

Online Teaching Challenges during COVID-19 Pandemic

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Abstract—A serious situation the world has faced, a virus is spreading very fast almost in every country leaving millions infected and hundreds of thousands dead. The whole aspects of life have been affected, health, economy, travel, manufacturing, trade and education is no exception. Universities cancelled face-to-face study, canceled study-abroad programs, forced students to leave dorms and in some cases students in off-campus housing, too, were asked to vacate and moved to online teaching. Meanwhile, Scheduled conferences have been cancelled, and almost every sports event or even practice have also been put on hold. The coronavirus pandemic has upended the world's education system, as most schools in almost every country have closed their doors for extended periods to combat the spread of the virus. Millions of students across 209 countries infected by the COVID-19 virus have been affected by school closures and health officials were predicting the crisis would last for months. The uncertainty caused by the pandemic seems to discourage not only the parents but also the educators as well from being hopeful that the quality of the education process will be guaranteed. This paper provides a view point and a review for the challenges faced by the students, educators, and schools during the Coronavirus pandemic in order to have better understanding for the online education challenges for better planning and management of the education process.

Index Terms—COVID-19, coronavirus, education challenges, online education.

I. INTRODUCTION

In 2019 the Coronavirus (COVID-19) pandemic has hit almost every country in the world leading to school closures. Even with all the precautions taken for social distancing, it was known if the school closures would be effective as a measure for stopping the outbreaks of COVID-19. The researchers searched the electronic databases to review the effectiveness of the school system closures and the social distancing procedures in reducing the spread of the virus. The authors found no data to support the effectiveness of the school closures in controlling the transmission of the virus. The historical data collected during the spread of the SARS in the FAR East countries showed no effective contribution of the school closures in controlling the pandemic [1].

The same scenario happened in 2009 when the influenza virus was announced as a pandemic by the World Health Organization after the alert level was raised from level five to level six. All over the world health professionals were searching for protocols to mitigate the virus. One of the non-medical interventions commonly used to deal with the pandemic was also school closures. Every time the school closures are thought off, officials try to weigh the benefits of

reducing the virus outbreak to the economic and social risk and also the risk of not getting the students the required education [2].

In all cases and once the school closures are thought of [3], educators always look for ways to continue the education process. The first tool comes into consideration is the online learning. But not all the institutions around the world are ready to transfer the whole education process to be online. Schools found themselves stranded trying to develop effective ways to continue the learning process. Most schools had to switch to online or distance learning for the rest of the year, and the question that the schools, students and parents asked: would the students still have the necessary skills to succeed. Add to this, will the online learning pass the efficiency and strength tests or not [4].

The education system has faced a huge challenge due to the COVID-19 pandemic. Reference [5] presented guidance to institutions, instructors and officials on addressing such a challenge.

The increasing trend of the usage of online teaching is going in a very high speed that may not facilitate a good control and measure for its effectiveness. Almost every educational institution has invested money in online teaching not only because they believe in its effectiveness, but sometimes as a publicity in the eyes of the education seekers. An institution offering online education needs to understand its key performance factors for them to do continuous evaluation, assessment and improvement for their system. This should enable the institution to always try to keep track with the demands of their students and the market competition [6].

The internet differs from any other technology that has been used before for teaching. It has wide acceptance and applications in the higher education institutions. It is a fact that the online learning has been implemented in broad applications, but still it did not gain the same broad satisfaction. The online learning has many obstacles that created many barriers for satisfaction. One suggested way to increase satisfaction is to create a community of learners, who can support each other in such a learning environment. Many strategies were presented in [7] to build community in online learning environments.

The attitudes and behaviors of the course designers, students and instructors are most significant quality factors for online teaching and learning and distance education in general. These stakeholders find many factors that inhibit them from being part of a distance learning education. Among these factors is the attitude, which they consider the most influential factor that determines their perception for the quality of online learning [8].

Many authors [9] have tested the questionnaire developed by McVay's [10] for measuring the readiness for online

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learning for research and practice. Smith and coworkers have given this questionnaire to a large number of undergraduate university students in Australia and United States who were taking different courses in different majors. The reliability and factors analysis done on the data showed that the two most important factors for online learning were self-learning management and the comfort with e-learning.

The effect of the self-efficacy of the students on their search strategies for online science learning activities was examined [11]. The study showed that, the students with high self-efficacy for the internet; most likely to have more efficient search strategies and a better chance for effective learning than the other students with internet lower self-efficacy.

The attitudes were added to the learners self-efficacy as important factors that characterize the learners performance, motivation and interest in online learning [12] and [13]. The author investigated the role that students' perception of the online learning plays in shaping their attitudes and self-efficacy. The study revealed that, the college students who showed positive attitudes and self-efficacy to online learning are perceiving the internet as an effective functional technology tool.

Online teaching can be even thought of as troublesome [14], the instructor has the biggest responsibility for making an online course an interactive and exciting experience, both for the students and the instructor. Reference [14] Listed the qualities that an online instructor should entertain to provide such an experience. These qualities include, not only technical knowledge but also technical help as the students look to the online instructor as the main source for education and technical help in such environment. Among the other qualities needed are, good organizational skills and understanding for the students' needs going through such challenging experience called online learning. The author also shed the light on the problems facing the instructors regarding online examination, tendency for plagiarism and technical difficulties. Here the author advises the instructor to be creative in putting the exams using for example essay questions and getting prepared to resolve the technical problems.

It was necessary to measure the students' engagement in online courses, this is why authors [15] tried to do so for asynchronous online courses. The researchers analyzed the students' behaviors while taking online courses and connected this to their achievement and tenacity. Two factors determined the students' behaviors, namely the duration and the frequency of participation. The study showed very important participation behavior differences between the students who complete a course and the others who withdraw and between the successful and non-successful completers. The successful completers showed persistence in participation, more frequency and higher duration for logging in.

It is a fact that, the access to online education and the number of asynchronous offered courses have grown in a massive way [16]. This is why a researcher like [17] studied the roles of the instructors in online teaching environment through the observations of the instructors and through the analysis of their courses. The author used Brege's typology

of online instructor roles to examine the relationship between the roles as thought of by the instructors and as enacted by them. There were wide differences in instructors roles and participation between the new to online teaching and the experienced instructors. The experienced instructors seemed to master better strategies to carry on their roles. Also, there was a direct relation between the effectiveness of course facilitation and the workload.

The choice of the online teaching platform is also of the most significant factors that affects the course outcomes for online courses [18]. The students need to have the impression that, the platform is easy to deal with and effective in learning the course contents. Some of the tools to make such a platform effective, is to use for example a variety of teaching media, providing continuous access to the learning environment and encouraging student-student, student-content and student-instructor interactions.

The problem of learners drop out was studied [19], withdraw or not completing an online course, trying to judge the degree of the problem and the factors leading to it. The study showed that, there are factors leading to such a problem, such as cognitive, psychological, sociological and technical. The critical factors were the impressions on the cognitive load and the ability to control the study process. The author argues that, the learners taking online course for the first time often complain about the cognitive overload when they start the online learning experience. This factor appeared to be a big contributor to the high withdrawal rates, especially for the learners dropping out during the early weeks of the course.

Although the rate of students taking online courses is increasing very rapidly, these learners tend to face significant challenges to develop the skill set needed for this type of learning environment [20]. The author also stated that, while the literature shows the speculations of the educators on the necessary skills the students need to have for such a type of education, still the literature lags the publications that covers the topic from the students prospective.

A scale called Online Learning Readiness Scale (OLRS) [21] was developed and validated to measure the college students readiness for online learning. The scale has five dimensions; internet self-efficacy, self-directed learning, learner control, motivation for learning and online communication self-efficacy. The study found that, as the student's grade gets higher (junior and senior) the readiness to online learning gets higher as well.

When teaching online, instructors and institutions search the literature for the best learning environments, instructional formats, and best strategies for communication. Some of the search results are based on frameworks and recommendations that stem from research while others are based only on online educators teaching experience [22].

When taking online courses, students are faced with many challenges. One of the challenges for the students whose mother tongue is not English is when they enroll in credit courses that are taught in English. These students have to adopt their learning style, thinking and writing skills to such online environment. Students' perceptions for online learning and teacher communication determines the quality of online educational experience. Problems such as limited

social presence, lack of social indications, not timely feedback, cultural interactions and gender are all factors of the complex online learning environment.

The challenges the online students face due to the dominant academic structures that are based on the western academic practices were studied [23]. Other students in other areas of the world may face challenges when dealing with instruction style that is based on writing, critical thinking and knowledge reinforcement methodologies that online learning is based on. Online courses transform the ways of learning through consciousness-raising, self-reflection and self-discipline. The design of the online assignment should engage both the students and instructors living the online classroom experience.

It cannot be ignored that face to face courses are operated differently than the online courses in many ways especially when it comes to teaching and assessment techniques. There is no physical interaction between the participants in online education. This leads to the believe that in this type of education some techniques for example such as group projects are not favored [24]. The author discussed how an activity such as group projects can be added to online courses. The author also presented some assessment tools that can be used with online courses to overcome the challenge of examination in online courses. The author mentioned that, instructors need to use formative assessments, which measure learning, rather than using summative assessments, which are mainly used for grading.

All the components of learning and teaching have been changed by going online [25]. There are three main categories of challenges that contribute to the success of online courses. Challenges related to learners such as; readiness, identity, expectations and participation. Challenges related to instructors such as; moving from classroom to online teaching, new faculty roles, teaching styles and time management. Challenges related to content development such as; the instructor role in developing online contents and the challenges that come with it such as incorporating multimedia into the content, content selection strategies. The education institutes have a role to play for facilitating online learning. That includes, improving readiness of learners, training for instructors and instructional design for content development.

The 14th annual distance education enrollment report [26] mentions that, since they started issuing the report, the pattern of the number of students taking at least one online course has seen steep rise over the fourteen years. Recently there is a decline in the number of students enrolled in online courses at private institutions, but the overall numbers of distance learning students is still increasing.

The worldwide status, challenges, trends and implications of online education in five regions of the world, namely, North America, Europe, South America, Asia, Asia-Pacific, and Africa is summarized in [27]. They summarized the challenges facing the online education to be, telecommunications infrastructure with focus on high bandwidth, recognition of online education as equal in quality to face-to-face education, specifying the best form of online education, globalization and standardization of e-education, and tailoring the online education system to the

educational needs.

The number of social work programs offered online is rapidly growing [28]. Some of the challenges of online education include; students access to content and flexibility, the course quality concerns, the relationship between instructor and student, and the students' academic honesty.

The challenges and opportunities related to communication in higher education online learning were explored. The authors intended to apply the face-to-face teaching strategies in online learning. They introduced the unique affordances associated with the online learning and shed the lights on the differences in online communication (in the context of learning) compared to face-to-face communication [29].

II. THE SUDDEN TRANSFORMATION TO ONLINE TEACHING

The situation in almost every country was not much different, but for sure was much challenging in some countries than others. For the first time, schools and educators found themselves suddenly in a big challenge that is, they have to move all of their courses to be taught online.

For the some school system, this is really something totally new and may be was not acceptable or even permitted earlier. For example, universities councils in some countries, which manages almost all the aspects of the higher education, was totally against even incorporating any single online course in the education curriculums. They did not believe that online education is a legitimate tool that can be used by the universities, especially for practical studies, such as Engineering and medicine. Knowing that, the online teaching was never part of any regular teaching curriculum in such countries, this can answer the question about the school system readiness for such a challenge.

Transferring the face-to-face classes to be online in a short period of time is not an easy task especially if the infrastructure does not support this move and the faculty who is suddenly facing the challenge is not prepared for this yet. Redesigning the course for online delivery and planning for such delivery takes lots of work and requires practice and planning for the faculty to successfully deliver and the students effectively get the materials and learn.

Faculty members suddenly got messages from their institutions to start using online methods to deliver their course materials and emphasis on using the institutions' learning management systems (LMS) and its platforms for such a purpose. Although the institutions may have LMS's, they were not really tested or utilized before, and the faculty even did not design their courses to be delivered online. Nevertheless, they have never used or tested their MLS for such a delivery before. This also means that, the universities may have not utilized what is called instructional design services, as faculty used to design their own courses for face-to-face delivery and they are not familiar with such services as instructional design help.

A. *It Is Easier to Teach Online*

For a long time educators were thinking that teaching online courses maybe easier than teaching face-to-face courses. But the fact they have discovered was that, ensuring

reliable communications with the students and getting them to commit to online courses especially in a crisis time is a very hard task.

In the traditional way of teaching, students can ask immediate questions once they do not understand a piece of information, they can also ask the instructor to repeat pieces of the lecture. But, during online teaching either using recorded lectures or using distance learning, this is difficult, for many reasons such as technical difficulties, too many students to respond to or due to the nature of the off line recorded lectures. In this case the lecturer must establish a way of communication with his students such as, WhatsApp, Zoom, Facebook messenger, Google Classroom, emails, etc...

Starting to teach online an instructor may be faced with strange situations such as finding students in the class who are not signed in his class. Some students may act inappropriately during casting the lecture. Other students may even not wanting to join the study groups thinking that, this way they are liable to submit any assignment.

In the virtual environment, students may think they can approach the instructor at any time expecting a prompt reply. His is why instructors have to set communication and reply expectations in advance.

For an online class, Instructors should not plan on delivering their normal length lectures as it is not recommended because students may lose focus and turn away from the class [30]. This is why, online lectures have to be divided into smaller sections that are in the vicinity of 20 minutes.

If the instructor is planning to deliver the lesson as a recorded video, it is recommended the video should not be more than 15 minutes. This way, it has a higher chance of being watched by the students.

III. TECHNOLOGY CHALLENGES

A. Technology Challenge From Faculty Prospective

When the sudden transition to online teaching have been enforced, most faculty members faced a steep learning curve trying to catch up with the new trend. In cases where faculty may have used earlier prepared slides for teaching, the problem was not as much as in the cases where the faculty had to reinvent the wheel and start from scratch trying to transfer their face-to-face courses to online courses.

Faculty were faced with technological problems when trying to redesign their courses, as now the material they have for the regular courses may not be enough to deliver an online course.

Even if they have already used for example power point slides to teach their regular courses, they are now faced with the problem that these slides are not enough for the students to understand the material by themselves and most probably the faculty will need extra tools and technologies that can enable them to deliver the teaching content.

Faculty may previously have used the computers, technologies and communication tools like internet provided to them by their institutions. Now, as they have to work from home, they will have to rely on their own resources at home

to design and deliver the course content, where these resources are not always available or efficient.

The faculty are faced with challenges such as their home computers may not be modern enough to handle the new features of course files, such as the big size files. Other challenges may include the internet subscription they need to get connected, the internet speeds that maybe too slow especially when everybody is staying at home using the internet either for work or for just spending the time.

Faculty maybe lacking tools such as screen recording software, video conferencing applications, cloud services and other tools that are needed to communicate with students, design courses and upload or cast contents. Most of the reliable tools are paid services or they charge subscription fees. This is why most of faculty members opted out to the free services and trial software, which may have lots of limitations on the usage and trial periods.

In the future, there is a need to better prepare teachers with information communication technologies (ICT) competency in advance, to ensure online teaching and learning can continue in another emergency [31].

Some faculty members started to use tools such as Zoom, but only the free version, which is limited to 40 minutes of airtime. This interrupted the class as it shuts down before the regular lecture time ends. Also Zoom required good internet speeds for streaming that might not be available for the student. Another challenge with such real time teaching, are the actions and comments that some students may do during the lesson that are not in line with the netiquette practice. This puts extra burden on the faculty member who found himself dealing with other activities that are beyond the scope of class teaching.

B. Technology and Accessibility Challenges from Students' Prospective

Schools should consider that, low-income students and those in rural areas often do not have reliable internet access and videoconferencing capabilities. This is why once faculty go online they should not assume that all students are tech savvy or that they have access to the internet. In many cases students had access to the internet on dorms, and once they had to leave their dorms during the epidemic, lots of them lost their connectivity. Also, even this generation sometimes called digital natives, they may find it uncomfortable setting in front of a screen trying to join an online class, downloading a lecture or trying to follow the screens of an on line lecture.

Students used to set down in a class, having eye contact with the lecturer and reading his/her body language and gestures make them more comfortable digesting the contents. They also get the sense of security that if they can't understand the content, the lecturer is there to ask and re ask for clarifications. But now, either having a real time distance learning lecture or what is called synchronous learning with all of the technical difficulties that maybe associated with the communication or internet speeds or other factors. Or even having an asynchronous lecture, where he watches a pre-recorded lecture sent to him by the lecturer, which maybe not of expected quality as the lecturer probably doing this for the first time. Recording videos is not the only challenge

faces the lecturers, but the quality of the sound represents probably the biggest challenge in lecture recording.

IV. THE ASSESSMENT CHALLENGE

A very important part of the education process is the assessment. After delivering a course section or the whole course, instructor will need to measure if the students really reached the final destination he wanted them to reach. The final destination here is that, they can demonstrate they can perform what came in the objectives of the section or course.

During the time of Covid-19 crisis, the regular strategy of examination or assessment by setting in a proctored exam was not accepted due to the possibility of spreading the infection. Instructors had to utilize online examination regardless of the possibility that the students may try to cheat. In order to reduce the possibility of cheating, the exams should be designed in a way to make this difficult. One way of doing this is by using the upper levels of intellectual learning skills in Bloom's taxonomy that depend on analysis and evaluation.

A. Advantages and Disadvantages of Online Examination

Online examination systems have advantages and disadvantages. Advantages include, saving papers, time and money. As a disadvantage, this type of examination is more susceptible to fraud, so the exam has to be designed in a way to solve this issue. The answers to the questions should not be easily found in books or online. Essay questions can be used but they are hard to grade as a human will have to grade them [32].

B. The Problem of the Practical Course Work

When it comes to practical course work such as labs, tutorials and workshops, the problem is bigger. The students cannot graduate without having such experience. In some cases students can use kits to do labs at home or even use virtual labs, but this needs planning and it cannot be implemented on a short notice. If the course work is not essential for the major and will not harm the body of knowledge if the student graduated without that experience, it may be acceptable not to give them such work. But, if the practical work is essential for the major, then there should be a plan for the students to do such work when the circumstances allow after the crisis is over.

C. Grading in the Time of Coronavirus

Once the virus started to spread out and the whole world adopted changes to their learning system, professors had to adopt their courses to online teaching trying to keep their instructions simple, and to communicate with their students. Schools have changed their grading policies, requiring either that spring courses be graded pass/fail or that students be given that option for individual classes. Some schools adopted the pass/fail system of grading for non-major courses, trying to help students during such a hard time. The problem here is that, it will discourage students from trying to excel in their studies. Students tend to focus on their studies if they know it will be graded. Also a no grading system may have the side effect of penalizing the students who can excel

under such circumstances [33].

V. EFFECTS ON HIGHER EDUCATIONAL INSTITUTIONS

A. The Problem of Moving Students out of Dorms

As colleges respond to COVID19 by going online and shutting down campuses, schools need to consider that, campus is not only a place for education, but it is also considered as a sanctuary for many students. Campus may represent to many students the only place they have steady access to food, shelter, safe living, health care and internet. For example, many international students have been stranded as they had to leave campuses and at the same time they could not even travel back home either for lack of funds to buy tickets or because most of the airlines have been shut as well. Therefore, before shutting off campuses, schools should have provided some exit strategies for their students to be able to continue not only learning but living as well.

B. Tuition Refunds

While lots of schools around the world did not mention if they will refund all or part of the fees parents and students have paid for the Spring semester, several campuses have said they planned only prorated charges for room and board for Spring. Petitions and talks are still going around trying to find an answer for this question.

C. Financial Effects

Educational institutions are expecting significant revenue loss as there is a big enrollment uncertainty exists among students as long as the Covid-19 virus spreading end in not certain when. Also cancellations of conferences, workshops, training sessions, sports events and tournaments will contribute to the financial fall out. Based on financial services such as Moody's forecast, the short term financial situation for educational institutions does not look good. The situation may go worse if the schools will be unable to get the students back during the Fall semester.

VI. CONCLUSIONS

During the COVID-19 pandemic crisis the world faced many challenges not only on the health scale and economic scale but also on the education scale. The sudden move to online teaching was a drastic step because not only the students were not ready for such a move, but the faculty and institutions as well. There were many challenges that have faced the stakeholders of the education process. Among these challenges, some countries suffered infrastructure problems such as internet availability and quality. Most faculty members did not have ready material suitable for teaching online. Institutions did not have a reliable LMS to deliver courses online. As students were not introduced to the Netiquette roles earlier, this led to many problems in dealing with other students and faculty. The problem of online examination was a real challenge, as the exams in most cases were not proctored.

The above mentioned challenges are now more understood and the stakeholders can now better plan, deliver and succeed online courses and manage the process in a more effective

way. All the experiences that the instructors, students and institutions have faced should enable them to deliver higher quality online learning and to continue the education process more effectively even in the time of crisis. Still there are some problems the system has to deal with, for example the examination process, therefore, researchers need to find more effective and secure ways to handle such problems.

CONFLICT OF INTEREST

There is no conflict of interest.

AUTHOR CONTRIBUTIONS

The paper has only one author who conducted all the work

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He has worked for Pirelli Tire Company International in Italy and Egypt as a tire testing engineer. Then, he was the TPM (Total Productive Management) Manager, responsible for building and leading the engineering teams (Kaizen teams) for the company improvement activities.