduce the educational inequality.

School teachers should also get proper training to handle online classes without interruption to face similar situations in the future. However, alternative methods to provide educational knowledge should be implemented such as broadcasting: television teaching, radio teaching as that will reach to vast majority where who do not have proper internet facilities.

- It should be immediately improving the availability of proper technology for the students who needs special care as most of the technological tools are developed for the normal students.
- Schools and universities should maintain technology bank where students can lend technological tools to use during the pandemic when they are not the one on it or not having financial stability to purchase it.
- At most, parents should need to have a proper training to support their children for home schooling during the pandemic.
- There should be proper communication system to maintain among parents, teachers and students to deliver the most important information regarding continuation of their education.

We should think about school curriculum to modify as we should be away from regular teaching methods. We should not anymore depend on theoretical education system. Now it is time to implement most important principles such as learning to know, learning to do, learning to be, and to live together with it. Anyway, we will not get the clear impact of the education until the pandemic is completely over. We have to carefully analyze the emerging economic crisis with the educational development as many public taxes are directed to healthcare and social beneficial. At the same time, many nations around the world will end as poor nations with unstable economic condition as their economic sector, industrial developments will collapse partially or completely. Therefore, the value of the education priorities will lose their place as many other social and economic indicators will take over. Many nations already indebted and the pressure of the reducing fiscal capacity to provide health care facilities to lower the impact of the pandemic. Therefore, international support for many countries is must to initiate just after settling the pandemic situation.

REFERENCES

[1] Q. Li, "An Outbreak of NCIP (2019-nCoV) Infection in China — Wuhan, Hubei Province, 2019−2020," China CDC Wkly., vol. 2, no. 5, pp. 79–80, 2020.
[2] W. Tan, X. Zhao, X. Ma, W. Wang, P. Niu, W. Xu, and G. Wu, "A novel coronavirus genome identified in a cluster of pneumonia cases - Wuhan, China 2019-2020," China CDC Wkly., vol. 2,   no. 4, pp. 61–62, 2020.
[3] P. Zhou, X.L. Yang, X.G. Wang, B.Hu, L. Zhang, W. Zhang, H.R. Si, Y. Zhu, B. Li, C.L. Huang, H.D. Chen, J. Chen, Y. Luo, H. Guo, R.D Jiang, M.Q. Liu, Y. Chen, X.R. Shen, X. Wang, X.S. Zheng, K. Zhao, Q.J. Chen, F. Deng, L.L Liu, B. Yan, F.X. .Zhan, Y.Y Wang, G.F. Xiao, and Z.L. Shi., "A pneumonia outbreak associated with a new coronavirus of probable bat origin," Nature, vol. 579, no. 7798, pp. 270–273, 2020.
[4] Y. Fang, Y. Nie, M. Penny, "Transmission dynamics of the COVID-19 outbreak and effectiveness of government interventions: A data-driven analysis," J. Med. Virol., 92 (6, pp. 645–659, 2020.
[5] B. Hanley, S. B. Lucas, E. Youd, B. Swift, and M. Osborn, "Autopsy in suspected COVID-19 cases," J. Clin. Pathol., vol. 73, no. 5, pp. 239–242, 2020.
[6] W. P. T. M. Wickramaarachchi, S. S. N. Perera, and S. Jayasinghe, "COVID-19 Epidemic in Sri Lanka: A Mathematical and Computational Modelling Approach to Control," Comput. Math. Methods Med., vol. 2020, 2020.
[7] A. Sanyaolu, C. Okorie, Z. Hosein, R. Patidar, P. Desai, S. Prakash, U. Jaferi, J. Mangat, and A. Marinkovic, "Global Pandemicity of COVID-19: Situation Report as of June 9, 2020," Infect. Dis. Res. Treat., vol. 14, no. February, p. 117863372199126, 2021.
[8] World Health Organization, "WHO Coronavirus (COVID-19) Dashboard", https://covid19.who.int/.,Accessed May 24, 2021
[9] World Health Organization, "COVID-19 Weekly Situation Report," World Heal. Organ., vol. 43, no. October, pp. 1–8, 2020.
[10] Our World in Data, "Statistics and Research Coronavirus (COVID-19) Cases", https://ourworldindata.org/covid-cases., Accessed May 27, 2021
[11] E.M. Onyema, N. C. Eucheria, F. A. Obafemi, S. Sen, F.G. Atonye, A. Sharma, A. O. Alsayed, Impact of Coronavirus Pandemic on Education, Journal of Education and Practice, Vol.11, No.13, 2020, 108-121.
[12] https://fr.unesco.org/covid19/educationresponse
[13] G. Di Pietro, F. Biagi, P. Costa, Z. Karpiński, J. Mazza, The likely impact of COVID-19 on education: Reflections based on the existing literature and recent international datasets, Joint Research Center, 2020.
[14] W. Xiong, K. H. Mok, G. Ke, and J. O. W. Cheung, "Impact of COVID-19 Pandemic on International Higher Education and Student Mobility: Student Perspectives from Mainland China and Hong Kong," Centre for Global Higher Education, 1–36, 2020.
[15] S. Yıldırım, S. H. Bostancı, D. Ç. Yıldırım, and F. Erdogan, "Rethinking mobility of international university students during COVID-19 pandemic," Higher Education Evaluation and Development, 1–16, 2021.
[16] A. Schleicher, "Covid-19 on Education Insights From Glance 2020," www.oecd.org, 1–31, 2020.