

Research Paper

## Graduate teaching during COVID-19 induced lockdown

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### ABSTRACT

The goal of this paper is to study the impact of the Covid19 induced lockdown on graduate education. We conducted an online survey wherein we surveyed undergraduate and post-graduate students. The questionnaire was made on Google Forms through which we received 803 responses. The respondents were from various universities of India. The data received from the survey revealed that teachers tried to reach out to students by providing them study material by different modes. The study material provided sufficient and useful information on the specific topics, however sometimes the students felt over burdened with the amount of information given. A significant number of teachers took online classes, the frequency and duration of which varied across different subjects and course. The survey revealed unpreparedness of the students and teachers when it came to online teaching. Majority of the students had little or no experience of this mode of teaching. A large group of students didn't have personal laptops. The online teaching process was hindered because of lack of internet access and technology due to geographical and financial restraints. Students suffered due to non-availability of infrastructure conducive to their learning like libraries, laboratories and classrooms. Majority of the students did not have online classes for all of their subjects. Many students felt that they did not have a conducive environment to study at home. Significant problems were encountered during this unplanned and sudden transition from classroom learning to remote/online learning. We found through the survey that socio-economic differences, geographical and financial restraints in India make the current method of online teaching full of logistical and infrastructural challenges. Overall, for both teachers and students, it was like setting into rough waters. Although at present people are attempting

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to adapt themselves to this new system of the teaching-learning process, there still is an underlying requirement to develop a holistic and encompassing mechanism which is in the best interest of every section of society.

**Keywords:** *Covid-19, Lockdown, Online Teaching, Remote Teaching, Internet Connectivity, Google meet, Zoom, Web Links*

The Covid-19 pandemic is considered as one of the most crucial and unprecedented global health calamities of the century. Post the Second World War, it is being seen as the greatest trial faced by humankind (PTI, 2020). The corona virus disease, originating from Wuhan in December 2019 (She J.etal., 2019), is an infectious respiratory disease, the outbreak of which has embarked a health crisis across the globe (Aaron Kandola, 2020). Beyond our physical well-being, it has also had a significant impact on the way we perceive the world today and our everyday lives.

Due to the extremely contagious nature of the virus, (Ramalingam and Balasubramanian 2020) it has rapidly spread around the world, posing enormous health, economic, environmental and social challenges to the entire human population. 'Flattening the Curve' has been a global struggle and all are trying to slow down the transmission of the disease by testing and treating patients, quarantining suspected persons through contact tracing, restricting large gatherings and so on.

Unfortunately, instead of improving, the situation has worsened and the cases worldwide are expanding exponentially. To escape from the community level transmission of the virus and the threat it poses to human life, the national governments are imposing lockdowns time and again. In India, the severity of the virus came upfront in March 2020 when the number of infected people began to rise. This forced the government impose a complete lockdown throughout the nation to halt its community spread. The notion of 'Work from Home' took the foreground as there was a hiatus on almost all the work sectors. It was as if human life had come to a standstill with people caged in their homes. Some still earned their livelihood but those whose work could not happen from the vicinity of their homes were rendered without a steady livelihood.

Countries throughout the world are facing a harsh impact, from micro to a macro level, almost all sectors are getting affected and their smooth functioning has become a challenge. One of the major sectors affected by Covid-19 pandemic is education. While countries are at different points in their Covid-19 infection rates, worldwide there are currently 1.2 billion children affected by the school, college and university closures due to the pandemic (UNESCO, 2020). In India, somewhere in the third week of March, state governments across the country began closing schools and colleges temporarily to curb the spread of Covid-19. The structure of education, including teaching and assessment methodologies, was deeply disrupted. The pandemic has disturbed the higher education sector as well, which is a major determinant of the country's economic future.

The virus has inspired a new wave of higher education, with a shift towards remote teaching. Traditional objections to online teaching have been cast aside. Emergency remote teaching is in essence an unexpected and unprepared shift. It is understandable that many universities did not have the time, resources or capabilities to set in motion adequate systems to adapt to this change in teaching methodology. It is pertinent to remember that this form of teaching is not online learning. Neither is its digital strategy nor digital transformation of a university.

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Whatever be the mode of teaching, it is important to find out what the student is imbibing. In any system input and output go hand in hand. In the education system, if we consider teaching as the input, learning experience becomes the output. What really matters is the output. How the learning experience has been absorbed by the students should always be on our mind.

Under the initiative of revoking the spread, multiple universities have announced for the upcoming semesters to be completely online. For universities and students, hopes of a return to normal campus life is a far-flung idea. In the near future in person teaching seems to be impossible unless it is in smaller groups.

To better the understanding of the impacts of COVID-19 pandemic on Indian collegiate education, this comprehensive re-viewing of the sudden transition to remote teaching/online classes done by numerous colleges and universities during the lockdown period is being done. The study will not only provide insights regarding the extent to which the colleges/universities were prepared and equipped to handle the situation but also give us leads to face the coming challenges.

### *Goal of the study*

The goal of the present study was to understand how teaching took place during the lockdown period imposed because of the Covid-19 infection and how this process of teaching –learning can be evolved to benefit students.

## **METHODOLOGY**

### *Sampling Methods and Sample Size*

The sampling methods used in the research were Convenience Sampling and Snowball Sampling (Taherdoost, 2016). The questionnaire was circulated amongst students of various colleges and universities of India and 803 responses were recorded in total. The population targeted for this study was undergraduate and postgraduate students. The responses were collected from University and College students across the country.

### *Type and Source of Data*

Primary data has been used for the study. The primary data was collected using questionnaire method through a Google Form. A questionnaire covering 20 questions was drafted with multiple types of questions, such as close ended, multiple choice questions and Likert Scale (Ankur Joshi et al, 2015) based questions.

### *Tools and Techniques*

Varied tools and techniques have been used in the study, ranging from various accounting techniques to statistical tools like percentages and ratios, which have been used as a device to analyse and interpret the responses of the respondents. The data have been presented using various means such as graphs, charts and tables as it helps in presenting quantitative facts in simple, clear and attractive manner and leave a lasting impression.

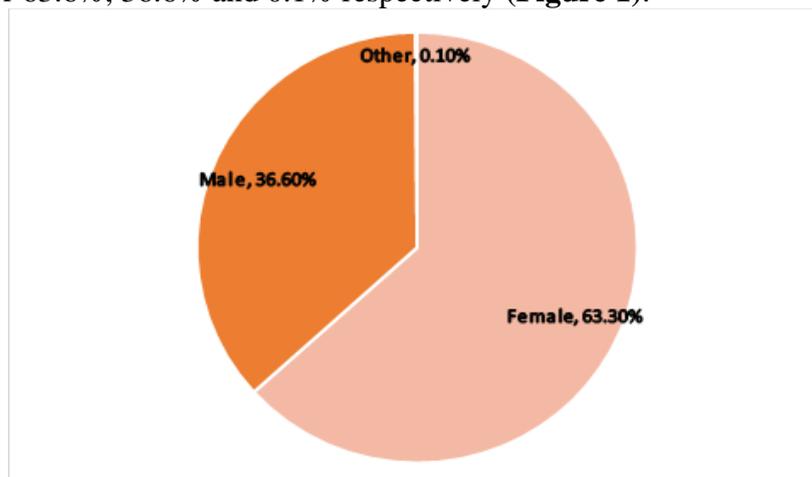
## **RESULTS**

### *Teaching during Lockdown period*

To understand the effectiveness of this sudden switch to remote/ online learning, a number of questions were designed and incorporated in the survey form. A total of 803 responses were recorded through Google Forms. Out of all the individuals who participated in the

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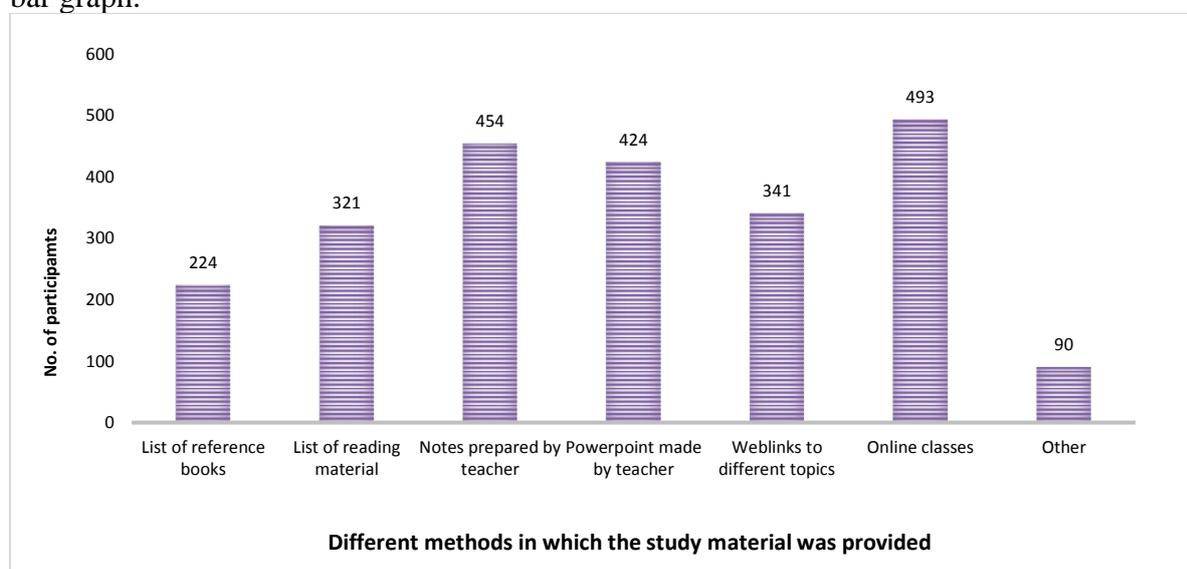
study, 508 were females, 294 were males and two preferred not disclosing their gender. Accounting for 63.6%, 36.6% and 0.1% respectively (**Figure 1**).



**Figure 1: Gender Demographics**

After the announcement of the lockdown in March 2020, institutes of higher education in India had to quickly shift to remote/online mode of teaching to cover the syllabus that was left to be taught. Under normal circumstances, the students have the resources of their institution's library, laboratory and classroom at their disposal. However, due to the fact that offline classes and access to libraries had been cut off, study material was provided to students in various forms.

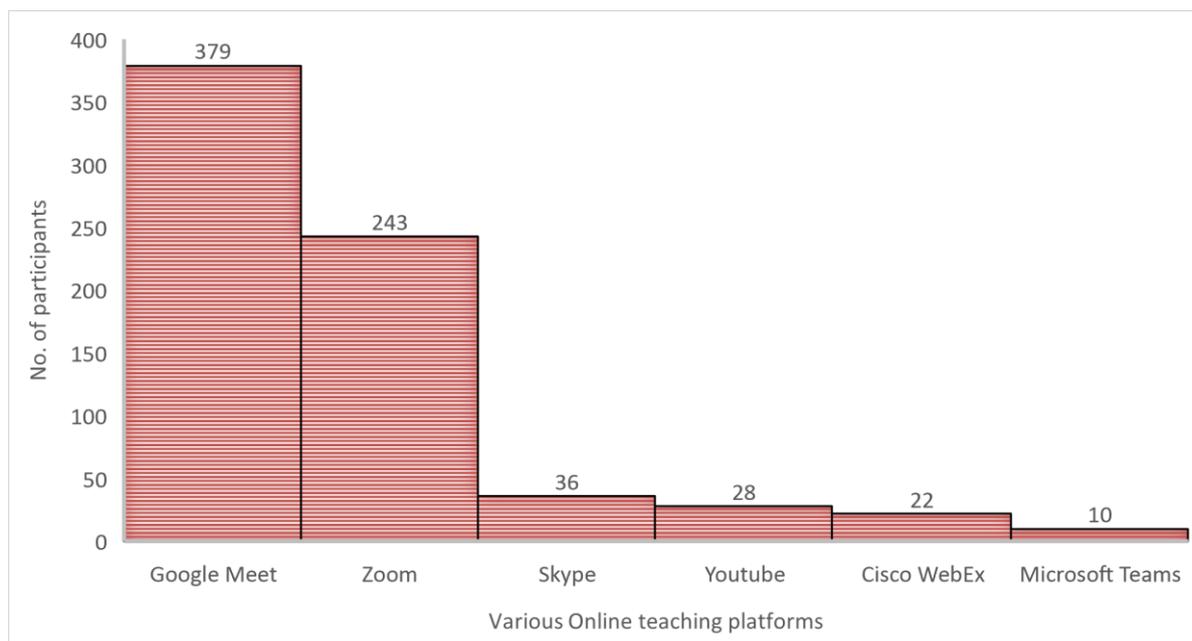
For 61.3% of the students, study material was provided during online classes. 56.5% of the students received study material through notes prepared by their teachers and nearly half of the respondents (52.8%) received the material through PowerPoint presentations. Web links were provided to 42.4% of our respondents. Every course has different studying requirements and availability of reading material, videos, modules and practical demonstrations vary from course to course. These varied responses were received owing to the fact that our respondents were from Science, Commerce and Humanities courses. **Figure 2** shows the different methods used by teachers to provide study material to students using a bar graph.



**Figure 2: Methods used by teachers to provide study material**

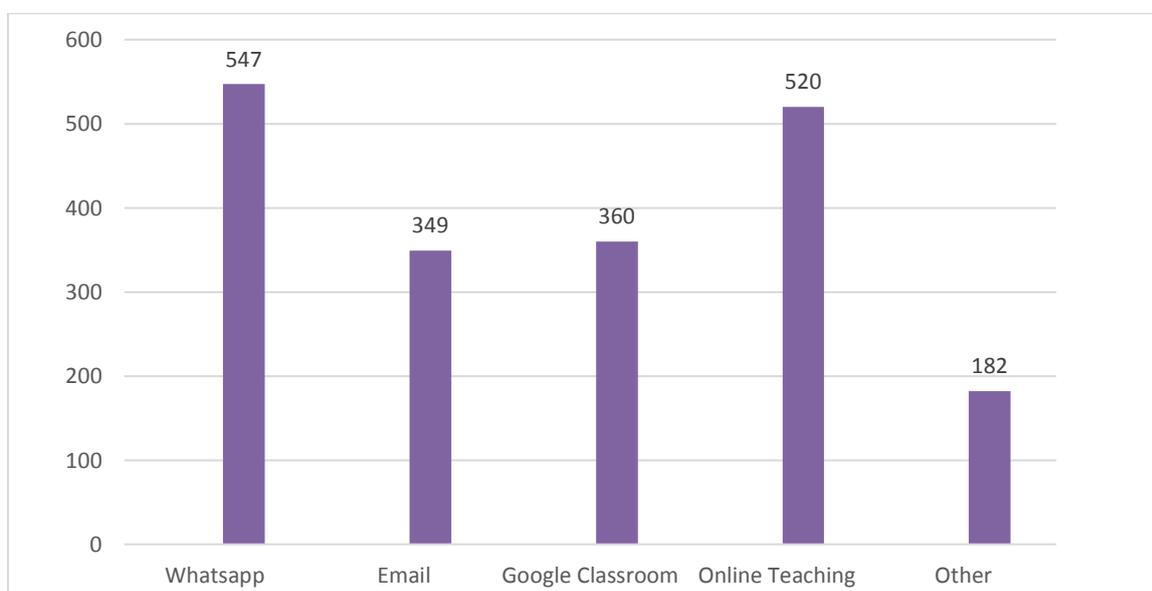
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When it came to conducting online classes, most teachers (47%) used Google Meet, while 30.2% of online classes were held through Zoom. Very few classes were held through Skype (4.4%), Cisco WebEx (2.7%) and Microsoft Teams (1.2%). These statistics are represented pictorially through **Figure 3**.



**Figure 3: Online Teaching Platforms**

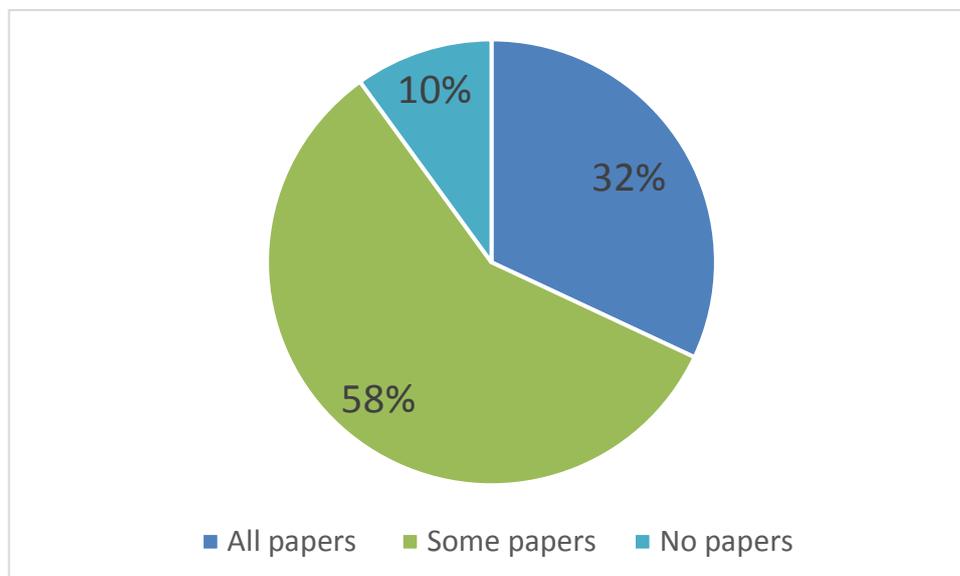
While the types of study material given to students was diverse, the platforms through which the study material was given to students was also varied. According to the results of the survey conducted, various platforms were used by the teachers for circulating the study material amongst the students. WhatsApp was the most commonly used platform to share study material. 68.1% respondents received their study material through WhatsApp. 64.7% of the students received their study material through online classes. 44.8% students were given study material through Google Classroom and 43.4% via E-mail. (**Figure 4**).



**Figure 4: Platforms used by teachers to send study material to students**

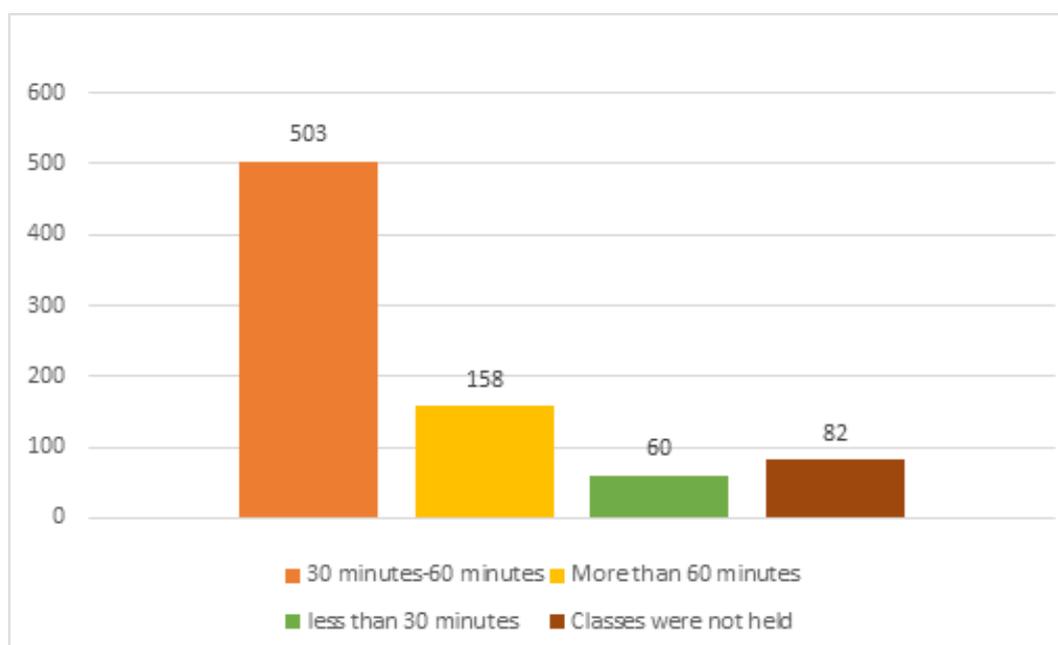
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Through the questionnaire, it was enquired whether all the papers of a particular course were taught to the student or not. Out of 803 respondents, 58% of the students had classes for only a few papers/subjects from their curriculum. Only 32% of respondents had classes for all their papers taught to them through online classes. A meagre 9.96% of students had no online classes. This data is represented through a pie chart in **Figure 5**.



**Figure 5: Proportion of papers taught in a particular course**

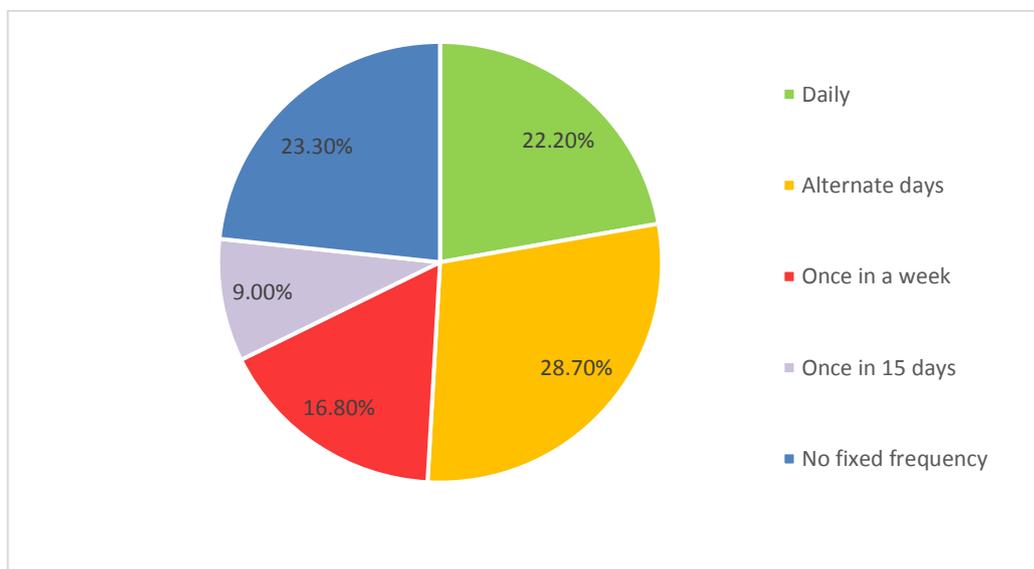
The majority of the students constituting 62.6% of the total respondents had their classes for 30-60 minutes whereas 19.7% of students had their classes for over 60 minutes. There were 7.5% of the respondents who had their classes for the duration of half an hour whereas 10.2% of the respondents did not have any online classes. **Figure 6** shows the duration of online classes of our respondents through a bar graph.



**Figure 6: Duration of classes**

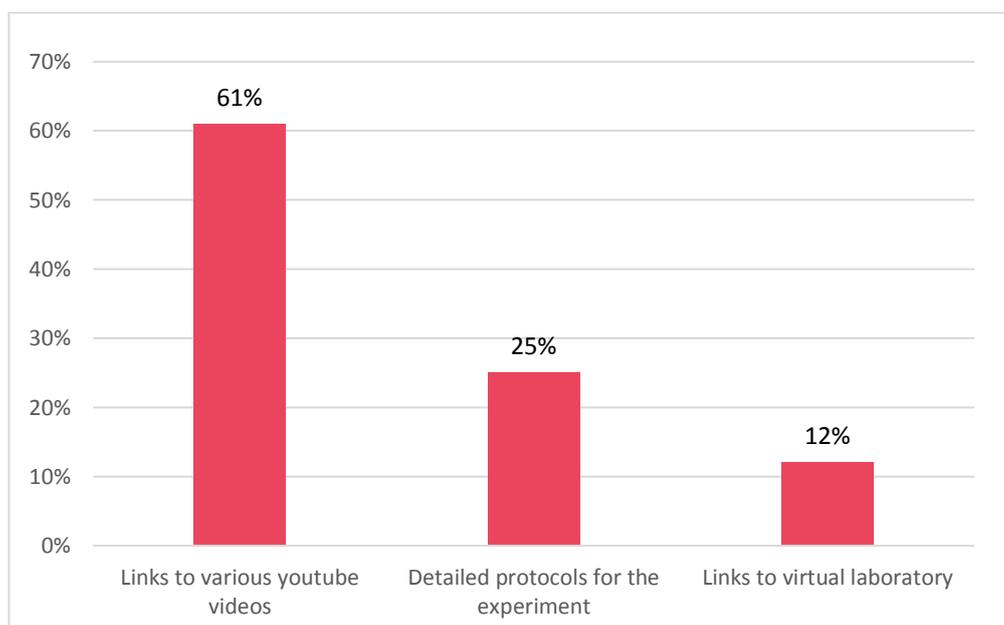
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Out of the students who participated in the survey, 28.6% of them had their online classes on alternate days. With 22.3% of votes, having online daily classes became the second most chosen option. There was a group of 16.8% of respondents who had their classes once a week and 9% who had their class once every 15 days. The option of ‘No Fixed Frequency’ of classes was chosen by 7% of the respondents. The frequency of online classes is illustrated through a pie chart below (**Figure 7**)



**Figure 7: Frequency of Online classes held**

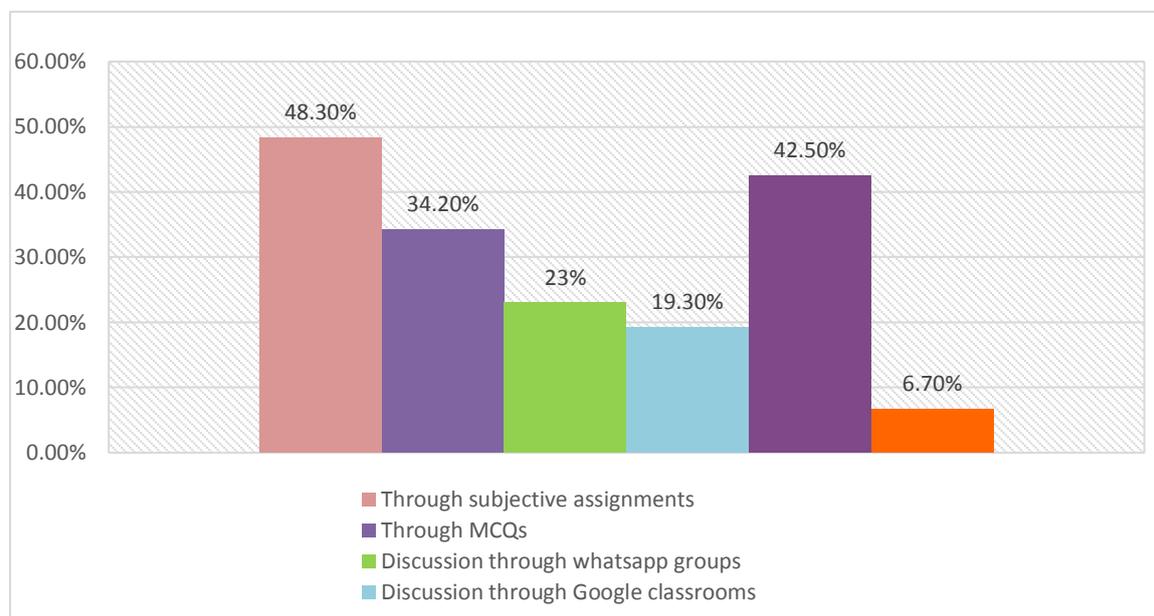
Out of 803 respondents who answered the survey, 286 students were from science courses. 61% were sent web links to various practical demonstrations as required by their subjects and 25% students were taught the practical aspects by detailed explanations given in the form of notes. As showcased in **Figure 8**, only a small percentage of respondents could get the relevant practical information through virtual laboratories (12%).



**Figure 8: How practical aspects of a subject were taught**

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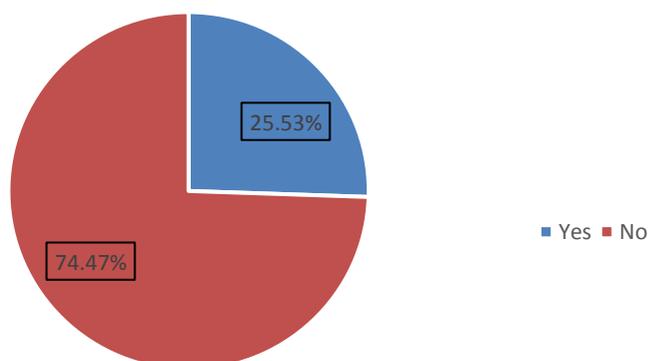
To evaluate the subject understanding of students, teachers used various ways, such as assignments, class tests, class discussions etc. Out of 803 respondents, 388 of them were evaluated through subjective assignments closely followed by the method of discussion during online classes, as this was how 341 respondents were judged for their knowledge. The method of giving questions in the form of MCQs was also used by many teachers as 275 students chose this option. Some students also had discussions on What'sApp and Google Classroom as these options were also chosen by 185 and 155 respondents respectively. There still existed a group of 104 respondents who did not have evaluation through any of such methods. The option of written tests was chosen only by 54 respondents making it the least used way of evaluation (**Figure 9**).



**Figure 9: Methods through which teachers conducted assessments**

### *Learning experience of the students*

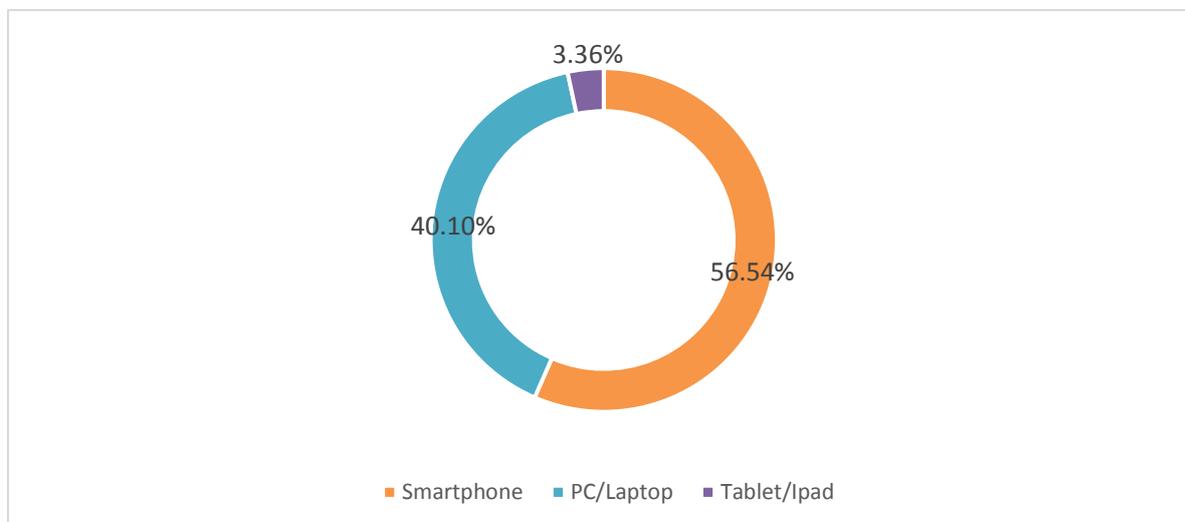
The concept of online teaching was novel for the majority of our respondents. The survey revealed that only 25.5% of students had prior experience of online teaching before pandemic times as compared to 74.5% who didn't have any exposure to online modes of education earlier. (**Figure 10**).



**Figure 10: Whether students had prior experience with online teaching before the pandemic**

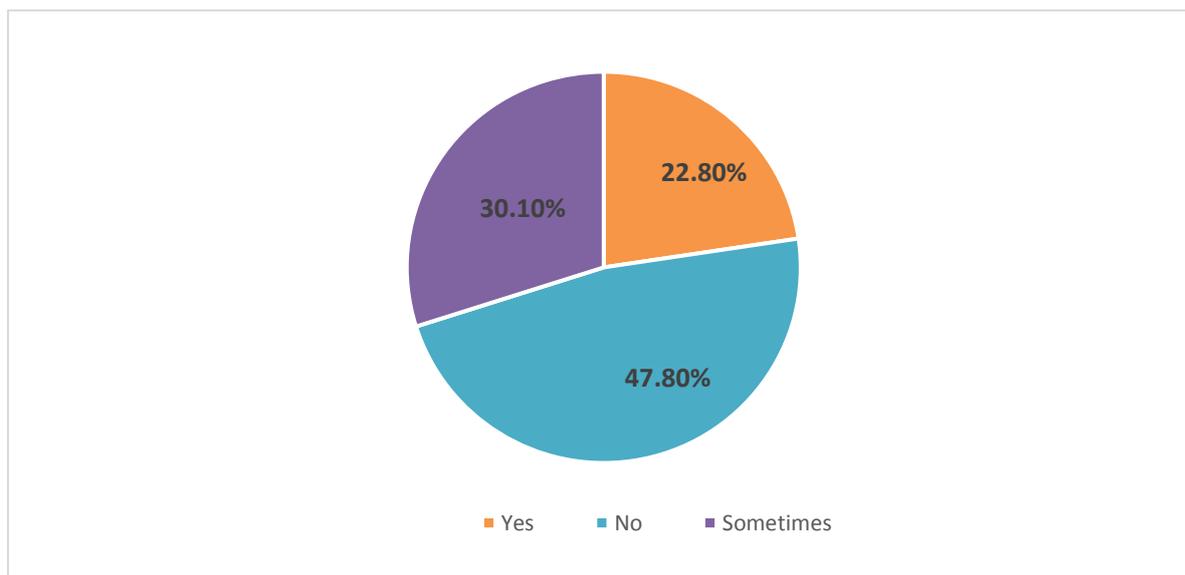
### Graduate teaching during COVID-19 induced lockdown

For the purpose of online classes or studying, students made use of varied electronic gadgets. Our data analysis revealed that 56.5% of people operated smartphones for accessing online classes and study materials while 40.1% opted for PCs or laptops, and only 3.4% used tablets or iPads. Refer to **Figure 11** which showcases this data in the form of a donut plot.



**Figure 11** *Electronic Devices used for online classes/studying*

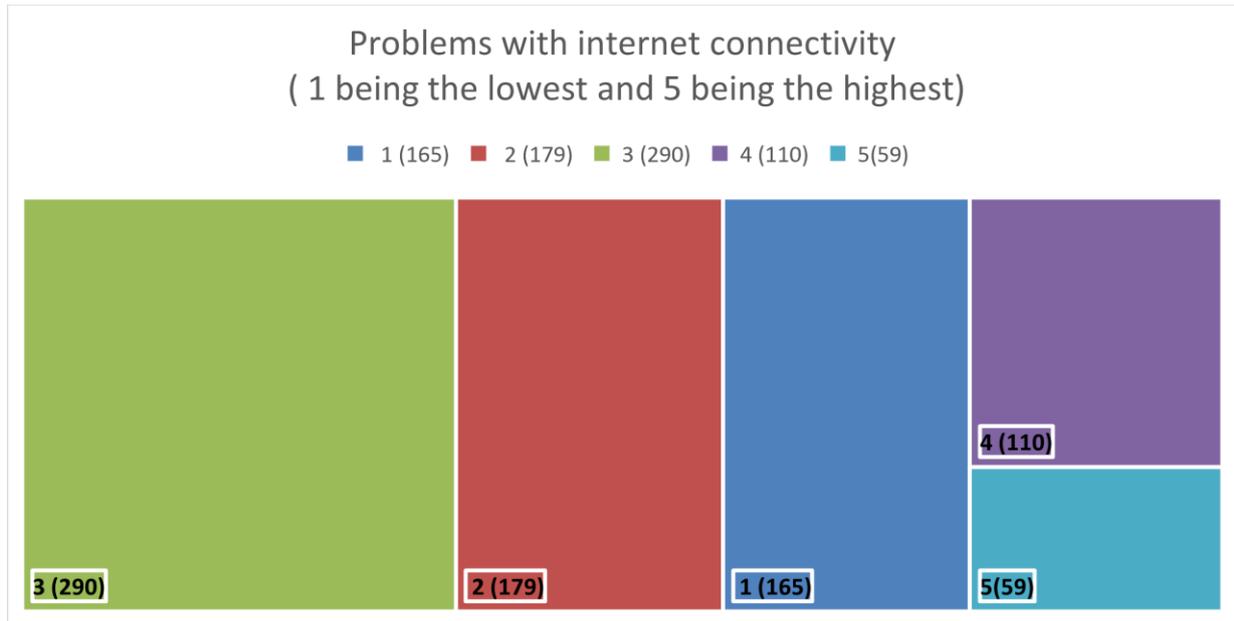
22.8% students had to share their gadgets with other members of the family. 30.1% shared sometimes while the rest did not have to share at all. See **Figure 12**.



**Figure 12:** *Sharing of online gadgets (for accessing classes) with other members of family*

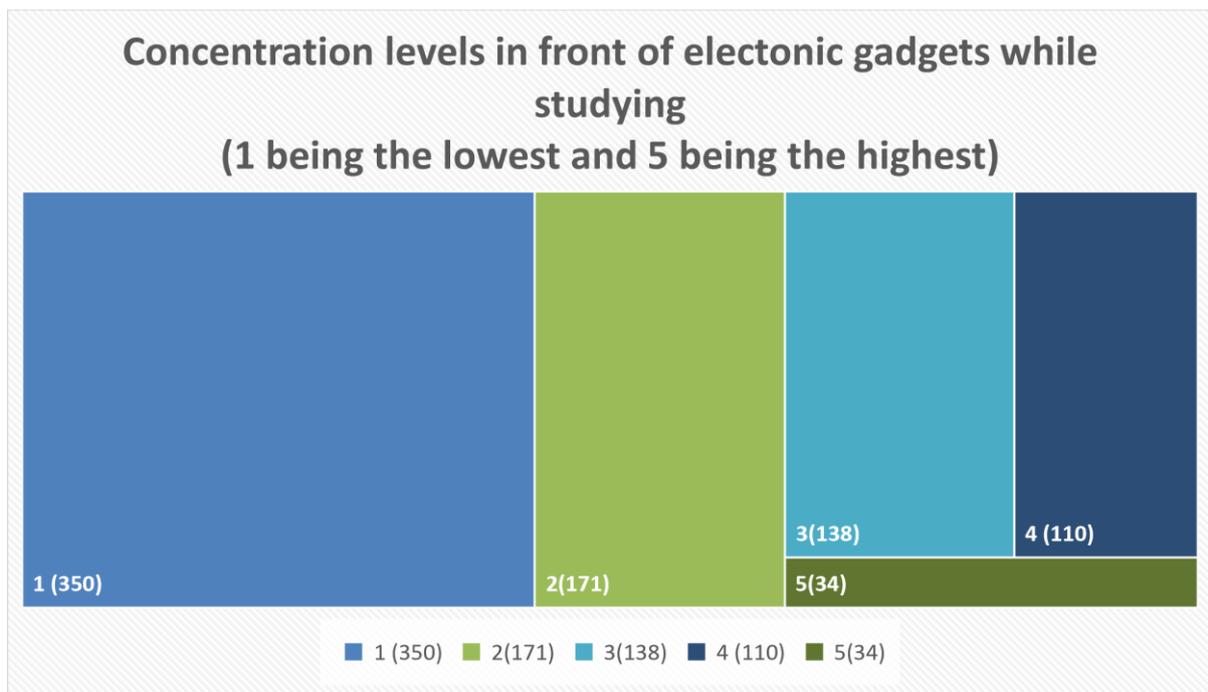
We asked the respondents to rate their experience related to internet connectivity on a scale of 1-5. (1 being the lowest and 5 being the highest level of connectivity issues.) 290 people rated 3, 180 rated 2, 165 rated 1, 110 rated 4 and 58 rated 5 out of 803 students. The results are shown through a Treemap chart in **Figure 13**.

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*Figure 13 Network connectivity issues faced by students*

We asked the respondents to rate the extent to which their ability to concentrate was affected while using an electronic gadget to study. We asked them to rate it on a scale of 1-5 (1 being the lowest and 5 being the highest). 43.5% rated **3**, 21.25% rated **2**, 34.2% rated **4**, 13.6% rated **1** and 4.2% rated **5** out of 803 respondents (**Figure 14**).

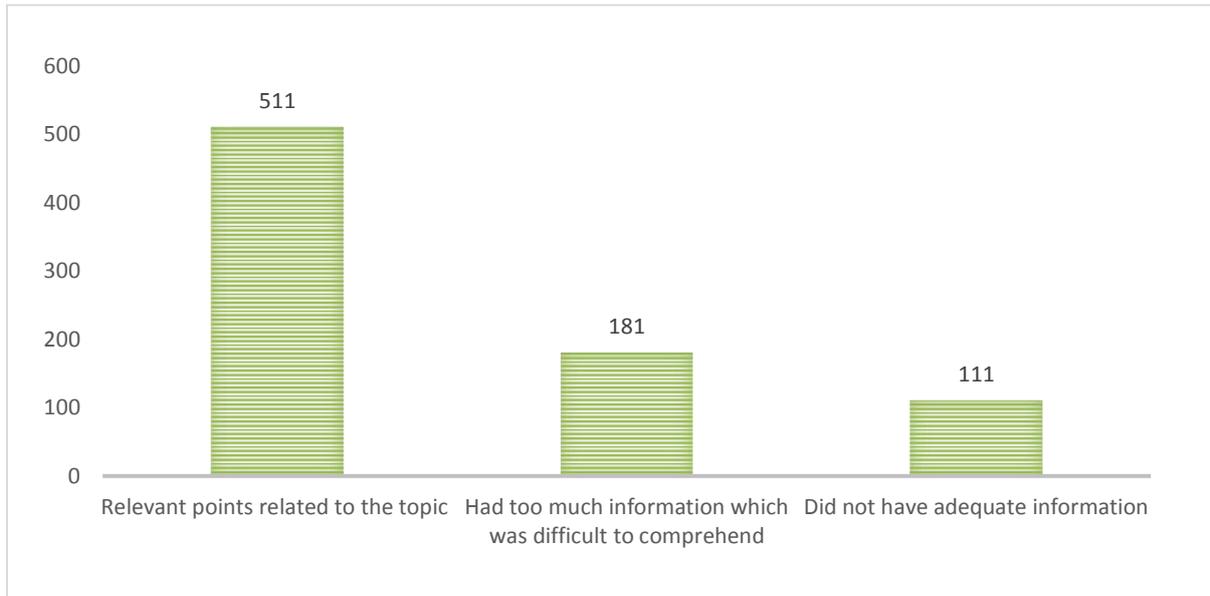


*Figure 14: Students' ability to concentrate affected by using electronic gadgets for studying*

Most of the study material provided by the teachers covered relevant points related to a particular topic (for 63.6% students). 22% students felt that there was too much information

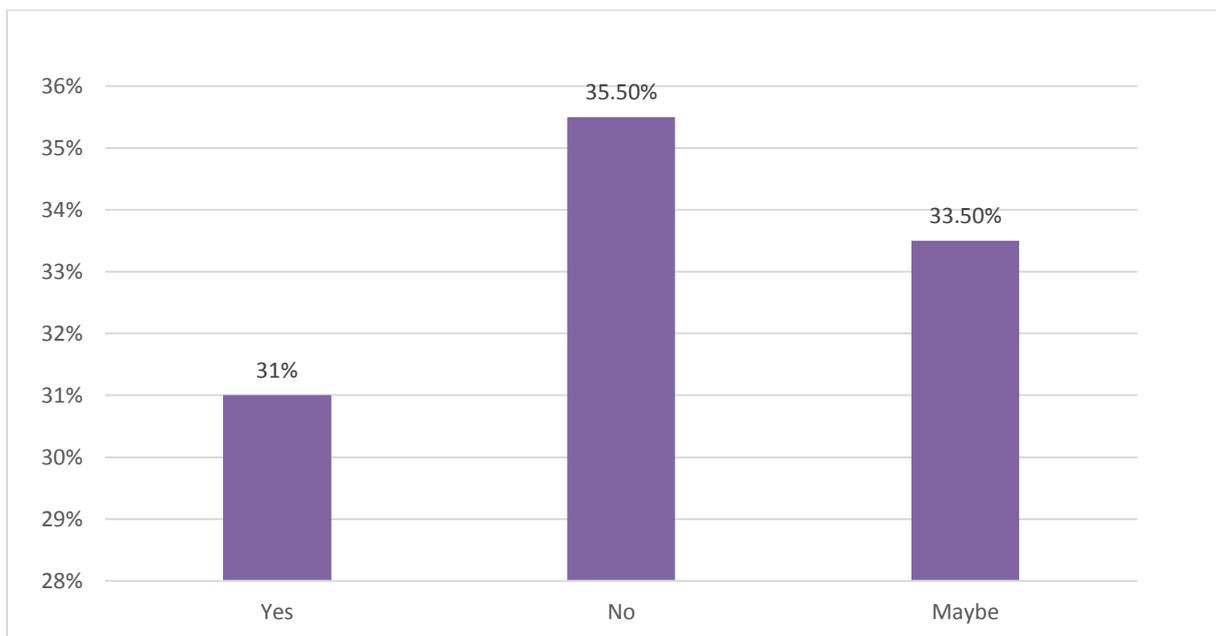
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given which was difficult to comprehend while the rest did not even have adequate information on a topic (**Figure 15**).



**Figure 15** Relevance of study material shared

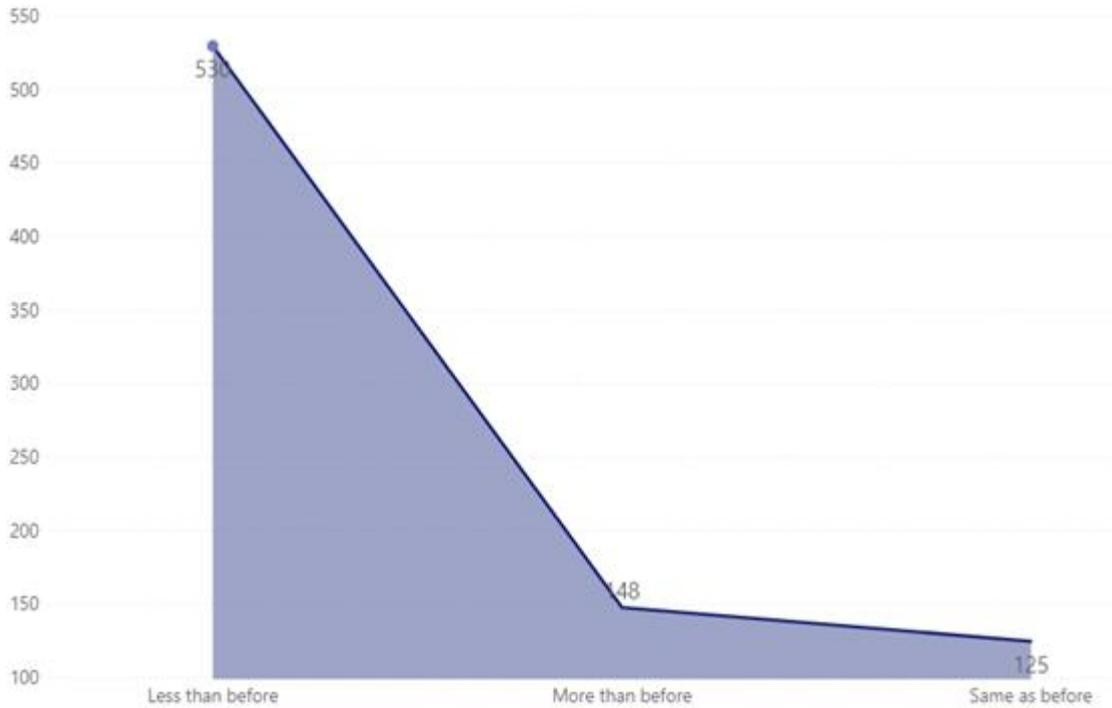
31% of people felt overburdened by the assignments given to them whereas the other 35% did not have any problem regarding this and the rest were unsure (**Figure 16**).



**Figure 16:** Burden of study material and assignments given

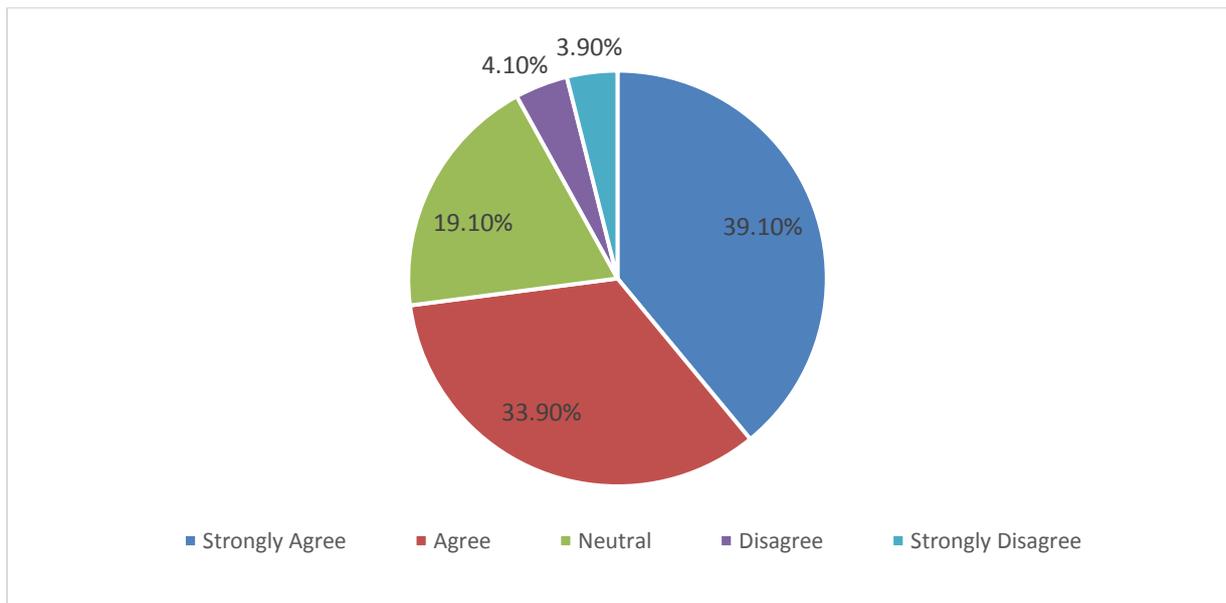
530 out of 803 respondents (66%) studied less than they did during the pre-lockdown period. 148 (18%) respondents started studying more during the lockdown period and the rest 125 (15.5%) did not face any change in their studying habits. These statistics can be seen in **Figure 17**.

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**Figure 17: Time spent in studying during lockdown as compared to before the lockdown**

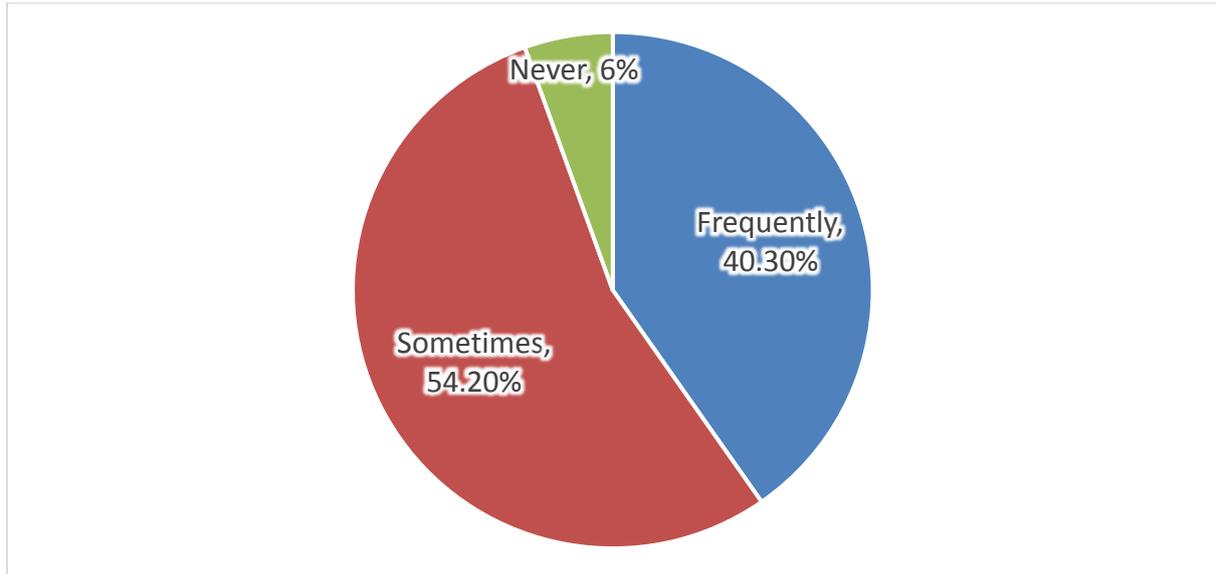
A higher proportion of students strongly felt that they are being impacted by staying at home due to Covid-19 induced lockdown (39.1%). 34% agreed with this while 19% were not affected. Only a few disagreed. **(Figure 18)**



**Figure 18: Impact of lockdown on the ability to concentrate on studies**

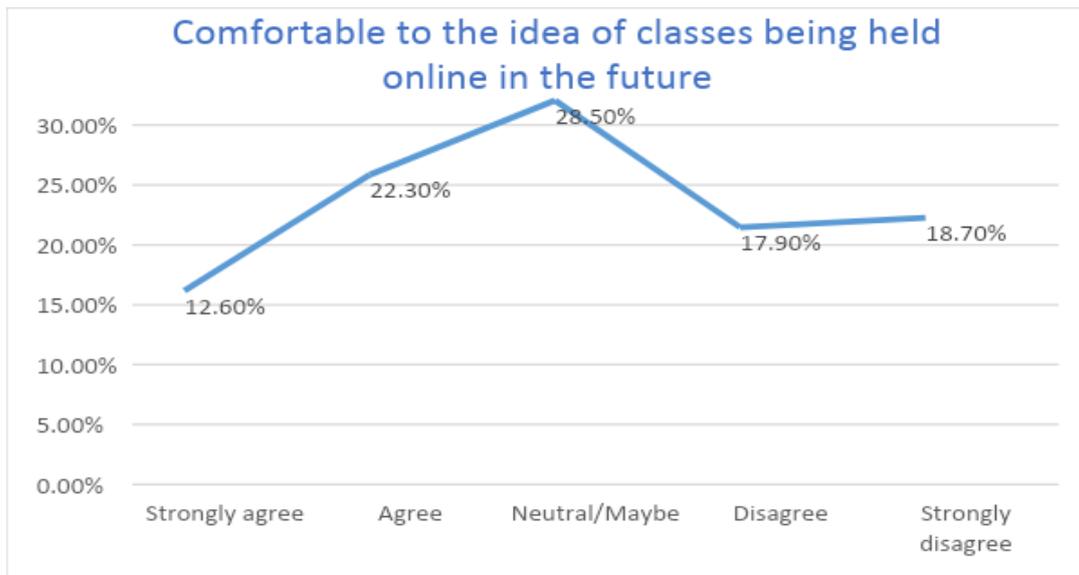
**Figure 19** describes that 54.2% of the students went online a few times to find some relevant study material. 40% of them did it frequently while the rest never did.

## Graduate teaching during COVID-19 induced lockdown



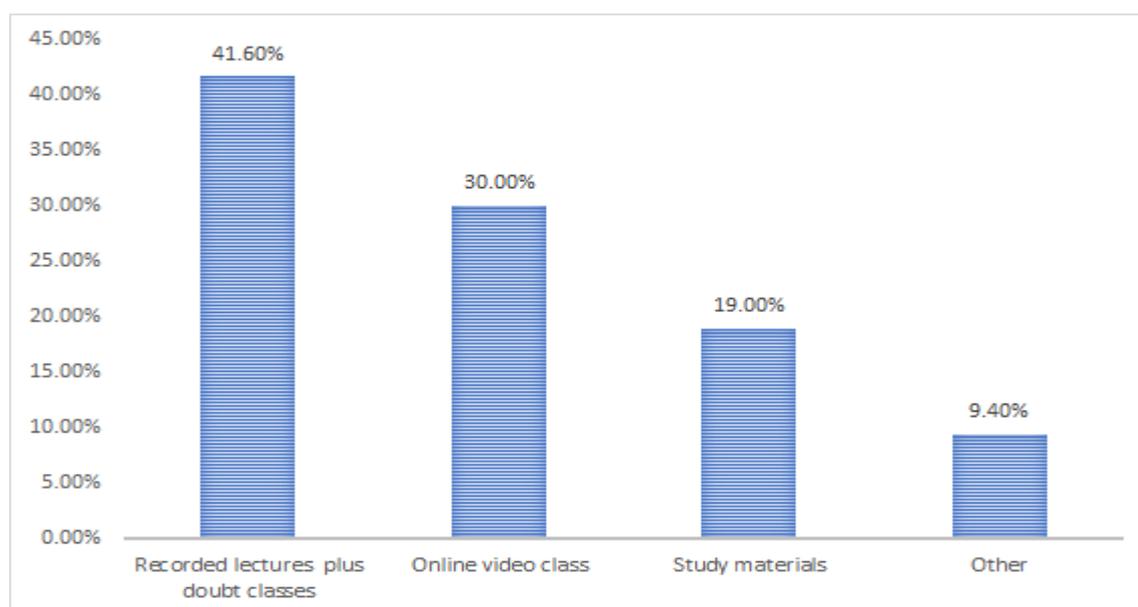
**Figure 19: The frequency of going online to find relevant study materials**

When asked about the idea of taking online classes in the future, almost 34.90% were comfortable with the classes being held online while 36.60% did not readily agree to the thought. Around 28.60% have shown a neutral attitude towards this question (demonstrated in **figure 20**) and on further enquiry of the preferred way they would like to receive their online learning in future, the most preferred form for about 42% students is recorded lectures alongside doubt classes. 30% preferred online video classes. The rest stated that sharing of study material would be sufficient to take care of their learning. (Depicted in **figure 21**).



**Figure 20: Comfortableness about the idea of classes being held completely online for the next semester keeping in mind the current growth of Covid-19 pandemic**

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*Figure 21: The method of teaching preferred by students post lockdown period*

## DISCUSSION

### *Teaching during Lockdown period*

The Covid-19 induced lockdown happened around the third week of March. At this point, there were roughly 6 weeks of teaching left to be done in educational institutes. To finish the syllabus, remote/online teaching were the only options through which studying could have continued. To find out how teaching and learning happened during this particular period we conducted a survey. Our respondents were from different streams, mainly science, humanities and commerce. According to our survey conducted, 517 students were from Commerce and Humanities (64.4%). 286 students out of 803 were Science students which were roughly 35.6% of the total respondents.

During this particular time, the teachers shared the study material with the students using different methods, often in the form of notes and power point presentations prepared for specific topics. A number of teachers held online classes and shared web links/ videos for various chapters. List of reading material and reference books were often sighted. It is important to note that availability of readings, video lectures, online teaching material, videos for practical demonstrations etc. varies from stream to stream and specific topics in a particular paper. For example, online videos and teaching modules are more abundant for a number of papers and topics in science stream as opposed to others. Hence depending on the requirements of a particular subject/course, transition to remote/online teaching methodology allowed teachers to complete their syllabus.

Through the online survey, it was observed that WhatsApp was a commonly used platform for sharing study material. This is possibly because of the application's widespread use and feasibility. Even before lockdown, WhatsApp was being used in the teaching community for sharing study material and other relevant information. Hence during the pandemic imposed, closing of educational institutions and the suddenness of the lockdown this means of communication gained further popularity.

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Since online teaching was one of the options to continue the teaching-learning process due to COVID-19 induced lockdown, a lot of platforms were used to conduct online classes. In our survey, Google Meet was the most preferred platform receiving 47.19% responses followed by Zoom with 30.26% respondents opting for it. These two apps are assumed to be highly preferable because of their easy accessibility in smart phones as well as laptops. Moreover, Google Meet and Zoom had an expanded participant limit of 100 (during that period) which acted as an added advantage for having more participants as compared to other platforms in a meeting. We also observed a significant number of our respondents choosing Skype, YouTube, Cisco WebEx and Microsoft Teams with 36, 28, 38 and 39 respectively as a platform through which online classes were conducted. On scrutinizing the rest of the responses, we also traced WhatsApp and Google Duo as alternative platforms for online classes but they lack many facilities such as restricted participants, no screen sharing, etc. Google Meet and Zoom can accommodate more participants and facilitate screen sharing which is why they were the most used platforms used for online classes.

Google Meet was a paid service which was made free by Google during the pandemic period so that it could be used by educational institutions and companies (Javier Soltero, 2020). This aspect further explains the popularity of Google meet as an online teaching platform. After Google Meet, Zoom was the most commonly used platform. It's easy to use interface, less latency period and high frame rates contributed to its popularity among teachers to use it to conduct online classes (Tyler Abbot, 2020).

Since there was a sudden shift to online teaching, frequency of classes varied greatly for different subjects/ streams. When the nationwide lockdown was first declared in late March 2020, several teachers had covered majority of the syllabus. One possibility why the data on frequency of online classes is varied could be because teachers conducted classes on the basis of how much syllabus was left to be covered. Accordingly, they conducted online classes on the basis of what was left to be taught to the students.

As far as the question of duration of classes is concerned, Zoom has a set time limit of 40 minutes for the non-premium users which would have caused the class to end in between the duration of 30-60 minutes. Another possible cause for this can be the network and device-related issues which were faced by plenty of students.

One major challenge posed to teachers and students of the science stream was over the conduct of practicals in laboratories since it was impossible to conduct them physically. The teachers provided theoretical background for all practicals through notes and web links. We had 286 respondents from Science stream and majority of them were provided links to videos and virtual laboratories for practical demonstrations.

The teachers incorporated many ways to assess the understanding of students related to various subjects. Since physical examinations weren't possible given the COVID-19 induced lockdown, the understanding level of maximum students were assessed through subjective assignments and MCQs. It can be understood that these assignments or online tests were not at par with physical examination in terms of reliability of who is actually giving the test. Given that many students faced a lot of problems during online classes, an assessment through these channels cannot be termed as unequivocally effective. A fraction of respondents gave tests through WhatsApp Groups which is not an official mechanism to take tests. A large number of respondents also faced a lot of issues in submission of tests because of network connectivity issues, accessibility to gadgets, etc.

### *Learning experience of the students*

The recorded responses from students were from varied regions and educational institutions all across the country. Students, from different states and cities, and distinctive colleges and universities, shared their experience of online learning thereby giving an overview of socio-economic conditions of different regions and providing insights into varied experiences of online modes of education during Covid-19 pandemic.

Almost three-fourth of the participants faced the transition from physical classroom to online modes without any prior knowledge of how the online learning works. The unplanned and dynamic shift from physical classrooms to online learning with no training and little preparation resulted in poor user experience initially. A sudden change often brings uncertainty and apprehension. So many college students faced ambiguity in the initial stages of shifting to online modes of education. Even though the students had the lack of experience, they slowly adapted to the new 'normal' of studying online. They understood the technicalities and modified themselves for online learning.

Some of the students had to share their gadgets (laptops/ PC/ tablet) with their family members which portrays the huge socio-economic differences in the country owing to which students don't have access to personal gadgets for online education. Adjustability with family members was experienced for the use of electronic devices for online studying.

Internet Connectivity was a major issue for most students. The average internet connection speed in India is 6.5 Mbit/s and the average peak connection speed is 41.4 Mbit/s. Globally, India was ranked 89th out of 149 countries/regions by average internet connection speed and 97th by average peak connection speed. 42% of internet users in India have an average internet connection speed of above 4 Mbit/s, 19% have a speed of over 10 Mbit/s, and 10% enjoy speeds over 15 Mbit/s. The average internet connection speed on mobile networks in India was 4.9 Mbit/s (Akamai, 2017, Speed test global index).

70% of India's rural households do not have internet connections. There is low internet penetration in states like Jharkhand, Bihar, Andhra Pradesh, Telangana, West Bengal, Assam and other parts of the North East. (IAMAI,2019)

Students were exposed to various distractions while studying online on their gadgets at home such as social media notifications popping every now and then, family members or any pet interrupting during the classes. Students didn't have access to a favourable environment at home. Some students also experienced eyesight deterioration due to excessive screen time. However, the number of students who felt overburdened due to sudden change in their ways of learning are slightly less as compared to the ones who do. Undoubtedly, some may be affected due to network connectivity issues and lack of gadgets available to them. Even though the environment wasn't conducive, the students still managed to submit assignments to their teachers for internal assessments.

Ability to concentrate on studies was strongly influenced by staying at home due to COVID-19 induced lockdown for less than half of the participants. In the physical classrooms, there is a specific decorum maintained, a conducive environment of studying, a code of conduct, and uniformity among fellow classmates. On being deprived of the same, students' attention span has also been altered in which many factors such as interruptions at home, internet failure, technological facilities, etc. play a major role.

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It is assumed that online classes provided the students with more space and solidarity to self-study and concentrate but the data showed on the contrary, it was seen that because of this pandemic induced online learning they became low on motivation. Virtual online classes lessening the competition between classmates, sudden increase in one's time schedule and being stuck at one place that is exhausting for one's mental health, might be some of the reasons behind not being able to concentrate on studies.

Despite many students not being comfortable with the idea of online learning continuing in the future, we all need to adjust to the new normal and evolve ourselves once again as we have done in the past like turning towards written from oral forms of education and now from offline to online. The study revealed that most of the students (almost half of them) preferred recorded lectures accompanied by doubt classes as a mode of teaching in future considering that colleges will not reopen soon in the near future. This shows that students feel more comfortable with recorded lectures as they have the flexibility to access them as per their convenience. They can even listen to the same innumerable times to understand the subject better. This would also take care of the interruptions in internet connectivity which is faced quite often by a number of students. A good proportion of students felt taking live online classes would be something close to a class room experience as their doubts can be answered there itself. Also, this mode provides some space for discussions as well. Very few students thought providing study material only in the near future would be sufficient.

We found through the survey that socio-economic differences, geographical and financial restraints in India make the current method of online teaching full of logistical and infrastructural challenges. Although at present people are attempting to adapt themselves to this new system of the teaching-learning process, there still is an underlying requirement to develop a holistic and encompassing mechanism which is in the best interest of every section of society. The work that began as an admirable response to an emergency will need to develop, to cope over a longer period. Hastily assembled online learning tools need to move from incidental planning to more structured form.

The need of the hour is to develop a multi-pronged strategy which is well-efficient to manage the crisis and simultaneously, build a resilient Indian (online) education system in the long term.

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The author declared no conflict of interest.

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