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Online teaching in Delhi-NCR schools in India during Covid-19 pandemic

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Abstract

Objectives: The spread of Covid 19 brought a sudden closure of schools in India, forcing them to take teaching completely online. This was an unprecedented situation in Indian schools where virtual teaching was never the norm. The pace of this technical intervention was so fast that it practically brought an educational revolution in the country. This led the researcher to conduct a survey for the teachers as well as students with the objectives to understand : 1. The major challenges faced by both the teachers and students, 2. The opportunities offered by the online teaching platform, 3.The attributes of online classes that can enhance the learning process, and 4. The lessons to be learnt about the efficacy of virtual classes. **Methods**: A survey was conducted for more than 500 teachers and approximately 1700 students of ten schools in Delhi National Capital Region in India. A questionnaire was administered to them through google forms. These schools were geographically scattered in the national capital region of Delhi and cater to different socio-economic backgrounds. **Findings**: Online teaching in Indian schools is still in its infancy and is gradually getting more popular since it is now the need of the hour. Technical issues are the biggest challenge for teachers and students and connectivity causes major problems. The pedagogy required for online teaching needs refinement. Both teachers and students have expressed that they have faced health issues with greater exposure to screen time. Absence of face-to-face interaction of teachers and students affects the teaching learning experience. **Novelty**: This study provided valuable insight into refining the practices of online teaching and learning, a hitherto less explored field, in Indian scenario. It gives the perception of both teachers and students regarding the procedure of online teaching.

Keywords: Online teaching; elearning; virtual classes; synchronous learning; asynchronous learning

1 Introduction

The impact of Covid 19 will remain for years, if not longer, across various sections of the economy. Education has been badly hit with millions of students stranded at home, staring at the screens and partaking of academic instruction passively. According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO), nearly 1.6 billion children in 190 countries have been affected with the school closure. The academic community in India took to its new WFH (work from home) role with much trepidation in the beginning. However, with the lockdown being no dampener in teachers' creativity and spirits, they learnt fast to connect with 'remote' students. The physical distance of online teaching did not deter them from the sacred responsibilities of shaping the minds and spirit of the students. This extraordinary situation fostered quickly the opening of digital interface of education, irrespective of the great digital divide that the country has. At least a quarter of Indian households are without internet access and a much larger proportion deals with dissatisfactory electricity supply. Even in Tier 2 and 3 cities, in a single family with two children, there is availability of only one smart phone to access school instruction. Some financially weaker sections may not afford the required technical gadgets and high speed internet services [1]

School closure in the country brought an unprecedented situation in students' life since all their classes turned virtual. It was not only a first-time incident in their lives but also in that of the teachers. Due to the accelerated adoption of the digital platform, many educational institutions considered this challenge as an opportunity to experiment with technology tools. Not to let the crisis hamper the curriculum, e-learning spread its wings faster than it would have been possible in normal circumstances. This turned educational pedagogy from teacher-centric to student-centric, allowing for greater engagement between the teacher and the taught to make virtual learning experience as real as possible. However, the quality and pace of this transition depended on the internet connectivity, availability of technical devices at home and preparedness of the teachers to get comfortable with e-learning practices. It was no less than a technological revolution triggered with a crisis that came upon us without any premonition. This hugely transformative revolution brought virtual classrooms within the confines of the homes, gearing everyone up to rise to the opportunity. Students also thought that it is an opportunity to innovate on lockdown issues [2] for adopting newer techniques [3].

The current research was undertaken within the first three months of the beginning of the process and both teachers and students along with the school and the society are still coming to grips with it. Many teachers do not possess an independent technical device, leave alone the students, particularly in the government and government-aided schools. The government is also trying to ascertain the impact of online teaching in the schools, started with a knee-jerk reaction, with the help of a nationwide survey whose results will take long to come. However, with this study being the first of its kind in the country, it will pave way for much future research in online teaching. The purpose of this study was to find out the efficacy of online teaching and learning process in high schools of Delhi national capital region and to explore the factors that lead to the engagement of students in online classes. The objectives of the study were to explore:

1. The challenges teachers and students were facing in online teaching.
2. The opportunities of online teaching in the Indian scenario.
3. The attributes of online classes that can enhance the learning process.
4. The lessons to be learnt from these schools about the efficacy of ongoing virtual classes, with special reference to the duration and health issues being faced by students.

In the social media during this period, there was a lot of discussion on long hours of school students before a screen with passive teaching by the teacher. Many a health issue were also brought to the notice of the school forums to reduce the exposure of students to online teaching. It was reported that students were suffering from stress, depression and anxiety [4]. Exploratory questions were also asked about the students' perspective on their comfort level with the classes since this was the first time in their school life that they were exposed to only virtual classes. Students belonged to the grade 9 to 12 where they also have to prepare for the centralised exams conducted in the country by national examination board. The sample size comprised 542 teachers and 1699 students.

During the past decade, researchers, schools and governments around the world have advocated enhancing student learning by using digital tools, i.e. the e-learning. Students are able to gain greater control on their learning in online settings compared with traditional classroom learning [5]. When students shift their learning from traditional to online learning environments, they are challenged by different learning and interaction methods. Developing students' understanding of content through use of internet is a challenge for teachers and students [6]. It is further reported by the author that metacognitive strategies play an important role in online learning. [7] consider that the various communication styles integrated into online learning activities are valued only when students are aware of the technology and tools associated with them. [8] conclude that students face both technical and social problems. Technical problems pertain to using computers for learning, particularly among the

first generation learners as the case is in Indian schools located in economically disadvantaged areas. They face difficulties in completing the homework given to them using email, also facing the problems of poor network connectivity. Regarding social problems faced by the students, the most important is dealing with the feelings of isolation in virtual learning. In[9] convey that without face to face interaction, students may feel isolated and it is not clear whether online teaching has the potential to enhance students' hands-on skills. Students want two-way interaction and personal attention[10].

It is important to understand the key features of online learning environments to create high quality learning possible. Social dimension of learning will always remain the highlight of classroom learning, particularly in a country like India where virtual teaching is still in its infancy. In Indian context, many studies of online learning in schools have not taken place although there are some on higher education institutions. Today, many organisations embrace e-learning as it potentially offers widening access at a reduced cost. However, online learning may not have the same effect for every organisation since its effectiveness depends on the investment in developing infrastructure for creating e-materials. As online learning moves from a marginal to an integral part of the school education system in India during the lockdown and social distancing period, questions and interventions related to learner success are of both theoretical and practical importance[11]. The large body of research with a wide variety of theoretical frameworks thought to explain student persistence for learning, points to the fact that there is no simple explanation or solution to help them towards their goals[12].

Higher level cognitive strategies facilitate student knowledge construction and further develop scaffoldings to enhance the development of student learning strategies[13],[14]. In[15] proposed the knowledge integration perspective of online learning and emphasised the scaffolding of idea recognition, connection and monitoring skills. However, research literature related to online learning strategies remains extremely limited in India. In[16] point out three features of web-based learning environments that differ significantly from traditional learning environments: 1) Associative, non-linear and hierarchal structure; 2) Enhanced multimedia capabilities; and 3) Various synchronous and asynchronous communication opportunities. Thus, understanding features of online learning environments along with the roles and competencies of the teachers is very important. Teachers, who are at the centre of this increasing demand and pressure to teach online are being challenged to rethink their underlying assumptions about teaching and learning online[17]. Lack of previous experience and in-service training causes difficult situation for the teachers[18].

The notion that teaching online requires the development of new skills and set of pedagogies has led researchers to study the roles that online teachers take in educational environments[19],[20]. Given the expanding interest and demand for online learning, combined with the results of studies showing that higher levels of learning are not easily achieved in online courses, there is an imperative to advance our understanding of how to facilitate effective online learning activities[21]. Teachers often rely on traditional pedagogical approaches that they develop over time in their practice in physical classrooms. However, when these practices are used in online setting, they often prove to be ineffective. As regards online teaching, it is necessary to take into account the particular features and specific tasks for online delivery of content[22],[23]. What is needed is the competencies to be able to use technology, have skills to design and implement courses, establish ground rules, animate synchronous discussions and interact actively with the students, make students aware of internet ethics and netiquette, among others[24].

2 Results of the Teacher Survey

The results indicate that the biggest challenge the teachers face in taking virtual classes is technical snag with a whopping 69.9% mentioning it. 22.3% of teachers find that pedagogy for online instruction is different from the traditional knowledge they have for teaching. It is not surprising therefore, that 23.6% of the teachers find maintaining discipline in a virtual class a major challenge. At least 17.9% responses point to the struggle of curriculum completion in a virtual mode. In spite of the fact that 65.7% of the teachers surveyed are comfortable in online teaching, it needs to be further explored why they face the challenges mentioned. Difficulties in alternative teaching practices, course delivery, assessment process and teaching mode could be the concern for teachers[25]. Another plausible explanation for the curriculum lagging behind schedule is the duration of these classes. In the brick and mortar school, students learnt for more number of hours with the curriculum progressing at a student friendly pace. These challenges can be addressed only when the schools re-work on the amount of curriculum to be covered within stipulated time. Also, noteworthy is the teacher's sense of lesser well being as a negative impact of the online teaching. At least 22.9% of the teachers contend with it. However, 80% of the teachers feel comfortable teaching online.
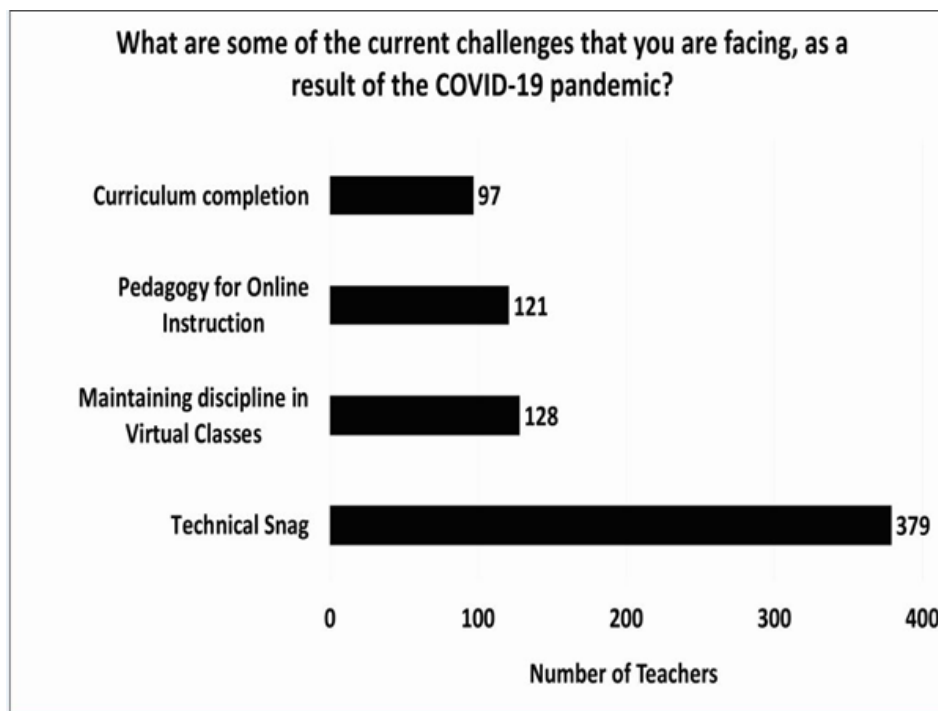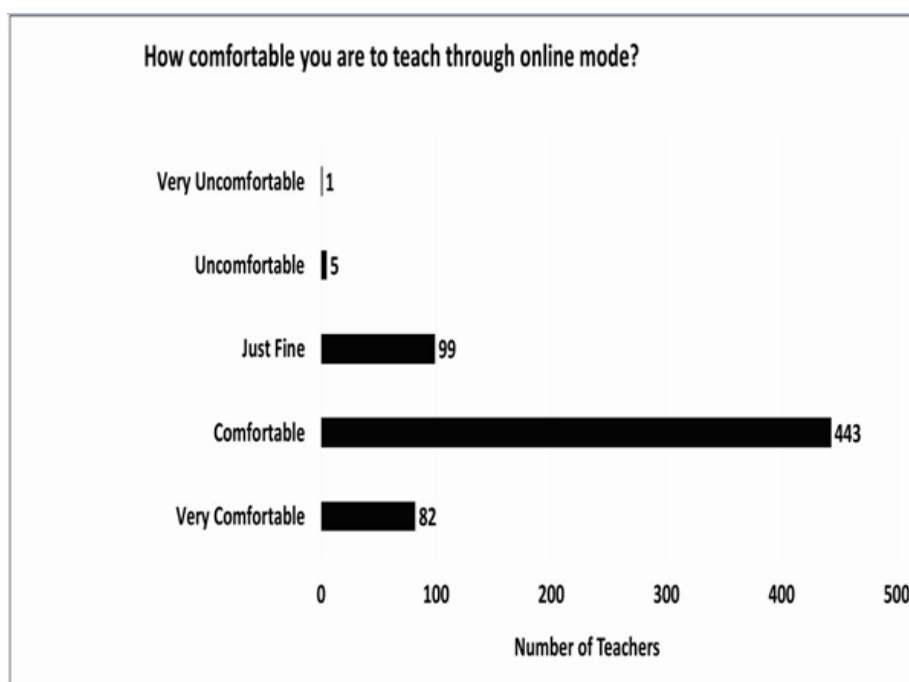
Fig 1. Challenges faced as a result of Covid-19 pandemic

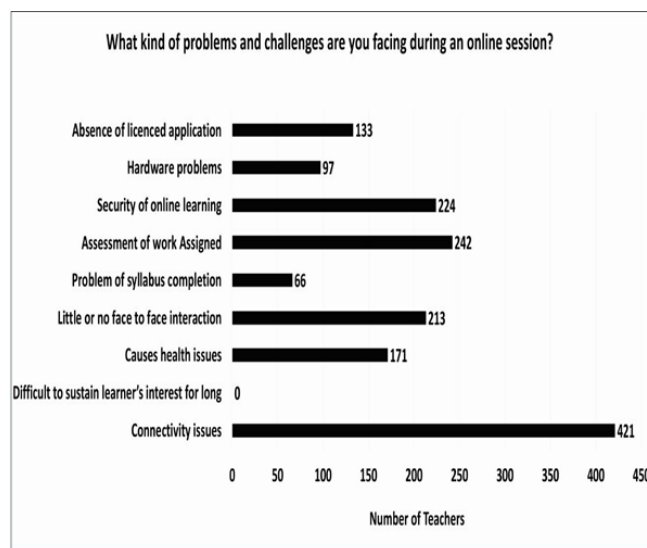**Fig 2.** Comfort level for teaching online

Fig 3. Problems and challenges faced due to Covid-19 pandemic

Around 73% of the teachers use a blend of synchronous and asynchronous mode of online teaching and blended learning has taken a lead role during this time[26]. Synchronous e-learning imitates a classroom, which entails classes taking place in real-time, connecting teachers and students via streaming audio or video. However, asynchronous e-learning lets students access pre-conceived lessons on their own time, working at their own pace and communicating with the teacher through email[27]. As this is the first time in Indian schools that teaching has gone exclusively online, parents and students alike, prefer synchronous learning where they can see the teacher and interact with her. It gives them a sense of greater engagement with the learning process.[28] emphasise the extent to which the absence of face to face environment in asynchronous online teaching reduces the possibility of in-person interaction between students and teachers.[29],[30]. In[31] studied about the importance that is still attached to face to face communication in students' learning experience. However, some research points to the advantages that the online teaching environment offers in terms of shifting the learning environment to a more social, flexible and personal space. This promotes student-centred, problem-solving and social constructivist approach to learning[32],[33]. Clearly, both the online and face to face learning have their respective uses as well as limitations. In blended learning, the two approaches work in a complementary way[34].
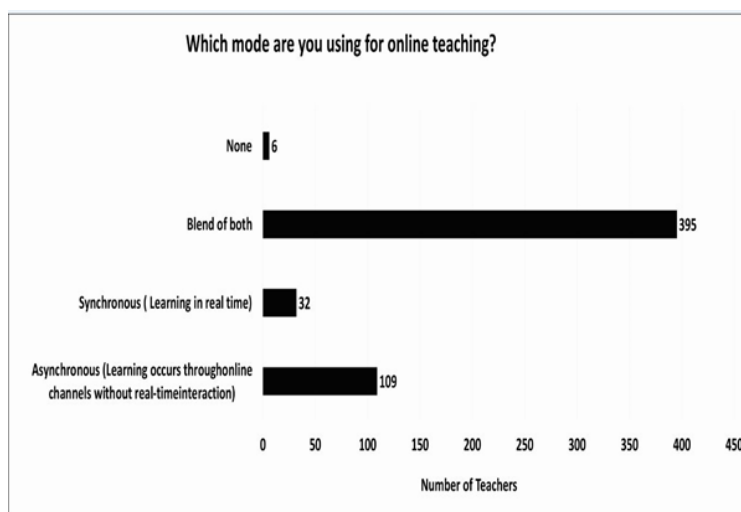

Fig 4. Modes of online teaching

Teaching with technology is not a "one-size fits all approach" as it depends on the types of technology in use at the time and also the curriculum content being taught. Since most students are experiencing it for the first time in their school life, the study gathered perceptions of the teachers pertaining to the challenges faced by the students. At least 18.3% of the students struggle with adaptability to the new system. It is often taken for granted that technology can enhance learning with student engagement inextricably linked to it. However, 32.1% of the teachers think that the attention span of students is lower in online teaching with 11.1% of the teachers feeling that students are more disengaged. Besides, 59% of them also think that the students deal with excessive exposure to the screen. Clearly, teachers are reflective about factors leading to student isolation and disengagement with the virtual teaching process.
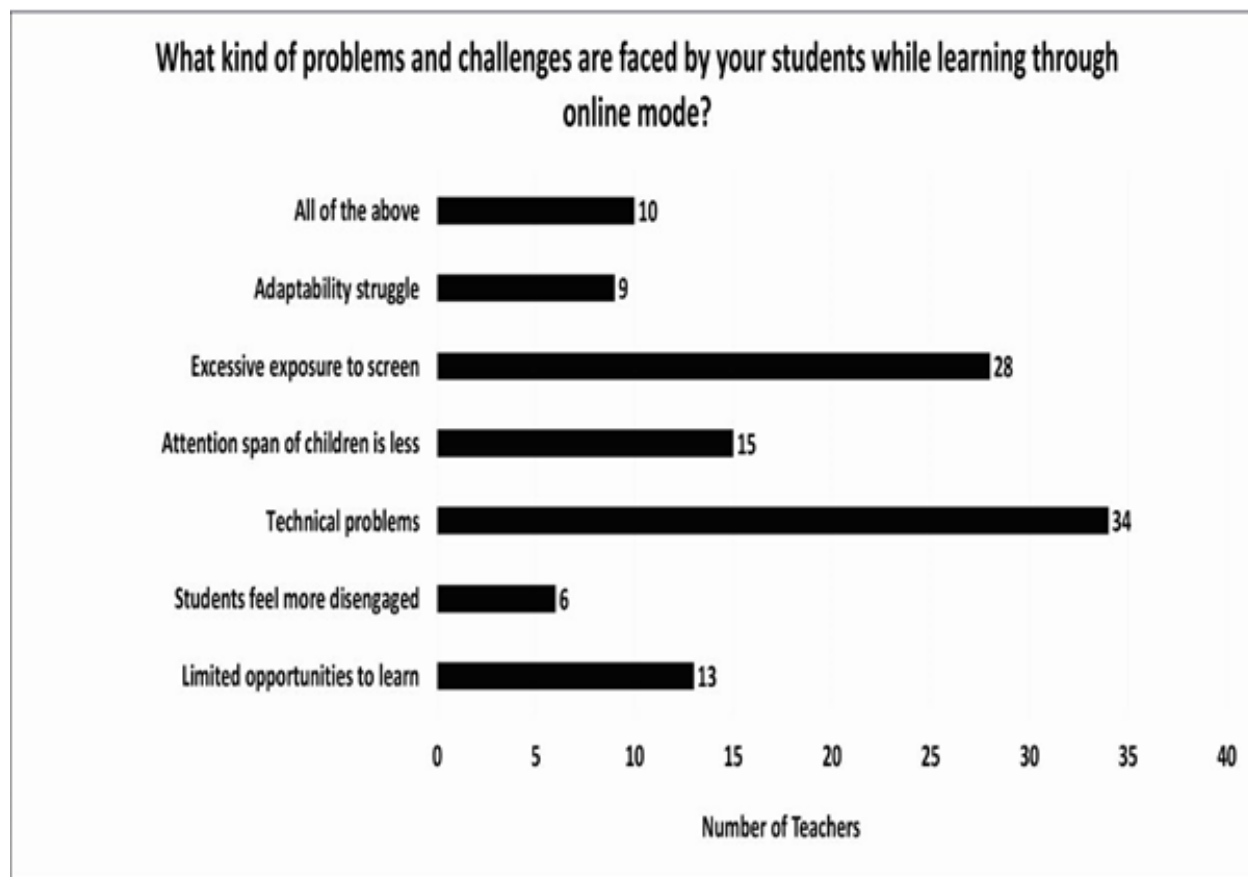

Fig 5. Problems and challenges faced by students

Since there is a duration limit of online classes imposed by the Ministry of Human Resources Development, Government of India, some classes are being taken through pre-recorded lessons only, particularly the co-curricular subjects such as art, music, dance and sports classes. Therefore, it can be seen from the survey result that 46.5% of the teachers feel that one of the areas which has been most affected as a result of online teaching is the co-curricular subjects. Also, there has been a greater impact on extra-curricular activities which the students got while they came to school. Activities such as theatre, class presentations, public speaking, poetry recitation etc have all got relegated to the background with the classes going virtual. Students miss their campus activities which were an integral part of their school-day routine. It can be challenging to create link between the online activities and the physical activities in school campus [35], [36]. Some research also suggests that an overarching pedagogical frame, explicit scaffolding of learning activities through podcasts and other appropriate media, hands-on assessment tasks and regular communication between student and staff are vital for creating a better learning environment for students [37].
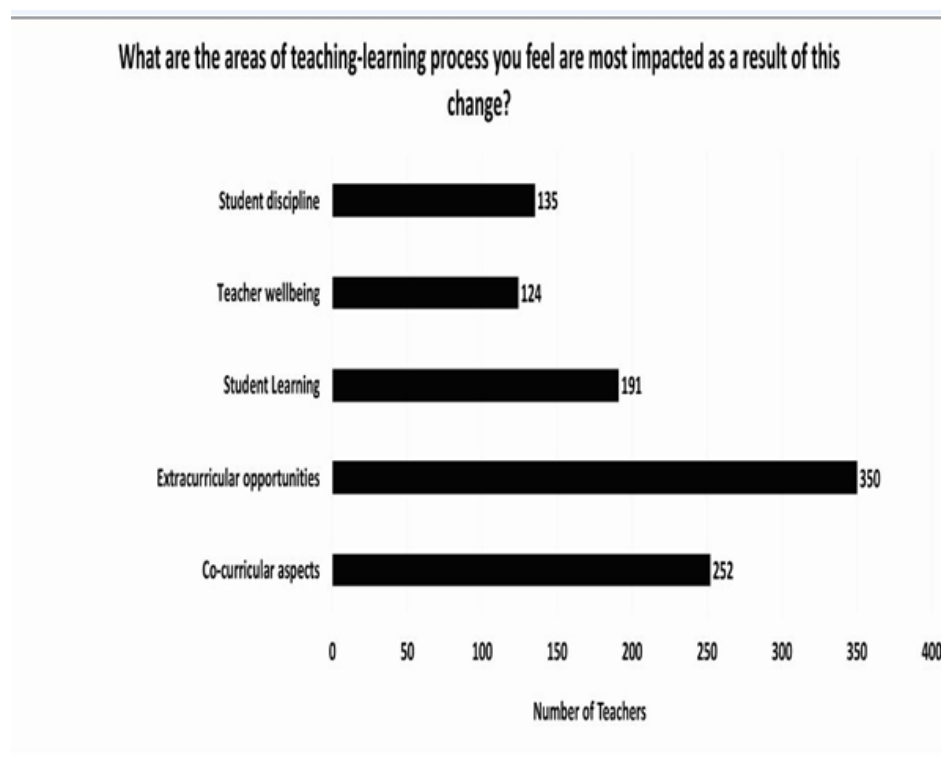
Fig 6. Areas of teaching most impacted by online teaching

Many studies have demonstrated the role played by the teacher in facilitating online learning, such as supporting technological efficacy[38] and facilitating content comprehension[39]. Fostering engagement in collaborative learning[40] and overcoming technological limitations[41] are important challenges faced by the teachers in virtual setting. When properly designed, e-learning environments can foster student motivation. For example, appropriate level of content can lead to promoting student self-efficacy and intrinsic motivation. In[42] strongly suggested that teachers play an important role in ensuring that the students understand the value of what is being taught to them. In a study[43], students experienced that their critical thinking skills were stimulated because the online setting was used for preparing oral peer discussion in face to face classroom environment. Similarly, in[44] study, students found themselves better equipped with science laboratory activities since online video lessons and instructions outlining the theoretical and practical aspects of laboratory work could be watched at any time prior to a class.

Special strategies are required for designing and delivering learning in the internet setting. Study of many online instruction systems do not exhibit consistent result in supporting student learning. 39.3% of teachers find the lack of face to face interaction a big challenge in online classes. In a comparative study[45], the overall finding is that university students following an online course in microbiology were less successful than their peers following the same course in a face to face version. Therefore, 55.7% of the teachers believe that even with good online tools of teaching, face to face interaction can never be replaced with online teaching and 24.7% of the teachers find it difficult to sustain learner's interest[46]. Less interaction with the material or a sense of isolation arising from low class attendance are counted as potential reasons for lower success rate. One of the suggested reasons for this negative difference in achievement for students following the online program is that these students had to deal with difficult concepts independently and without sufficient explicit face to face teaching[47]. In[48] conclude in their comparative study of community college students in traditional classroom based and blended courses that student learning in online setting appears not to arise from technology alone but from the combined influence of implementation, context and learner characteristics which interact with technology[49]. Therefore, 40.4% of the teachers do not want to continue with online teaching after the lockdown period is over.
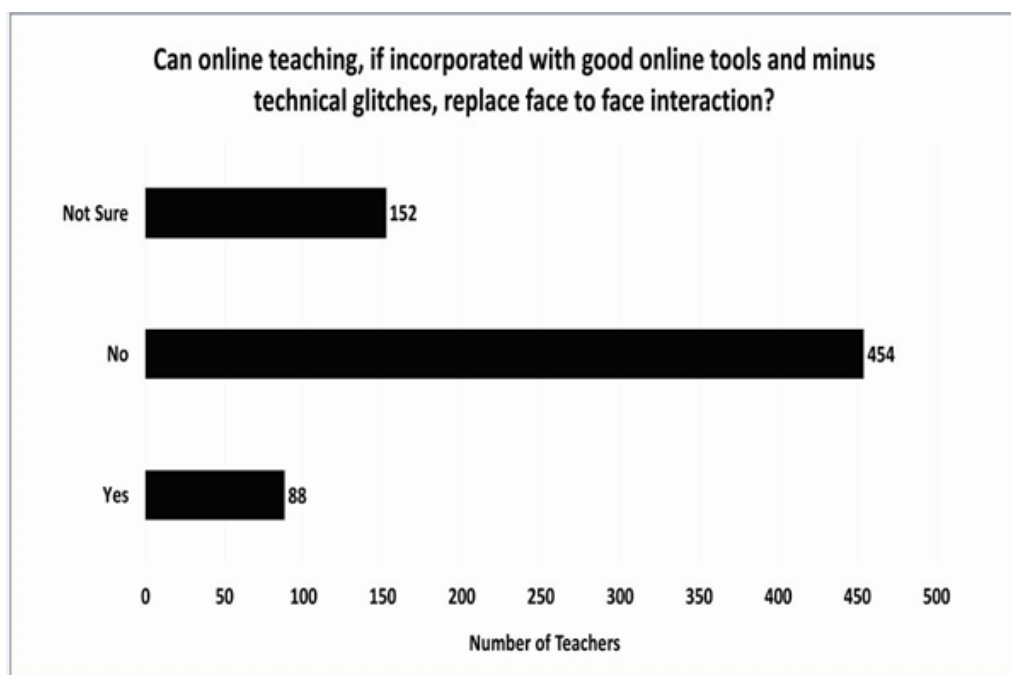
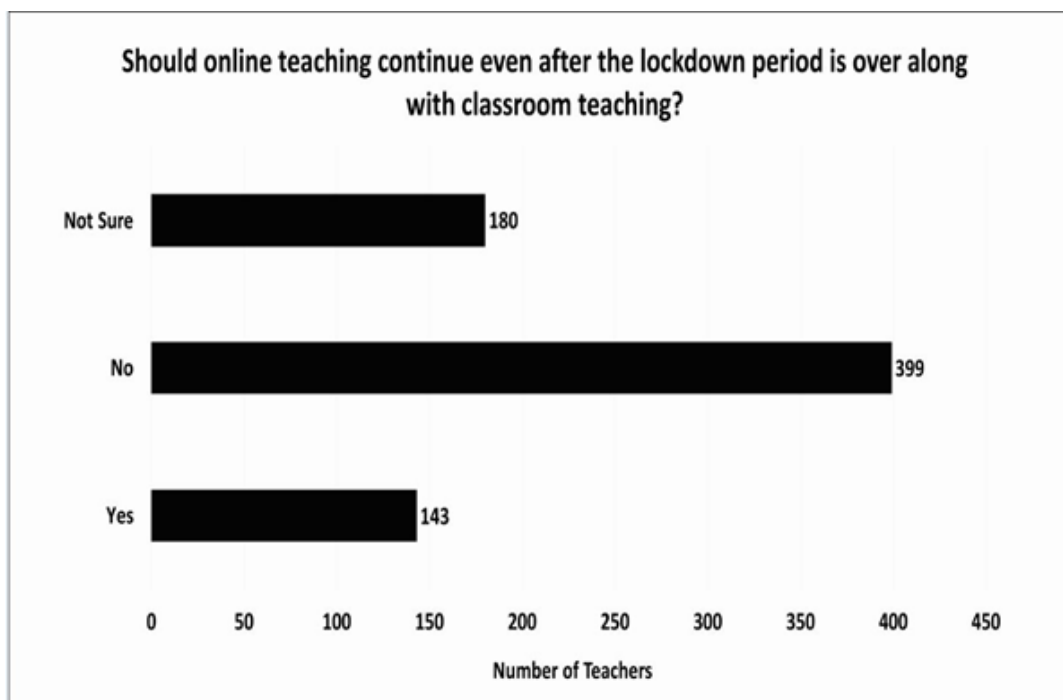**Fig 7.** Can online teaching replace face to face interaction

Fig 8. Should online teaching continue after the lock down period is over

One of the most important challenges, after connectivity issues (43.4%) faced by the teachers during online sessions is the assessment of the work assigned. 44.6% of the teachers struggle with assessments and 23.8% of the teachers struggle with online correction of assessments given[50]. Further, 50.2% of the teachers also think that the possibility of using unfair means in online assessments is high. In[51] note that the distant nature of online approaches renders difficult many observational and participatory assessments. Similarly,[52] observe that informal assessment may be especially difficult for online teachers because of the absence of face to face contact. In[53] identified five areas of concern among the instructors - time management, student responsibility and initiative, structure of the online medium, complexity of content and informal assessment. Besides,[54] include the importance of authentic assessment activities. Concerns about academic integrity have been highlighted by[55] besides the challenges involved in assessing online discussion and collaboration.
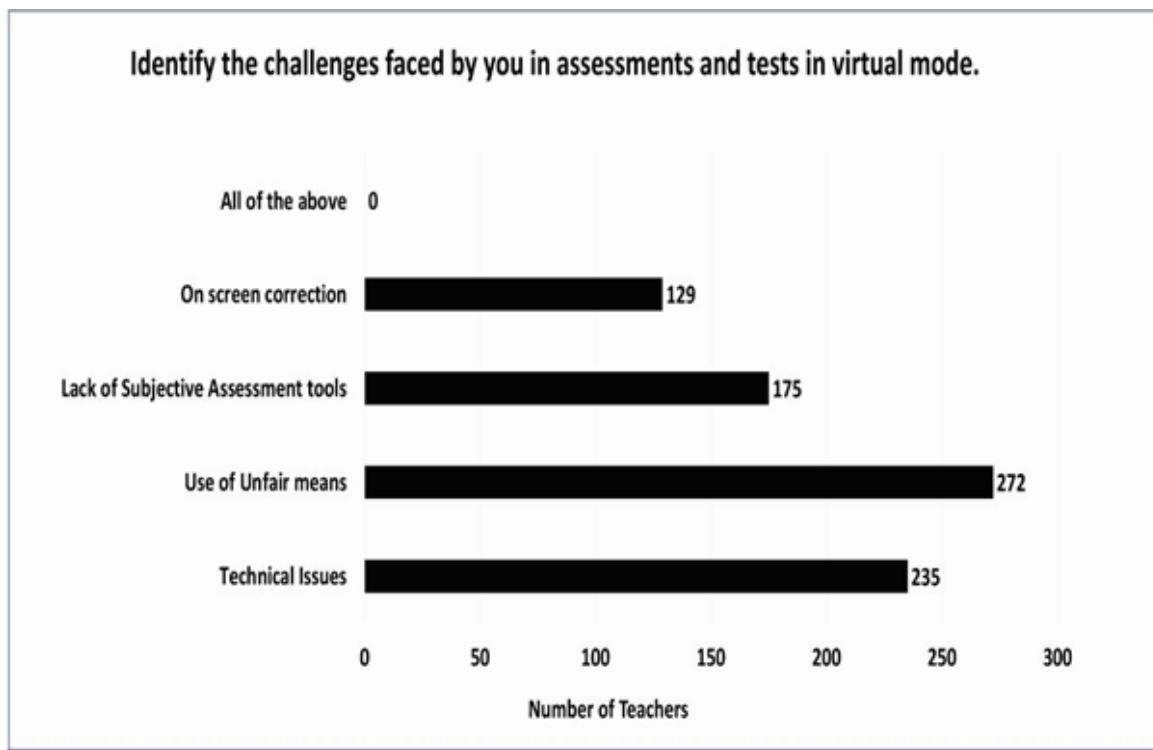

Fig 9. Challenges in assessments and tests in virtual mode

Around 70% of the teachers think that they need organised training about the use of online tools, even though 80% of the teachers are comfortable teaching online. Teachers have also expressed many positive aspects of online teaching with 43% preferring the flexible schedule of teaching which is not the case in a physical school. 35% of the teachers think that online teaching helps them to cater to larger groups more easily. Besides, 42.4% of the teachers are positive about not traveling to the schools which in a city like Delhi could take a lot of time. Teaching online is less exhausting and more comfortable. 20% of the teachers are also able to offer more time to the students if they want some additional support through remediation practices. Researchers have reported that the teacher moves from being at the center of the interaction and source of information to becoming a "guide on the side"[56]. There can be multiple rounds of communication and clarifications[57]. Some researchers note that in addition to reaching learners at a distance, online format of teaching can also lead to convergence of educational practices by carrying forward the face to face interaction. Online format of teaching also leads teachers to challenge their beliefs, judgements, interpretations, assumptions and expectations[58],[59]. As they gain experience in the online environment, they often turn the approach around, changing to the methods that benefit their face to face teaching later[60],[61].
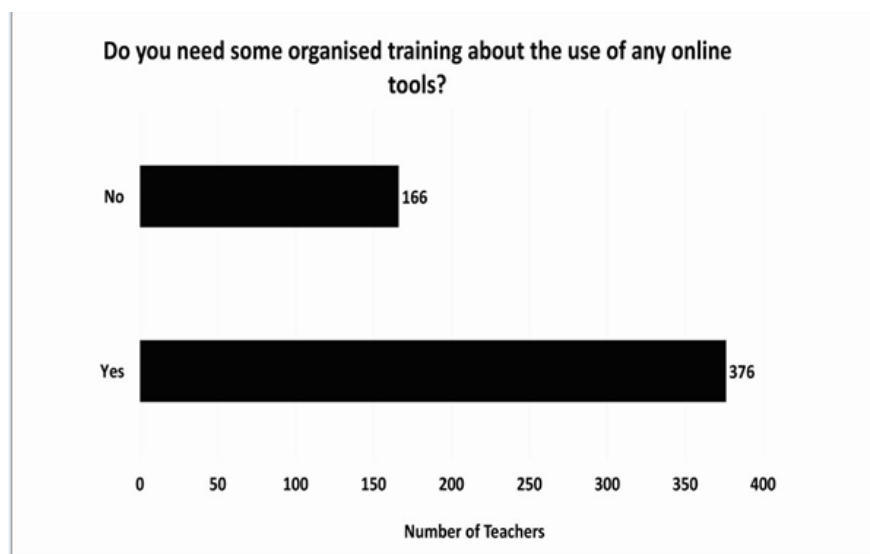
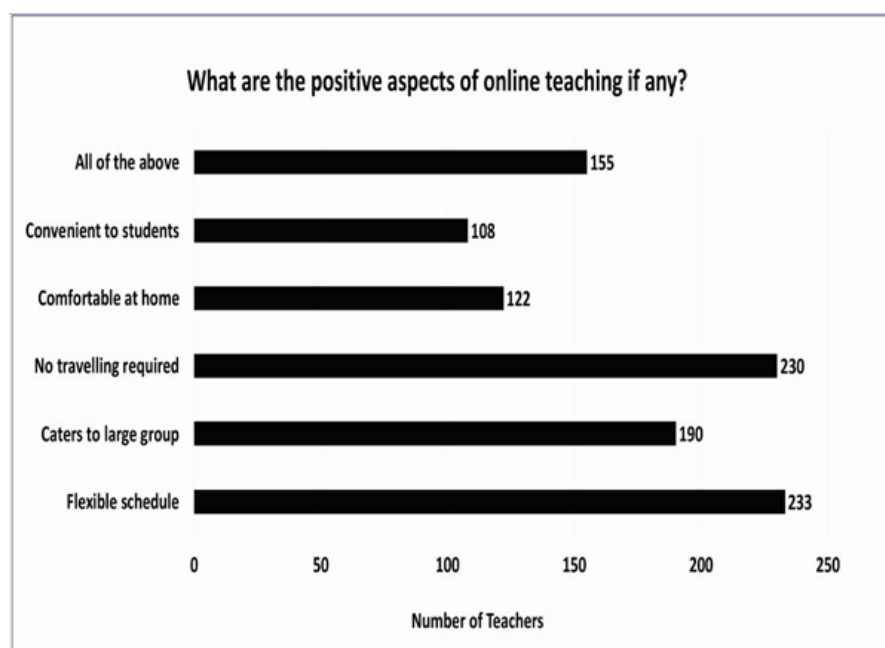**Fig 10.** Need for organised training for online tools

Fig 11. Positive aspects of online teaching

3 Results from the student survey

As technology continues to get integrated in teaching, it is important to understand student perception on the effectiveness of online teaching. Along with the teacher survey, a student survey of high school students was also conducted to gather their perceptions on synchronous and asynchronous learning (Appendix B). 1699 students of five schools in Delhi and adjoining regions participated in the survey. The findings indicate that 42% of the students feel less connected in online classes and 45% do not think that online teaching is working very well for them. 22% of the students also do not feel comfortable in communicating with the teachers through online platforms. These findings get corroborated by some researches [62], [63], [64], [65]. In [66] report that approximately one third of the students who had completed at least one online course expressed negative attitudes towards online education. A variety of structural, procedural and emotional factors detract from community building in the online

environment[67]. In[68] maintain that perceptions impact attitudes regarding learning and subsequently influence performance.
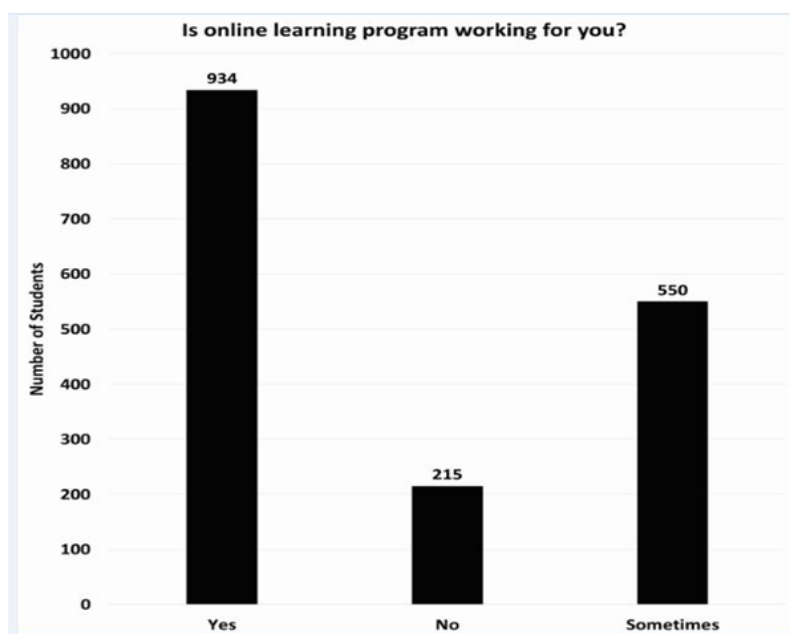

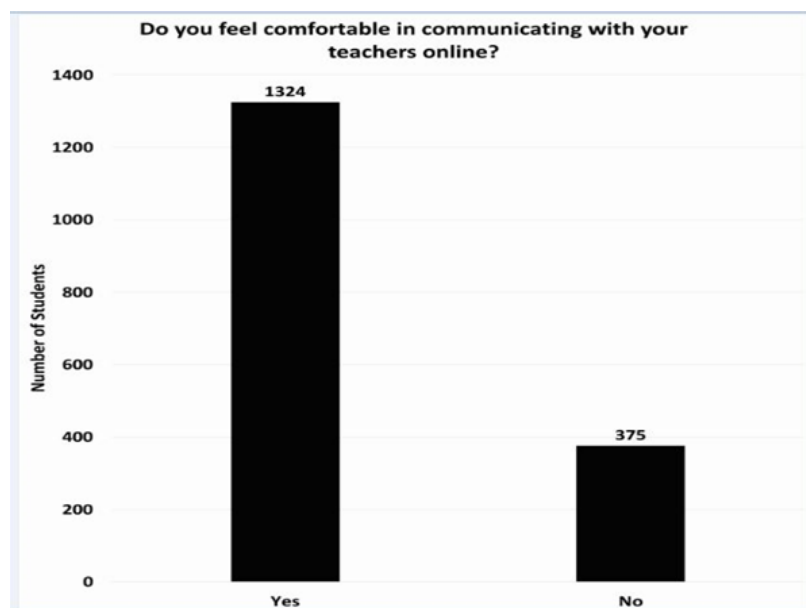**Fig 12.** Efficacy of online learning program for students

Fig 13. Comfort level of students in communicating online with the teachers

90% of the students feel some distraction or the other during online classes[69]. A majority of the students find technical issues as most distracting and at least 35% find the home environment as a distraction from focusing on the class. Also, 32.8% of the students think that personalised attention can enhance the online teaching-learning process. Clearly, the sense of belonging to a meaningful learning community is an important factor in online learning experiences of students, especially because it is difficult to make their social presence perceptible[70],[71],[72]. Studies have related students' sense of belonging to meaningful online learning communities to their engagement and learning environment[73]. Lack of peer response or teacher moderation

seemed to be detrimental to students' identity because they feel isolated and peripheral to the academic environment[74]. Research has found that peer to peer learning leads to satisfaction among students in online learning environments[75] social interaction with peers supports self reflection[76], engaging learning[77] and as a means of consolidation knowledge[78]. Several studies also find that opportunities for interaction among students and educators are very important[79] both to their own satisfaction and achieving of learning outcomes.
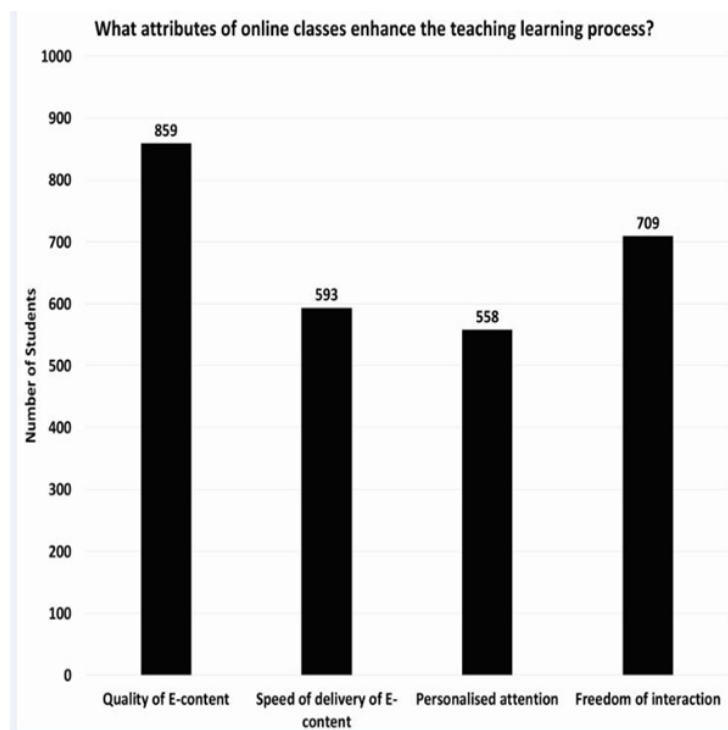

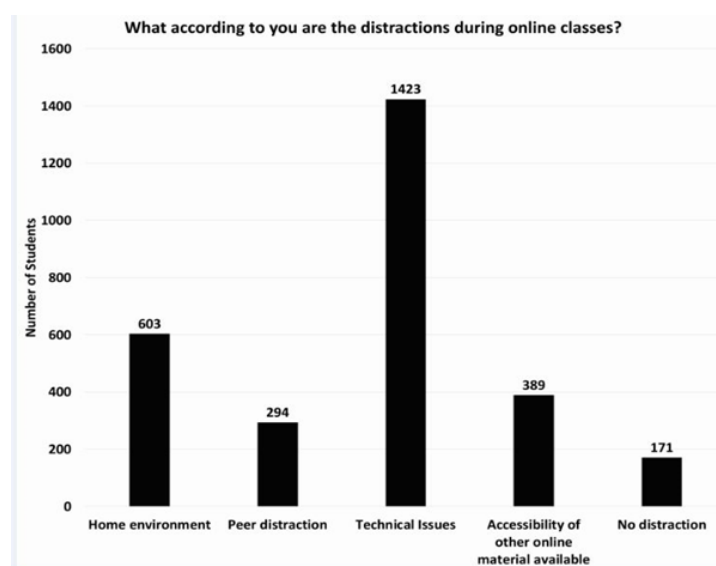**Fig 14.** Attributes enhancing the online classes

Fig 15. Distractions during online classes

41.7% of the students think that freedom of interaction with teachers and peers can enhance the teaching learning process [80]. 18% of the students feel that they do not get quick response from their teachers in online setting which is an opportunity lost for learning and clarifying a concept. Activities like collective brainstorming, team-projects, live chats, shared whiteboards and role-playing can lend a social interactivity to online learning [81]. We need our students not only to focus on concepts but also the key ideas, relationship and skills. The learning environment interface should also meet the desired standards for usability, which requires professional design skills. A framework of well-articulated learning objectives and outcomes are also needed which will make learning quantifiable for the learner. Even the most attractive power-point presentations will not ensure active learning unless there is a simultaneous teacher audio and video component. [82] suggests that building social capital through online class discussions can be very valuable for the students. These online interactions can broaden their knowledge base. To get them fully engrossed in learning, we need to have multimedia interactions, simulations, explorations, games, quizzes and drag-and-drop exercises too [83]. 81% of the students believe that new technologies require new approaches to learning and problem solving and at least 60% feel that online learning experience is the need of the hour [84].
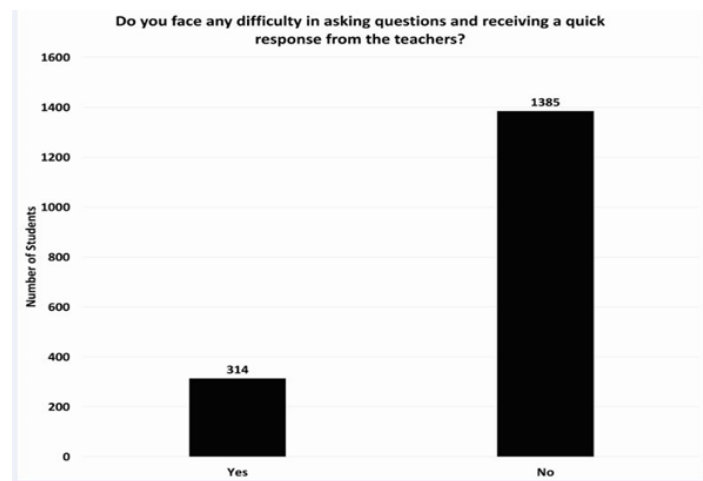

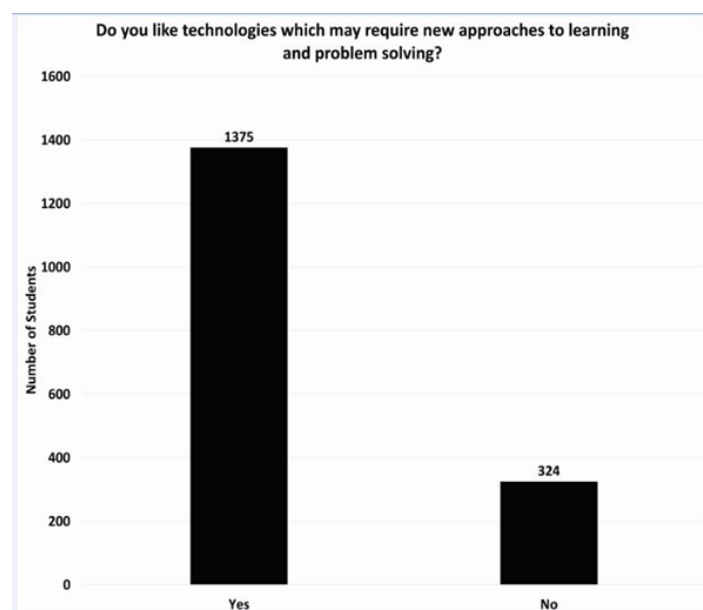**Fig 16.** Difficulty of asking questions and receiving a quick response

Fig 17. Technologies that require new approaches to learning and problem solving
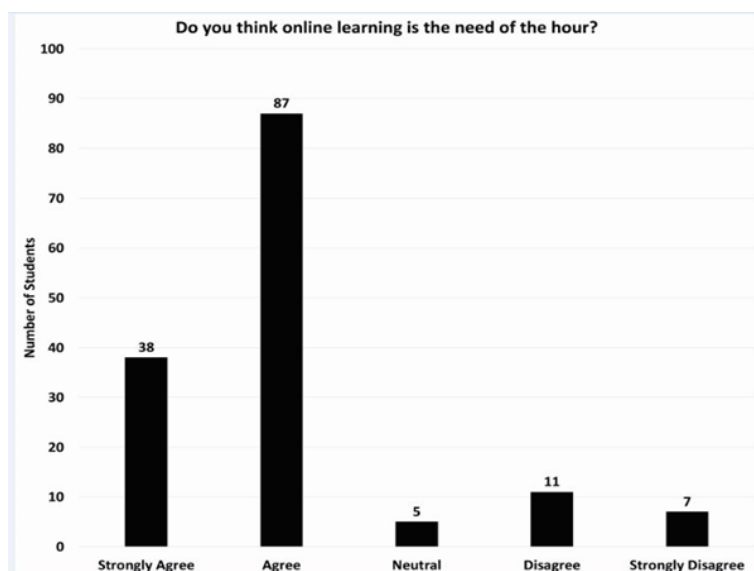
Fig 18. Online teaching - the need of the hour

The most common complaint of students in online format is that they find monotony and ennui, sitting before the screen. 52% of the students surveyed feel that long hours of online learning have adversely affected their health. It is not surprising therefore that 50.7% of the students think that the screen time for classes should not be more than three hours. Newspapers and social media in India is rife with the negative impact of virtual classes on students' eye-sight and general health. That has led to the reduction of teaching time in most Indian schools since it is the students' first foray into virtual teaching. There is some research on the decline in cognitive levels due to increased stress and anxiety caused by long duration of screen time[85],[86]. The anxiety might manifest itself in subtle ways such as more negativity towards technological tools[87], decreased motivation[88]. Some studies also indicate that frequent electronic media and computer use can cause socio-emotional problems such as, tiredness[89], shorter sleep duration[90] and sleep disturbances[91]. The bright light of the screen may suppress melatonin secretion, delay of biological clock and increased mental and physiological arousal[92],[93].
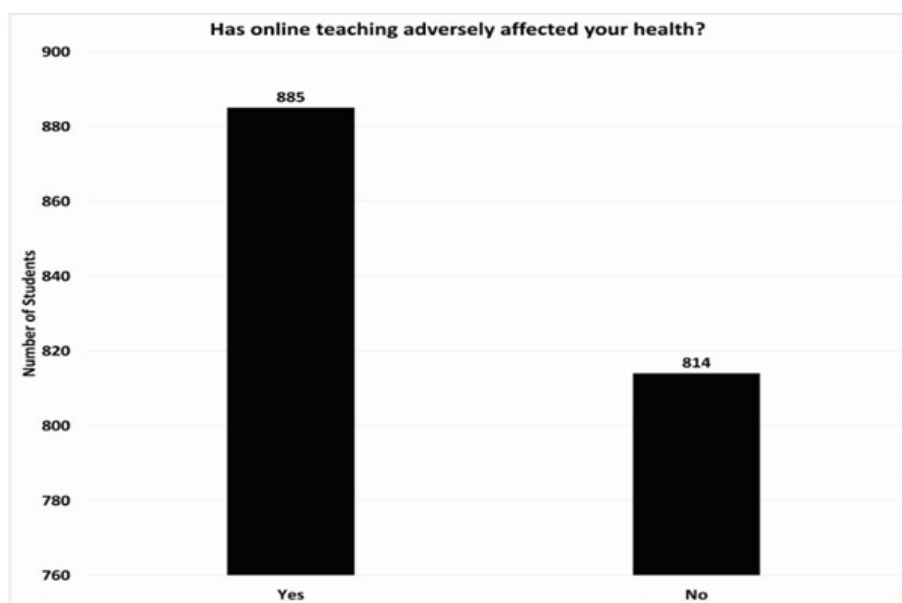

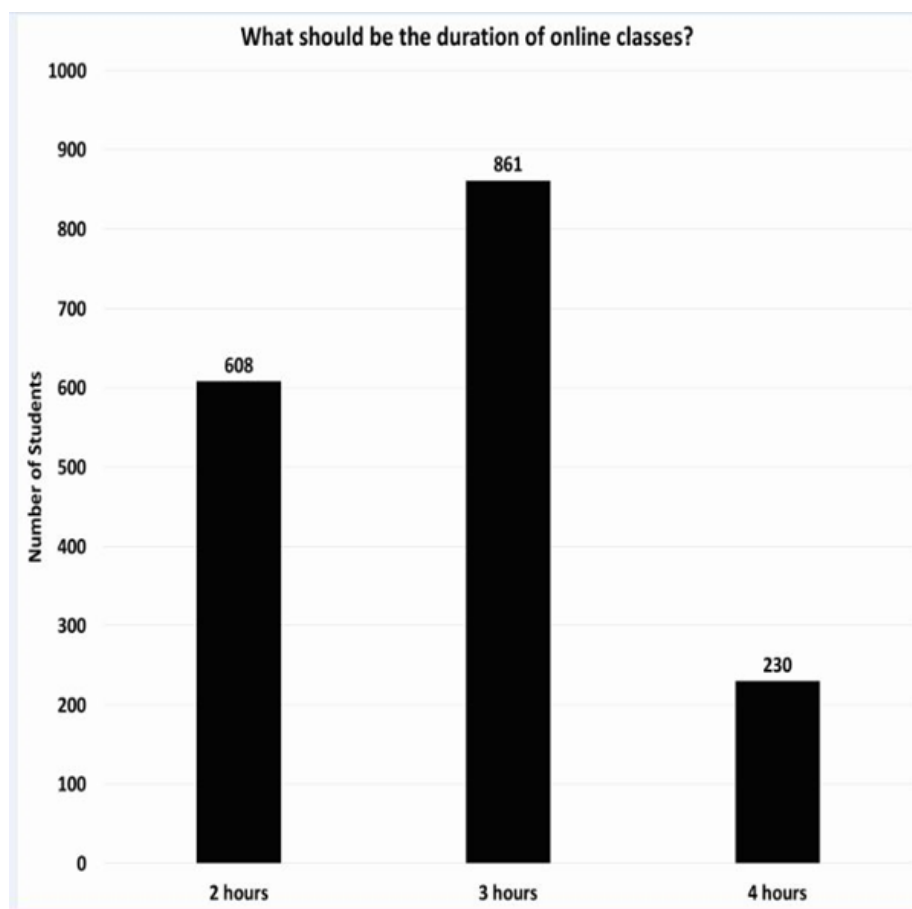**Fig 19.** Effect of online teaching on health

Fig 20. Duration of online classes

4 Conclusion

Online teaching in Indian schools is in stark contrast to the traditional classroom teaching where teacher's discourse dominates the environment. With appropriate measures, online teaching can become shared and collaborative learning - the ideal model of instructional dissemination. Feedback mechanisms have to be built in to be ploughed back to the classroom transaction and reinforce knowledge[94]. Built-in tracking mechanism for student performance can enhance the overall experience. If Covid-19 triggered school closure has taught the educationists anything, it is that we have learnt to liberate learning from outmoded systems of curriculum delivery and the disproportionate emphasis on information transfer. Educational revolution which might have taken another decade in coming is now around us and the ramifications will take much longer to fully reveal to us. When teachers return to the face to face classroom, they would have adopted new technologies and learned new approaches for enhancing student engagement to improve student learning. Technology has indeed been used purposefully during this period to enhance rather than just automate learning. However, the online education is not a substitute but an appendage to classroom teaching[95].

APPENDIX A

SNo.	Particulars
1	What are some of the current challenges in teaching that you are facing as a result of the Covid 19 pandemic?
2	How comfortable you are to teach through online mode?

Continued on next page

Table 1 continued

3	What kind of problems and challenges are you facing during an online session?
4	Which mode are you using for online teaching?
5	What kind of problems and challenges are faced by your students while learning through online mode?
6	What are the areas of teaching-learning process you feel are most impacted as a result of this change?
7	Can online teaching, if incorporated with good online tools and minus technical glitches, replace face to face interaction?
8	Should online teaching continue even after the lockdown period is over along with classroom teaching?
9	Identify the challenges faced by you in assessments and tests in virtual mode.
10	Do you need some organised training about the use of any online tools?
11	What are the positive aspects of online teaching if any?

APPENDIX B

S No.	Particulars
1	Is online learning program working for you?
2	Do you feel comfortable in communicating with your teachers online?
3	What attributes of online classes enhance the teaching learning process?
4	What according to you are the distractions during online classes?
5	Do you face any difficulty in asking questions and receiving a quick response from the teachers?
6	Do you like technologies which may require new approaches to learning and problem solving?
7	Do you think online learning is the need of the hour?
8	Has online teaching adversely affected your health?
9	What should be the duration of online classes?

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