Impact of COVID-19 Pandemic in Engineering Colleges of Bhutan Concerning Teaching and Learning

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Abstract: The education system has predominantly been just a face-to-face session that happens in a classroom in various schools and colleges in Bhutan. Given that, all the teachers and even the students were accustomed to that way of teaching and learning. However, with the arrival of the COVID-19 pandemic, there was a radical shift to online teaching and learning for almost two years across the schools and colleges within the country. Being new to the platform, almost all have to learn how to use the technology that enables them to make their teaching and learning productive. The research mainly outlines the analysis of the challenges and impact of the COVID-19 pandemic in engineering colleges of Bhutan with online teaching and learning sessions.

Keywords: Impact, Challenges, Engineering Colleges, Online, Teaching and Learning.

I. INTRODUCTION

Online learning is the most recent and trendy form of distance education in this modern era. According to [1], online learning is education that happens with the help of the Internet, and it is also referred to as e-learning [2]. With online learning, students don't have to be available physically in class, but they can do learning from anywhere and at any time of the day using a portable device connected to the internet. In the past few decades, it has impacted many post-secondary educations and it is still growing [1]. The rate of enrolment in online courses is seen to rise more than that of the students enrolled in a traditional classroom setting. As per [2], the increase in online enrolment from fall 2007 to fall 2008 was seen to be 12.9% which resulted in exceeding the overall higher education student population in the U.S by 1.2%.

Nevertheless, online teaching and learning couldn't gain much attention across the colleges of Bhutan and traditional classroom teaching remains the most preferred and popular platform for delivering the course contents to the students. However, like the students of other nations, students of Bhutanese were seen to enroll in some courses delivered online by the renowned online platform such as Udemy, Data camp, Coursera, etc. but, it wasn't popular due to the lack of requirements such as Internet and infrastructures to complete the courses. Moreover, not recognizing certificates obtained through distance education by the Royal Civil Service Commission (RCSC) [3] could be another main issue for the same. Furthermore, anything that is being taught online doesn't guarantee full delivery to all the students and there are high chances of learning getting compromised at the student's end. Guiding students by teachers in times of learning of students will be limited and inquiries of students to their teachers during the time of doubts or confusion won't be as feasible and effective as face-to-face inquiry. Those issues and challenges hinder the learning of students to the maximum of their capacity thereby leading to organizations and employers not getting capable employees to boost and develop their company to a larger scale.

The first positive case of Covid-19 in a country [4] has seen the shift from the platform of the traditional classroom setting to the online form of teaching across the colleges within Bhutan. It came into effect after the public notice of School closure [5] across the country by the Prime Minister due to the outbreak of Covid-19. After this, the teaching faculties of colleges had to conduct online classes right away. Adapting to a new platform wasn't easy and challenging for teaching faculties as well as students. However, some students are a bit comfortable with time and could learn with a new platform, but some have to face difficulty due to low or no internet at their place [6]. This is one of the issues faced by Bhutanese students when online teaching and learning is taking place during the time of the pandemic and therefore chances of compromising the quality of education are high.

In the following sections, the literature review, methodology, results, and conclusion related to online teaching and learning are described.

II. LITERATURE REVIEW

Online learning enables to shift teacher-centered approach to a student-centered approach in which students will have an opportunity to actively participate in an interactive, collaborative approach to learning rather than being passive listeners

[1]. Instructors will just give guidance during the student's learning process. As per the paper by [7], paradoxically the expectation of student enrolment in the United States' post-secondary, was seen to decline by the fall of 2011 while enrolment in online education is seen to be continuously increasing. This is because courses available online can easily cross geographic boundaries while there is a barrier with courses of postsecondary education to make it happen [7].

As the shift to online education grows all over the world, one concern related to it was the quality of the online programme being offered [8]. The institutions need to be far-sighted enough to envision what is going to happen next and accordingly, they should design a course for online education to gain credibility by all [9]. Not only did educational institutions and accreditors but also the students and employers have seen the quality assurance of online teaching and learning as a prominent issue [8]. [10] has noted issues in online education are lack of access to resources and people in times of need. In addition to this, the assessment of students' work by faculty was seen to be challenging as they won't be able to track and validate the assigned work of students.

The comparison study done by [11], found the course completion rate of online education and traditional setting to be varying depending on the courses, sometimes online education has higher and vice versa. Besides, a conclusion related to the student's grade secured was also made. [11] has found a higher percentage with grade frequencies of As, Ds, and Fs in online courses whereas, traditional courses with a high percentage of grade frequency in Bs and Cs. [12] has pointed out that the student's academic performance measured by the post-test in the online science course was better than the performance of the traditional course section but vice versa for courses like mathematics.

According to [13] [14], online teaching is considered a complicated task, and commitment from faculty is vital because it demands a lot of precious time and sacrifices. [15] has estimated the time taken by an instructor to design and develop one hour of online instruction to be 10 hours excluding the time spent on the professional development of faculty. It was mentioned that the two crucial backbones to have successful online education with quality are student and faculty satisfaction [16]. Just as we are concerned with student satisfaction and so much motivation was provided for the successful completion of online courses, it is equally important to look at the faculty's satisfaction as well [13]. This is because no motivation and support to faculties will result in performing low which ultimately will have adverse effects on the student's satisfaction. Moreover, experienced instructors may no longer want to continue with online teaching if they are not happy with the support they get from administrative staff and which will result in financial implications [15] [17].

III. METHODOLOGY

The research is mainly to find out the issues, concerns, and anything related to online teaching and learning being faced by the teachers and students of the Engineering Colleges of the country. From this study, we were able to understand how teachers and students support the idea of online teaching and learning. Moreover, we could know the drawbacks or difficulties being faced by them. And finally, their recommendations and suggestions to be incorporated in the future if online teaching and learning are to be continued.

To fulfill this study, a quantitative method of research where the survey questionnaire was adapted for data collection. Survey questionnaires were designed with a mixture of open-ended, closed-ended, and Likert scale questions. For that, the sample size targeted to be used are the selected faculties working in two engineering colleges that have been involved in delivering the online classes. Besides, students enrolled in the year of 2018 and 2019 in engineering colleges were the targets of the sample. From the targeted sample, 88% individuals of the faculty have responded whereas 85.90% individuals of the student enrolled in the year 2018 and 87.06% individuals of the students enrolled in the year 2019 have responded to the survey questionnaire circulated through the college electronic mail. After the response was received, data was checked and verified for any missing data or mistakes. Then, it was analyzed by using statistical software.

IV. RESULTS AND DISCUSSIONS

For the study, data related to internet stability, technical issues, workload, student engagement, topics coverage, effectiveness, assessment, administrative support, self-satisfaction, and quality are collected from the faculties involved in teaching online. And from the students, data related to internet accessibility, technical problem, understandability, assessment, effectiveness, motivation, inquiry of doubts, access to resources, flexibility, and satisfaction are collected. The analysis was done according to the data collected as shown in the following section.

From the responses received, the analysis shown in figure 1 shows the overall responses who have participated in the survey questionnaire and figure 2 depicts the staff and students who have faced issues with internet access during the online teaching and learning sessions.
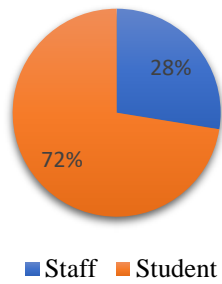
Number of Responses

Figure 1: Number of Responses

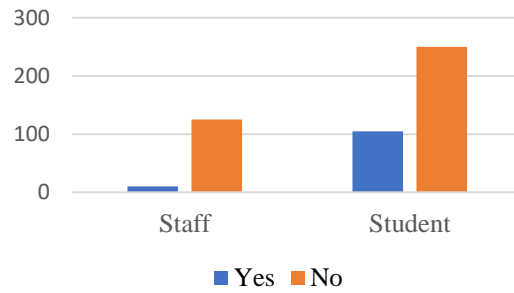**Problem with Internet Acces**

Figure 2: Problem with internet access

A. **ANALYSIS OF DATA COLLECTED FROM FACULTIES**

According to faculties' responses on the effectiveness of online teaching, 67% of them have felt it is ineffective whereas, only 33% felt it is effective for imparting knowledge to their students.
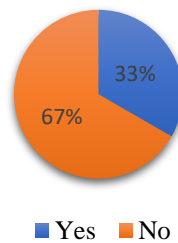
Effectiveness of Online Teaching

Figure 3: Effectiveness of Online Teaching

It was learned that faculties are feeling and experiencing a heavy workload as compared to a class taken in the classroom. However, the majority of the faculties have agreed to the student's active participation during the online classes.

Workload of Online Teaching
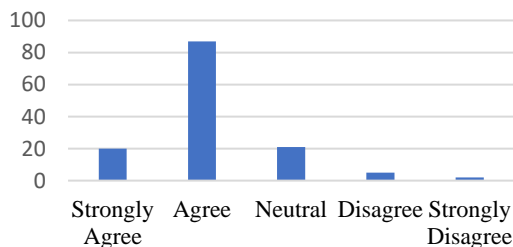
Figure 4: Workload of Online Teaching
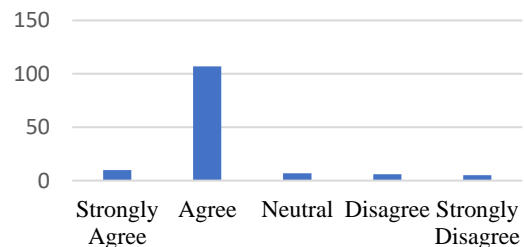
Student's Participation

Figure 5: Student's Participation

Though student participation is high, faculties feel that in-depth coverage on the topic is impossible due to a lack of facility with them. For example, if they need to show practically or demo, they are not able to do it.
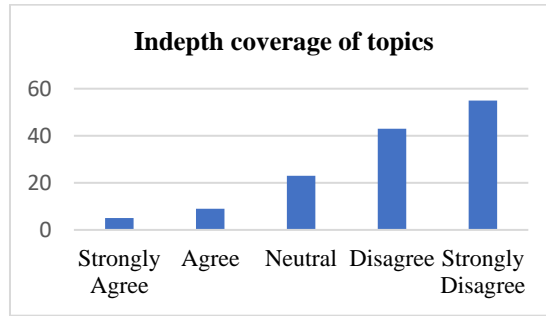
Figure 6: Coverage of Topics in detail

Assessing students' work online doesn't seem to favour them because most of the faculties felt as doing assessments online is ineffective.
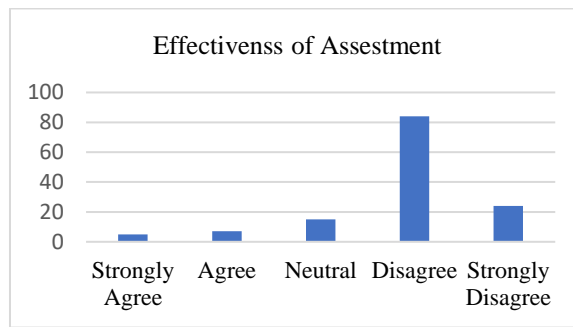

Figure 7: Effectiveness of Assessment

The majority of the faculties weren't satisfied with the performance of the online classes they take. None is happy with what they are delivering online. Moreover, they feel that quality is being compromised with online classes. This is because, they are not able to show or teach as per their expectation as they teach online with technical issues, requirement issues, and more.
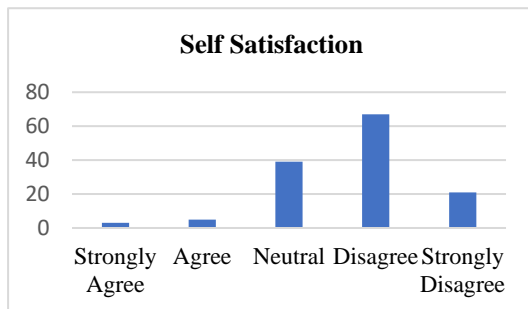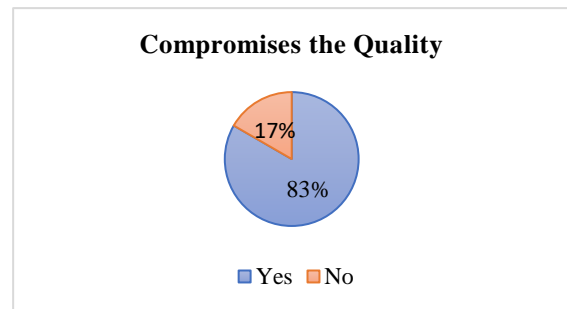

Figure 8: Self Satisfaction

Figure 9: Compromises the Quality

B. ANALYSIS OF DATA COLLECTED FROM STUDENTS

As they involve in online learning, the majority of them have no technical issues. However, 36% of them faced the issue.
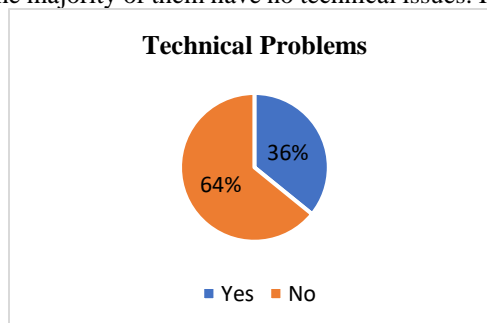

Figure 10: Technical Problem

Most of them are in a neutral state related to the understanding of the lesson as they are taught online and few think that don't understand at all from the sessions. But they felt that doing assessments online is effective for the majority of them as they can do assignments in softcopy and also tests can be done using the online platform which brings more convenience to them.
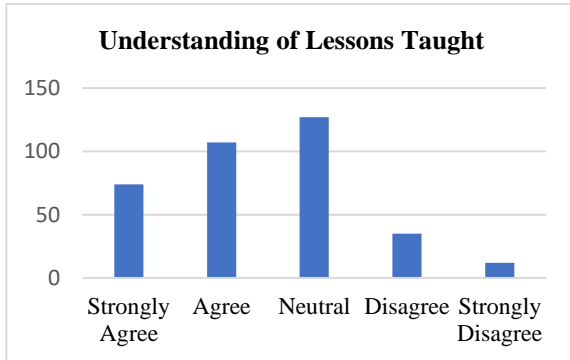
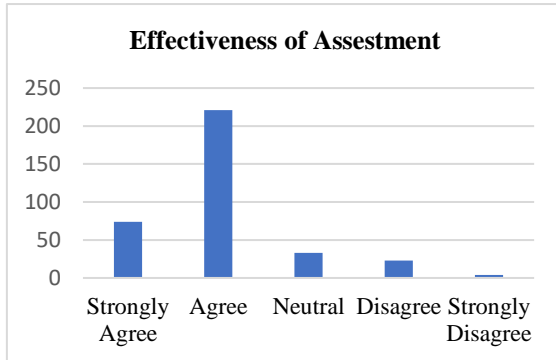

Figure 11: Understanding of Lesson being taught

Figure 12: Effectiveness of Assessment

They are totally against the flexibility of inquiry on subject matters and maybe they are not able to enquire and clear their doubts as and when they require. Furthermore, only some students are satisfied with the knowledge they gain from online teaching.
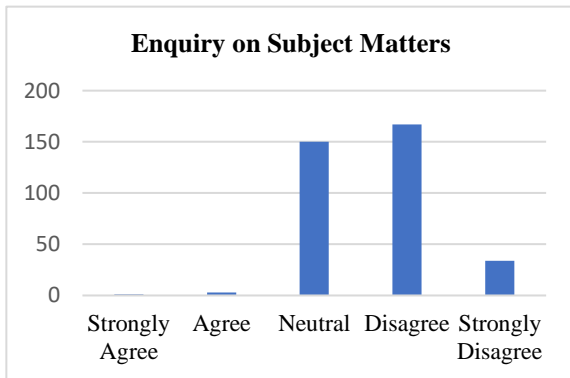

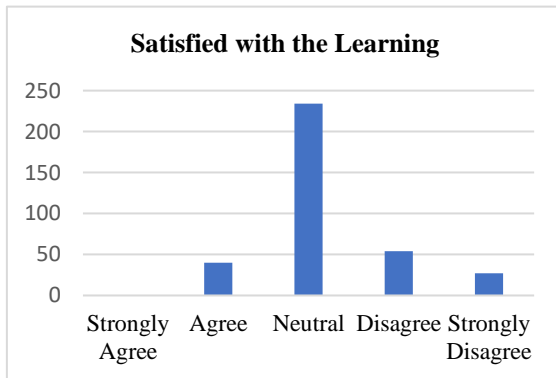Figure 13: Flexibility to enquire on the subject matter

Figure 14: Satisfied with Learning

It seems like there are only a few issues related to availability and access to resources. It could be because, they are provided with e-books and if they want to explore more, they will require other resources. And also, most of them have the feeling that learning online is flexible as they can learn anytime as per their schedule.
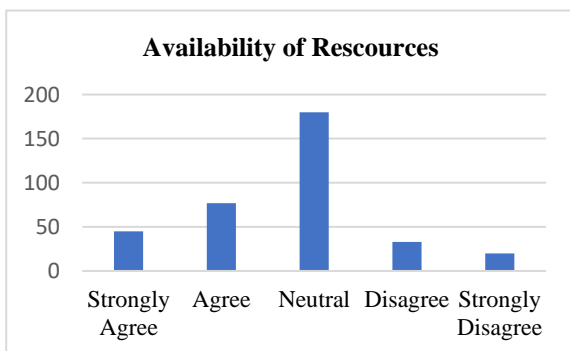
Figure 15: Availability of Required Resources

Figure 16: Flexibility of Learning

V. LIMITATIONS OF THE RESEARCH

As the respondent is targeted specifically to engineering colleges, it is expected that some of the analyses presented in the research can be biased. In this regard, the researchers feel that the results will be accurate if colleges other than engineering colleges can be included in the research area by future researchers. Furthermore, the data collection can be

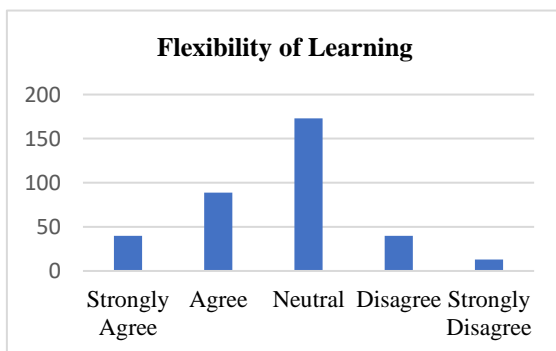done through the personal interview with the respondent to achieve the accurate result because it helps the researchers to ask questions without limiting to "YES" and "NO" questions.

VI. CONCLUSION

Online education is seen to be evolving all over the world while there is a drastic decline in the regular enrolment of students in institutions. This is because all the students who want to learn need not have to be present physically but they can learn as and when they feel like learning from anywhere at any time. With that, one who is busy during day time but if they have time in the evening can still get the opportunity to learn what they wanted if their choice of courses is available online. Another flexibility there is that they can access online courses of any country without any barrier unless they have no internet access. Obtaining the certificate while staying at their home is something exciting and encouraging for students if they take online courses. However, online teaching and learning were just talked about until the outbreak of COVID-19 in Bhutan, and colleges across the country weren't prepared at all when they are ordered to take online classes during the pandemic. This is because not only students but also faculties had faced difficulty in coping up with it as they are with no choice and had to make it a reality during the time of college closure.

Online courses can cover or reach students all over the globe, but knowledge delivery or quality of education received by students isn't guaranteed as per the paper [8]. This is because needed resources and subject specialists may not be available in times of need [10]. They have the opportunity to explore by themselves but with less guidance, they receive from experts, there are high chances of getting lost on their way of learning. Moreover, faculties won't be able to track every student's work and cheating by students will be unstoppable. In the worst case, they might let someone do their work on their behalf and achieve high grades but the knowledge they get will be compromised which will not only affect their career but also put institutions at stake.

It was learned that for successful online education, both student and faculties satisfaction need to be considered [13]. This is because faculties are the key player to make their students learn as required and good guidance from them will bring a huge impact on the student's future. Therefore, enough support must be given to faculties as, and when required, it will help them to continue working on making courses livelier for their students to involve in continuous learning. However, it wasn't fully successful in Bhutan though faculties have dedicated their time to delivering online courses with utmost motivation. This is not because students are uninterested in learning and bored of online teaching but because the internet connectivity issue [6] they have at their place made them not feasible at all. Furthermore, courses that have practical components were not conducted online due to the lack of requirements on the student's side. It was also found that doing assessments online or conducting exams online isn't the trusted mode of assessment if the quality of education is the priority.

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