

# **Students' Perceptions of Online Lecture Delivery Modes: Higher Education During Covid-19 Pandemic and Beyond**

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**Abstract**—During the Covid-19 pandemic, universities adopted several learning modes to ensure the continuation of the education activities. They adopted many methods of learning such as online once (online real-time with no recorded lecture; face-to-screen instead of face-to-face), online repeatable (online real-time with recorded lecture), Self (pre-recorded lecture only), and blended (pre-recorded lecture with face-to-face learning). Since all these methods are adopted without any evidence of their acceptance by the students, the purpose of this study is to evaluate each of these modes and identify the most preferred mode of learning. Also, this study tested the new method of blended learning preferred by the students. A questionnaire was shared among the students in two faculties in the University of Kelaniya Sri Lanka, and 903 were responded. Accordingly, this study found that the majority of the students preferred online real-time lectures together with the recorded lectures. This method was again tested with a selected student group and confirmed. Thus, this study recommends face-to screen lectures together with the recorded lesson is the most appropriate method to adopt during the new normal context.

**Keywords**—Covid-19, modes of learning, face-to screen, recorded lectures

## **1 Introduction**

In March 2020, the Covid-19 pandemic made all industries worldwide immediately closed for all the in-person activities and forced to adhere to social distancing, travel restrictions and lockdowns. Thus, education also became a standstill, and all the universities faced the challenges of continuing the education under new normal. Subsequently, almost all higher education institutions and academics shifted to the online mode of teaching and adopted their own pedagogical approach, which has led to varying effectiveness and practicability of teaching and learning. All the universities across the globe under the influence of Covid-19 pandemic have just changed the existing curricular which are prepared mainly for in-class teaching to online mode without a suitable pedagogical approach which has become a challenge now [1, 2, 3]. It could be observed that academics use various teaching methods to continue the teaching and learning process through this online delivery mechanism. Those teaching methods are

mainly four types: namely, online once (online real-time with no recorded lecture; face-to-screen instead of face-to-face), online repeatable (online real-time with recorded lecture), Self (pre-recorded lecture only), and blended (pre-recorded lecture with face-to-face learning). Therefore, it is very much essential to investigate the effectiveness of various delivery methods adopted during the Covid-19 in terms of students’ perception, as the higher education sector is unlikely to restore its previous state in recent times.

On the other hand, some researchers have already predicted that the online delivery of lectures will not only be an option for the pandemic situation but will also become one of the main delivery methods in the era of technology development [4]. It is interesting to see how receptive this idea of continuing online delivery of lectures in the post Covid-19 era will be to the student community [5].

Blended learning has been recognized as a learning pedagogy with a potential to foster innovative and flexible learning opportunities [6]. Ref. [6] supports the continued use of blended learning as a pedagogical approach. In another study on “Blended Learning: Post Pandemic Solutions” by [7] proposes that the “combination of online, offline, and face-to-face learning could create a more pleasant atmosphere for students, teachers, and parents”. It is interesting and important to investigate how the students who had an opportunity to follow lectures in Blended learning mode think about continuing education with this mode of learning.

Therefore, the purpose of this study is three-fold; to investigate the most appropriate teaching methods from the students’ perspective, whether to continue online learning in the post Covid-19 pandemic era, and to test the students’ perception on the new mode of blended learning as the most preferred learning mode with a selected cohort of students.

Accordingly, four objectives of this study are stated as follows.

1. To evaluate the different modes of learning exposed to the students during the Covid-19 pandemic
2. To identify the most preferred mode of learning of the students
3. To test the students’ perception of the new mode of blended learning as the most preferred learning mode with a student cohort
4. To identify whether students are in support of continuing online learning in the post Covid-19 era.

## **2 Literature review**

E-learning has two forms i.e, synchronous and asynchronous. In synchronous form, the lessons are delivered in real-time through video conferencing tools; thus, there is a live interaction between the teacher and the students. In the asynchronous form, the students learn through the materials provided by the teacher, and the interaction happens through forums, emails and discussion boards, or synchronous chat rooms. On top of that, Blended learning is where both face-to-face (in-class) and online learning occur based on a carefully designed structure.

The teaching pedagogy used in synchronous and asynchronous learning impacts the ‘learning habit inclinations’ [8]. They found that students who experienced synchronous classes are less in autonomy and high interaction than prerecorded content. According to [9, 10], students prefer synchronous and recorded live lectures and asynchronous recordings with the live question and answer session compared to non-recorded live lectures. Further, they revealed that students like to have interactive quizzes and activities during the lesson. The researchers suggest that a combination of synchronous and asynchronous should improve the student learning experience. A study conducted in Pakistan on language training revealed that synchronous mode is more beneficial for the learners, but the limitations can be reduced at the synchronous discussion sessions [11]. Also, many researchers have found no difference in effectiveness or grades obtained either the students attending live recorded lectures or only watching the recorded lecture [12, 13, 14, 15, 16]. However, some studies found that there is a negative relationship between the students who only watched recorded lectures and their grades [17, 18], thus they proposed the need of a blended teaching environment. Ref. [19] found a positive association between prerecorded lecture students’ ratings on the teaching effectiveness of the lecturer. Also, the same study found that students more preferred bit-sized rerecorded videos than longer recordings. This is also supported by Ref. [20] in a unique way. They have offered the student the facility to accelerate the speed of the recorded video and found that out of 88.5% of the students who watch the recorded video has used accelerated technology and stated reasons as, it saves time, watch only the segments they missed or didn’t understand [21], improve the focus, look up for information. Students use this saved time to study other materials, sleep and rest, take notes, and be involved in leadership and research activities. Providing the recorded lecture is also beneficial for the students who follow which do not offer in their mother tongue. This is found by Ref. [22] that lecture recordings are mainly caused by the non-native speakers who have difficulty in understanding the language during the lecture. Therefore, students like the flexibility given by the pre-recorded lectures and same time, they like to have live lectures to instill the social interaction [23].

However, the lecture recordings should not be used to replace face-to-face or online real-time lectures and should be used as supplementary or adjunct [20, 24, 25, 26]. If the lecturer provided the recorded lecture similar to a live lecture, it will decrease the students’ attendance to the class [27], which is an obligatory component in both students and lecturers at higher education. Thus, the recorded lecture should be carefully planned and give the motivation to attend the lectures. Also, the prerecord lectures can be used repeatedly, thus resulting considerable cost savings [14].

### **3 Sri Lankan background**

In Sri Lanka, after a brief silence with the outbreak of the Covid-19 pandemic, educators slowly moved to virtual meeting platforms like ZOOM and TEAMS, and social media like WhatsApp and Viber to meet their students virtually. Lectures were conducted using these virtual platforms. However, there were a lot of challenges faced by

the higher education community during this period. Lack of trained staff on using virtual meeting platforms, dedicated servers for these platforms, financial difficulties due to charge for Internet access, poor Internet connectivity and etc [28]. This mode of learning can be considered as a new form of face-to-face learning mode since the only difference is lecturer and the students are geographically dispersed. In the literature, the transition of learning pedagogy from face-to-face teaching to a new form of face-to-face learning over the Internet is termed as face-to-screen learning [29]. No recorded lessons were distributed among students. We refer to this mode of learning as Online Once (online real time but no recorded lecture). Then later, due to students complains on weak Internet connections, lack of data cards to connect to the Internet and charges for data on servers, and the demand from students to have the recorded lecture for later references, educators had to consider the option of recording the online lectures and distribute among the students [30]. We refer to this mode of learning as Online Repeatable (online real time lecture plus recorded lecture).

Specially in the case of using social media for learning, educators share the pre-recorded lectures without follow up discussion either in physical face-to-face mode or virtual meeting mode. This learning mode is referred to as Self (Pre-recorded lecture only).

Blended learning has been identified as one of the options to replace the traditional face-to-face teaching. Majority of educators in the higher education sector used face-to-face teaching. In Blended learning, both online teaching (Pre-recorded lecture in this case) and face-to-face teaching can be seen. We identified this mode of learning as Blended (Pre-recorded lecture followed by face-to-face activities). The face-to-face component was possible since in between 1st wave and 2nd wave of Covid-19 pandemic, students were called to the higher education institutes for a brief session lasting about one month.

As mentioned earlier, due to various problems, some educators did not conduct online lectures during the 1<sup>st</sup> wave of Covid-19 pandemic. They used the opportunity to get the students to the traditional face-to-face mode of learning during the period between the 1<sup>st</sup> and 2<sup>nd</sup> wave of Covid-19. Therefore, we have given the option of Physical (fact-to-face only) mode of learning as well.

Accordingly, we have given the options of Physical (fact-to-face only), Online Once (online real time but no recorded lecture), Online Repeatable (online real time lecture plus recorded lecture), Self (Pre-recorded lecture only), Blended (Pre-recorded lecture followed by face-to-face activities) to students to select what was (were) the method(s) they followed and asked them to specify the most preferred learning mode among them.

Most of the styles are intuitive. However, we invite you to read carefully the brief description below.

## **4 Research design**

This research took place at the University of Kelaniya in Sri Lanka, covering the Faculty of Commerce and Management Studies and the Faculty of Computing and Technology. This research was conducted in two phases. i.e., in the first phase, data

were gathered to achieve the 1st and 2nd research objectives and in the 2nd phase of the study is conducted to confirm the findings of the 1st phase of the study.

At the 1st phase, data were collected through a questionnaire developed in a Google form and shared among the students of all levels of the two faculties and 903 undergraduates were responded.

The questionnaire was designed to achieve the first two research objectives set at the beginning of this study as follows.

At the beginning of the questionnaire, they were asked to mention their faculty, level of study, degree following, gender and the district they live in as demographic factors. After those the following questions were given.

— **To evaluate the different modes of learnings exposed to the students during the Covid-19 pandemic**

The partial sentence “I have been engaged in the following types of learning modes: “was given with the opportunity to select multiple responses from “Physical (fact-to-face only)”, “Online Once (online real time but no recorded lecture)”, “Online Repeatable (online real time lecture plus recorded lecture)” , “Self (Pre-recorded lecture only)”, and “Blended (Pre-recorded lecture followed by face-to-face activities)” to complete the sentence since students were offered more than one mode of learning during Covid-19 pandemic.

— **To identify the most preferred mode of learning of the students**

The question “What is the most preferred mode of learning?” was given and asked the students to select only one answer from the following list of options: “Physical”, “Online Once”, “Online Repeatable”, “Self”, and “Blended”.

Also, the questionnaire contained an open ended question to give reasons as to why they preferred a particular mode of learning.

— **To test the students’ perception of a new mode of blended learning as the most preferred learning mode with a student cohort**

After gathering the data for the above two objectives, data analysis was carried out to examine the most preferred mode. There we found that online repeatable i.e., online real time lecture plus recorded lecture is the most preferred method of the students.

As the second phase of the study, i.e., to confirm this finding and also to achieve the third research objective, a group of students which consists of 66 in the subject of Management of Technology of the Department of Commerce and Financial Management of the Faculty of Commerce and Management Studies of the University of Kelaniya were selected to test the most preferred method of learning.

At the beginning of the semester, they were informed the following procedure and adopted it.

(1) Upload the pre-recorded structured video lessons (duration of a video is between 8-15 min) to the LMS

(2) Upload the materials relevant to the topic such as websites, book sections, and YouTube videos, to the LMS to refer to.

(3) Ask the students to write the weekly summary of the topic of the video and upload it to the CAL as an assessment (use the discussion forum so that every student can see others’ summaries to develop their notes)

(4) A Zoom lecture is conducted every 4th week (after self-learning with pre-recorded lessons for three weeks) to discuss the subject matters related to the previous weeks' lectures.

Students’ feedback was collected through a questionnaire in the mid-semester to examine their perception on this new method. In the questionnaire, they were given to rate in a 5-point Likert scale on to what extent they like pre-recorded structured video lessons, duration of the video, other materials uploaded to LMS, writing the summary of the topic and overall likeness of this method. An open-ended question was given to write their opinion on live Zoom lectures conducted in every 4th week.

Out of 66 students 46 responded to the questionnaire.

— **To identify whether students are in support of continuing online learning in the post Covid-19 era**

Students of the both faculties (that is 903 respondents) were asked the question “Do you think that digital learning should be continued in some form in post Covid-19 period?” and asked them to select one from the options “Yes”, “No” and “May be”. All respondents, that is all 903 respondents had responded to that question.

## 5 Data analysis

Out of the total responses (903 responses) received, the Faculty of Commerce and Management studies consists of 66.2% and the Faculty of Computing and technology consists of 33.8%. It is shown in Fig.1. Also, as per the Fig. 2, out of total respondents 56.4% are females while 43.6% are males.

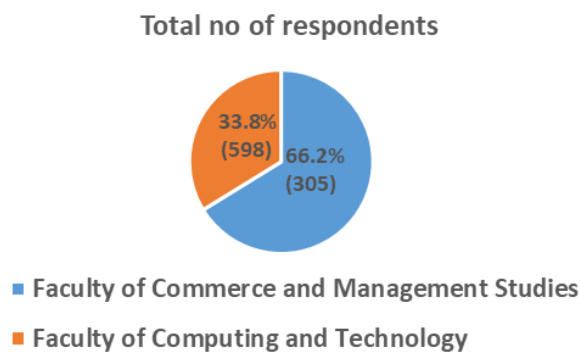


Fig. 1. No of respondents by faculty wise

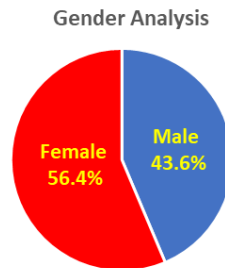


Fig. 2. Gender Analysis of the respondents

**5.1 Objective 1: To evaluate the different modes of learnings exposed to the students during the Covid-19 pandemic**

The survey results (Fig 3.) confirmed that 303 respondents were followed Physical mode of learning. According to the survey results, it shows that 449 respondents out of 903 total respondents had online once mode of learning during the past year under Covid-19 pandemic. The survey results further shows that online repeatable mode of learning has been rated number one by total of 753 respondents out of 903 student respondents. Two hundred and eighty five (285) respondents confirmed that they continued their higher education in prerecorded mode of learning too. The survey result shows that only a handful of lecturers used blended learning techniques in teaching and learning with only 101 respondents out of 903 total respondents confirming that they could continue their education through this mode of learning during the Covid-19 pandemic.

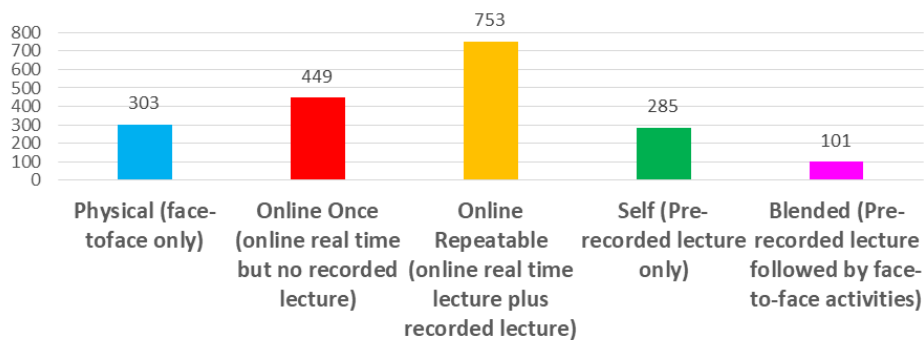


Fig. 3. Model of learning used during Covid-19 Pandemic

**5.2 Objective 2: To identify the most preferred mode of learning of the students**

When the study asked students, what is the most preferred mode of learning for them, 531 (58.8%) responded as the online repeatable i.e., online real time with the recorded lecture is the most preferred mode of learning to them. Out of 903 respondents, 287 (31.8%) said that physical lectures as their most preferred mode of learning, while 54

(6%) preferred for blended learning and 18 (2%) and 13 (1.4%) preferred for self and online once respectively (See Fig. 4).

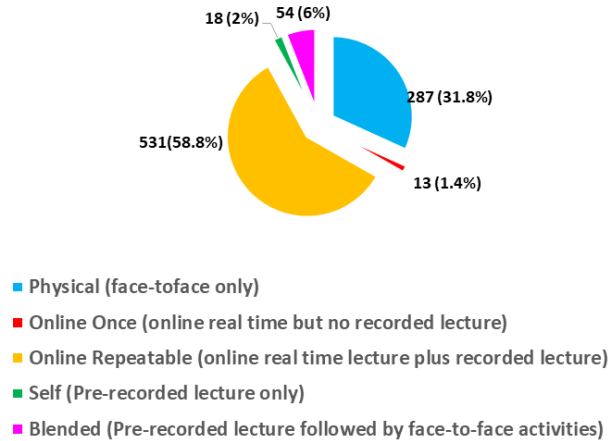


Fig. 4. Most preferred mode of learning by the students

The Table 1 shows the cross tabulation of students’ responses between the learning modes used during the Covid-19 pandemic and the most preferred mode of learning. Further analysis of data in the Table 1 gives us the following important and interesting observations:

1. The two learning modes: the “Physical (Face-to-face only)” and the “Online Repeatabe (online real time lecture plus recorded lecture)” are the most favored mode of learning by the respondents. This is visible in the table at row 1 and row 3.
2. Only 138 respondents out of 303 who followed the “Physical (Face-to-face only)” mode of learning are among the 287 respondents who rated this mode of learning as the most preferred mode of learning. As a percentage, 45.5% of respondents who followed the “Physical (Face-to-face only)” mode of learning thinks that it the most preferred mode of learning.
3. Another 136 respondents who followed the “Physical (Face-to-face only)” mode of learning rated the “Online Repeatabe (online real time lecture plus recorded lecture)” as the most preferred mode of leaning. It is 44.9% of the 303 respondents.
4. Only 487 respondents out of 753 who followed the “Online Repeatabe (online real time lecture plus recorded lecture)” mode of learning are among the 531 respondents who rated this mode of learning as the most preferred mode of learning. As a percentage, 64.7% of respondents who followed the “Online Repeatabe (online real time lecture plus recorded lecture)” mode of learning think that it the most preferred mode of learning.
5. Another 205 respondents who followed the “Online Repeatabe (online real time lecture plus recorded lecture)” mode of learning rated the “Physical (Face-to-face only)” as the most preferred mode of learning. It is 27.2% of the 753 respondents.



**Table 1.** Mode of Learning used during Covid-19 VS Most Preferred mode of learning

Used	Preferred					Total (Figure 2) [Single Selection]
	Physical	Online Once	Online Repeatable	Self	Blended	
Physical	138 (45.5%)	158	205 (27.2%)	88	30	287
Online Once	1	9	9	3	0	13
Online Repeatable	136 (44.9%)	249	487 (64.7%)	154	49	531
Self	4	6	15	13	0	18
Blended	24	27	37	27	22	54
Total (Figure 1) [Multiple Selection]	303	449	753	285	101	903

The students perceived that online real time lectures together with the recorded lecture is the most preferred mode of learning mode of them during the pandemic.

Students like this method mainly because of the weak internet connection, power disruptions and device troubles. In the open ended questions, they have explained these reasons as follows.

*“I am living in the rural area. There is no stable internet connection. If the recorded lectures are uploaded then I can download without troubles”*

*“Some days we won’t be able to join zoom sessions due to bad weather conditions, power cuts, not having sufficient data. So we listen to the recorded lectures”.*

*“I and my brother both are using one device to learn so, in here has to face some troubles”.*

*“Having a recorded lecture is always good since we can use them later even we did not get the ideas in the first place. Sometimes connection issues happen in even urban areas.*

*Sometimes our devices (laptops, phones etc) might break or not function as they intended to and also repairing them is quite hard these days. With recorded lectures one can refer those materials even after weeks when they repaired or recovered their devices”.*

Further, they stated that even with the live lecture (online once) they can clarify the things using the recorded lecture and recorded lectures can be watched many times. Accordingly, students noted that:

*“I can able to ask live questions from lecturers during the lecture time and able to watch recorded lectures when I absent to participate”.*

*“Ability to listen to a lecture more than once, Ability to ask questions in real time lecture, Easy to self-learning”.*

*“It’s useful when I need to refer to the lectures in case something goes wrong during the live sessions.*

*“Live (real-time) sessions are needed in order to keep the learning approach more interesting and communicate with the lecturer effectively by asking questions and so on. It strains my eyes when staring at a computer screen for too long during continuous live sessions. So, it’s helpful if the lectures are recorded - that way I can refer back to them in case I miss any information during the live sessions”.*

*“In a real-time environment, we can easily refer questions to the lecturer. Having records gives us the added advantage of being able to memorize the subject easily”.*

The second most preferred method of the student is physical learning mode and students like this mode mainly because of the difficulties they had to face in doing practical subjects. Two students have explained this as follows.

*“Because online method does not teach practical well. Ex: we had a networking lab in the 2nd year. That module did only two days physically. I think we didn’t learn that well. This is the main reason I had faced.”*

*“The most suitable way for the practical subjects is physical. (Practical subjects can’t do perfectly in online ways)”*

Also, in the physical environment they feel it is comfortable, interactive, and easy to communicate with the lecturers and their peers. Accordingly, the following statements of the students revealed those.

*“Student can connect with the lecturer, Student has education environment inside the class, and Student can be able to actively participate for the practical lessons”.*

*“There is a better educational environment in the faculty. We can discuss problems with lectures or students. It is the most effective learning method that we are getting used to it”.*

### 5.3 Objective 3: To test the students’ perception of new mode of blended learning as the most preferred learning mode with a student cohort

The finding gathered through the 1<sup>st</sup> phase of study applied in the new semester which began in May 2021.

Accordingly, 78.7% stated that they liked the pre-recorded structured video lessons that were given to them, while 66% like the length of the video. These results are shown in the Fig. 5 and Fig. 6 respectively. The reasons they given as for their selection were those videos can be watched again and again, easy to lean anytime without Internet access, they can work at their pace of time, easy to download, shorter videos are good as they are not bored, can concentrate than long videos and easy to grab the information.

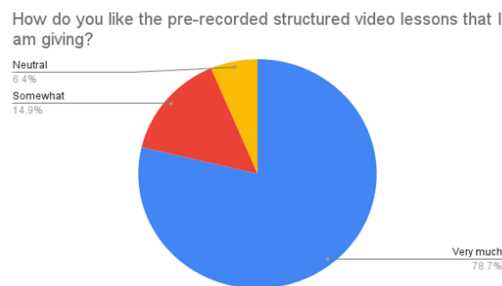
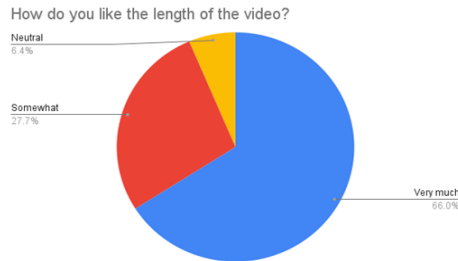
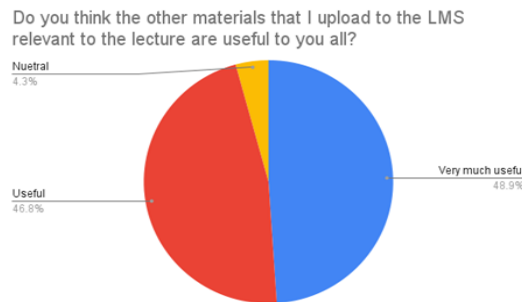


Fig. 5. Likeness for pre-recorded lectures



**Fig. 6.** Likeness for the length of the pre-recorded video

According to the Fig.7, 48% like the other supported materials that uploaded to the LMS.



**Fig. 7.** Usefulness of the materials upload to the LMS

It is interesting that 95.7% like the assessment of writing the summary of the topic as it enhances their knowledge which shows in Fig. 8.



**Fig. 8.** Perception of writing the summary of the topic

The Fig. 9 shows that among the respondents, 55.3% like this mode of teaching. As reasons, they have stated that it is more comfortable for them since they have the recorded lecture and solve the Internet connection issues of joining live lectures every week. Also, they stated that this method encourages them to search the Internet for more information regarding the topic.

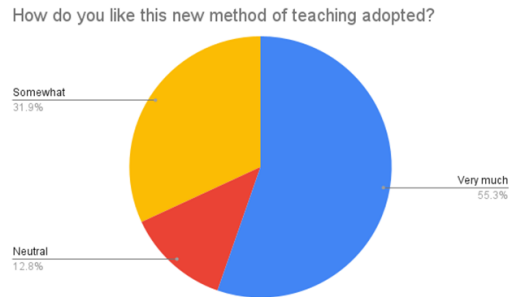


Fig. 9. Likeness of the new blended learning method adopted

**5.4 Objective 4: To identify whether students are in support of continuing online learning in the post Covid-19 era**

The survey result confirms the suggestions made by Ref. [31] to use online learning in the future education. According to Fig. 10, only 16% of the total respondents rejected the idea of using online learning in the post Covid-19 era, but 52% says “Yes” while another 32% were undecided.

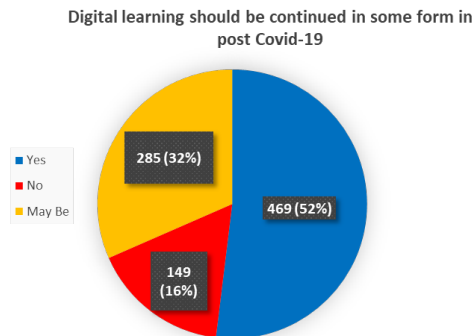


Fig. 10. Continuation of digital learning in post Covid-19

Summary of the results:

1. Majority of respondents think that the Online Repeatable (Online real time lecture and the recorded lessons) is the best mode of learning during the Covid-19 pandemic.
2. Majority of respondents confirm that some form of online education should be continued in the post Covid-19 era.
3. Therefore, new form of blended learning: Pre-recorded lessons with assignments and the follow up face-to screen sessions has been well accepted by the students

## **6 Conclusion and Recommendations**

Since the outbreak of the Covid-19 pandemic, higher education institutes employed several learning modes like Physical (fact-to-face only), Online Once (online real-time but no recorded lecture), Online Repeatable (online real-time lecture plus recorded lecture), Self (Pre-recorded lecture only), Blended (Pre-recorded lecture followed by face-to-face activities) to reach their students and continue the higher education which is essential for any economy.

Thus, this research paper aims to evaluate the different modes of learning exposed to the students during the Covid-19 pandemic and to identify the most preferred mode of learning of the students and to test the students’ perception of a new mode of blended learning.

According to the students’ responses, the most preferred method was online repeatable (online real-time lecture with recorded lecture) followed by Physical (fact-to-face only), and online repeatable methods are tested and confirmed as a new form of blended learning approach. Also, students preferred to continue digital learning in post Covid-19 also.

Covid-19 forced the education to transfer online. Also, the blended learning method has long been accepted as a productive learning method [32] [33] [34] [6]. On the other hand, today, we must deal with digital natives, and it is essential to use technology in dealing with them [35]. But in a pandemic like Covid-19, we cannot implement blended learning in the same way as we used to do it. Its physical part cannot be activated in this kind of Pandemic situation. Also, it cannot be forecast for future disasters. Therefore, the Blended Learning model should be innovated to match with this new normal context. Thus, video-recorded lessons with face to screen mode are the most suitable method to adopt instead of traditional Blended learning methods.

Therefore, this study helpful for the universities and faculties who follow the online teaching methods in the post-Covid -19 era or during the next normal conditions to design their teaching/learning strategies. Since the students are more preferred for online lectures with short length recorded lessons, the faculty should provide the students with quality and structured video-recorded lectures followed by direct contact with them either face-to-face or face-to-screen to make the learning more worthwhile. The future sustainable learning model should satisfy three conditions:

1. It should be technology driven since the future education should cater to the digital natives
2. It should be applicable to the normal conditions as well as to the conditions like new normal situation after Covid-19 pandemic
3. It should make sure that the only minimum disturbances to the teaching/learning process during the transition from the normal to new-normal and vice versa.

Therefore, a new form of blended learning that is pre-recorded, short length digital lessons followed by a face-to-screen sessions with students is recommended.

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