Impact of Pandemic COVID-19 on the Teaching – Learning Process : A Study of Higher Education Teachers

Amit Kumar Arora [1]
R. Srinivasan [2]

Abstract

The world is battling COVID-19 and economies across the globe have declared a lockdown. Work from home (WFH) has become the norm, especially for service organizations. Following government instructions, even the academic institutions had to shut down temporarily, affecting academic delivery. Thus, they had to find new alternatives to academic delivery, and virtual classes were the way forward. In the present paper, we attempted to study the impact of lockdown on the teaching – learning process. The objective of the study was to assess the adoption rate for virtual classes and to determine the various benefits, challenges, and reasons for non - adoption of virtual classes. The study considered responses from 341 teachers of higher education institutions (HEIs) of Ghaziabad region. The study was divided into two parts. One set of respondents were those who adopted virtual classrooms and another set that did not adopt virtual classrooms. Descriptive statistics and *t* - test were performed to analyze the data collected through primary sources. Among those who adopted virtual mode, the mean of actual benefits was significantly less than the mean of expected benefits. Network issues, lack of training, and lack of awareness were stated to be the major challenges faced by them. Lack of awareness was stated to be the most important reason by those who did not adopt virtual classrooms followed by lack of interest and doubts regarding the usefulness of virtual classes. Less attendance, lack of personal touch, and lack of interaction due to connectivity issues were found to be the significant drawbacks of virtual classes. The study also suggested the ways to overcome the above challenges, drawbacks, and reasons behind non - adoption of virtual classes.

Keywords : **COVID-19, teaching – learning process, virtual classes, COVID-19, impact on learning**

JEL Classification Codes : I21, I23, O3

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It seems only yesterday since we turned into the new millennium, but 20 years have already gone by. So fast-paced and busy our lives have become that one does not realize the passing of time. From the time of being hunter-gatherers to today's society that is madly running after the accumulation of wealth, humans have evolved into greedier beings, completely unmindful of the existence of a billion other species living around us, competing for the same space. Humans have not realized that we are not the only God's gift to the planet. But we are so overcome by greed that we have trespassed onto the space of all other species with utter disregard to their presence and coexistence. When the laws of nature are defied, then nature finds its way to get even with us.

The year 2020 has commenced most unpleasantly. Novel Coronavirus, more popularly known as COVID - 19, which emerged in the city of Wuhan, China has caught us by surprise and is making us all run for cover. Due to no known medication being available for the treatment of the virus and due to its uncontrolled spreading from person

[1] *Assistant Professor – KIET,* Group of Institutions, Delhi-NCR, Ghaziabad - 201 206. (E-mail : amitaroraicwa@gmail.com) ; ORCID iD : https://orcid.org/0000-0001-9311-0740
[2] *Professor – KIET,* Group of Institutions, Delhi-NCR, Ghaziabad - 201 206. (E-mail : r.srinivasan@kiet.ed)

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to person, the world has come to a halt, pushing everyone indoors and the global economies into recession. Even the most powerful economies like the USA and Europe are clueless about how to control this onslaught by a microorganism. This pandemic has thus far affected about a million people across the globe, has killed more than 50,000 people, and it is feared that it has still not reached its peak. Hence, much more pain remains. The pain caused due to shutting down of the global economy is so deep that no one can fathom its depth nor anyone can predict the duration for which the pain is likely to last. Experts are advocating extreme caution as it is expected to be worse than the 2008 Global Financial Crisis and the Great Depression of the 1930s. The seriousness of the threat can be gauged from the fact that even the Summer Olympics 2020 proposed to be conducted in July – August 2020 in Japan have been postponed. The last time such a decision was taken was during World War II in the year 1944. Similar negative effects are seen across industries.

It has always been debated whether technology has been a boon or a bane to the human race. In the present case, it has proven to be both – a boon as well as a bane. On the one hand, the awareness created through the social media platforms has cautioned one and all to take preventive measures so that the negative effects of the virus can be brought under control, but at the same time, the same platforms are being misused by the unscrupulous elements in the society by causing fear and panic among the citizens. As technology is helping in spreading awareness among the masses, the same technology could become the saviour of the economies of the world.

Hitherto, work from home (WFH) was a culture which was exclusive to the information technology (IT) and IT-enabled services (ITES) sector only. However, with the lockdown announced across countries, it is becoming the norm across all the service sectors. Even the education section, which has predominantly practiced the brick-and-mortar (classroom) based teaching – learning method, is now forced into looking for other options. To beat the economic slowdown, now many educational institutions, be it schools or higher educational institutions (HEIs), have opted to test the online mode of course delivery.

The objective behind undertaking this project is to understand the acceptability and efficacy of online education among the teaching fraternity as an alternative to classroom mode of course delivery. With this background, the following objectives are set for this study :

(i) To determine the impact of COVID-19 on teaching methodology.

(ii) To determine the difference in the adoption rate of virtual classrooms due to COVID-19.

(iii) To determine the various challenges faced by the teachers during the adoption process of virtual classroom tools.

(iv) To determine the benefits of adoption of virtual classroom tools.

(v) To determine the drawbacks associated with virtual classes.

(vi) To know whether any difference exists between the expected and actual benefits associated with virtual classes.

(vii) To know the reasons behind the non-adoption of virtual classes.

Literature Review

Prasad, Sunitha, and Rani (2019) conducted a study to determine the advantages, drawbacks, and the trend of MOOCs. The study found MOOCs are not a new context in online education to give access to large courses online. Context features, technological factors, and motivation behaviour are the factors that affect the intention to continue the use of MOOCs. It was also found from the study that various benefits make MOOCs popular,

which are : Vastness, openness, opportunity to exchange thoughts, improve knowledge, and saves time in getting education.

Alqurashi (2018) studied the data collected from 167 respondent students of undergraduate and graduate courses to determine online self-efficacy, the interaction between OLSE, learner content, known learner content, and instructor content. From the analysis of the data, it was found from the study that OLSE, LI, LCI, and LII were interconnected and the students had a high level of satisfaction when the content of the course was well designed. It was found that the instructor has to focus on the expected and perceived benefit which the students are seeking from online education. Learner and instructor interaction work as the main and significant predictor to improve the satisfaction level of students in online education.

Lone (2017) studied the concept of online education and its present and future state in India and estimated that the e-learning market in India was about $ 3 billion, and the government and various startups were putting their best efforts to make the e-learning available in each corner of the country. Online education makes education and learning so interactive and gives the students a chance to plan their future themselves and to get the practical implementation of the learning. The study also found some challenges of the e-learning platforms, which are computerization, lack of infrastructure, and hardware availability to get access to online learning.

Collecting data through document analysis, survey, and interviews, Cochrane (2016) concluded that if the course designs are centered on learning, student engagement, and on self-reflection, then online professional development can transform for the teachers as well.

Gaytan (2015) adopted the grounded study method to study the faculty and student views on the aspects critical to the student retention in online courses and concluded that the online students preferred receiving lectures from their professors and for them to be able to interact freely and to be able to connect better for enhanced learning.

Kuo, Walker, Belland, and Schroder (2013) studied the sample of UG and PG students of Western University who had enrolled for online courses of 12 weeks to find the students' satisfaction level and present state of online education. With the help of regression analysis, ANOVA, and correlation, it was found that some predictors had a significant relation with the online learning, that is, instructor-student interaction, learner content, Internet efficiency, and among these learners, content was the main and significant predictor of the students' satisfaction from online learning. It was also found that there are some areas where there is a need to pay attention like course content, learner – instructor interaction, content designing, and its proper organization so that the satisfaction level of the students from online education can be increased.

Osvaldo (2012) opined that massive open online courses (MOOC) are an important development for online education and have the potential to attract and benefit a large number of students as well as to learn from the best of instructors. Autonomy, diversity, openness, and interactivity form the backbone of the online education system.

Mkrttchian (2011), while reviewing the "hhh" framework propagated by the Internet Peoples University, opined that the hybrid distance education approach provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative learning environments. He added that the framework provides the students, teachers, subject experts, and "hhh" team members to interact with one another and also helps the students to move to become a reflective practitioner rather than just a theoretician.

Mayadas, Bourne, and Bacsich (2009) opined that online education has not only created a permanent place for itself, but is also creating new openings for teachers, policy makers, and educational institutions ; thus, providing increased chances of completing their degree, better accessibility, etc.

Shea and Bidjerano (2009) used structural equation modelling (SEM) to study the impact of technology as a delivery mechanism of education and concluded that instructors' skills in fostering teaching presence and their abilities to connect with the students determined the effectiveness of the students' learning.

Moreno-Ger, Burgos, Martínez - Ortiz, Sierra, and Fernández - Manjón (2008) recommended the use of educational games to enhance learning, but observed that the absence of the systematic design and implementation of educational games as a limiting factor of this method of education and further said that the

game design method should include adaptation and assessment features.

Bonnel (2008) felt that an efficient feedback mechanism forms the backbone of online education. Feedback could be about course design, faculty roles, student participation, etc. This way, the students' learning as well as professional skills are enhanced.

Sprague, Maddux, Ferdig, and Albion (2007) observed that the transformation in the online education system will involve significant increases in the numbers of students and faculty who are involved in online education.

Eom, Wen, and Ashill (2006) applied structural equation modelling (SEM) on the course structure, instructor feedback, self - motivation, learning style, interaction, and instructor facilitation, and concluded that while only instructor feedback and learning style were found to be significant denominators, the authors further added that online education had the potential to change the educational landscape.

Research Methodology

(1) Sample : The study considered the teachers of higher education teaching undergraduate, postgraduate, or both the programmes. The study is a cross-sectional study conducted during the lockdown due to COVID-19 in March 2020. The study targeted 400 teachers out of which 353 responses were received, that is, approx 88%. Out of the 353 responses, only 341 responses were considered, as 12 responses were not complete. The samples were drawn from Ghaziabad city in the state of Uttar Pradesh. In Ghaziabad, there are 112 colleges as per the higher education department.

(2) Method : SPSS was used to analyze the data. *t* - test was used to know the mean difference between the expected and actual benefits of virtual classes. Descriptive statistics and bar diagrams are used to analyze the data.

(3) Data Collection Procedure : The study is based on primary data. The data were collected using a structured questionnaire filled through online as well as offline mode. Reliability of the questionnaire was tested through test – retest method. The score of the test was found to be 0.843, and a score above 0.7 is considered as good. The questionnaire consisted of three parts in which Part - A consisted of a total of 11 questions, which was for the respondents who adopted virtual classes ; Part - B consisted of two questions and was to be filled by the respondents who did not adopt virtual classes ; and Part - C consisted of personal information of the respondents.

Data Analysis and Results

(1) Profile of the Respondents : Table 1 shows the profile of 341 respondents of the study. From Table 1, we can see that 71% of the respondents were males and 29% were females. Most of the respondents were in the age

Table 1. Profile of the Respondents

	F	%
Gender		
Male	242	71.0
Female	99	29.0
Total	**341**	**100**
Age (in Years)		
Below 30	36	10.6
30 – 40	182	53.4

40 – 50	101	29.6
50 Above	22	6.5
Total	**341**	**100**
Experience (Years)		
Below 5 years	52	15
5 – 10 years	81	24
10 – 15 years	112	33
15 – 20 years	74	22
20 & Above	22	6
Total	**341**	**100**
Programme Teaching		
Under Graduate Programme (UG)	233	68.3
Post Graduate Programme (PG)	78	22.9
Both UG & PG	30	8.8
Total	**341**	**100**

category of 30 – 40 years followed by respondents in the 40–50 years category. Majority of the respondents had 10 – 15 years of experience in teaching undergraduate programmes.

(2) Adoption Rate of Virtual Classes : The adoption rate of virtual classes in the current scenario of lockdown due to COVID-19 was found to be 63% as out of 341 respondents, 215 were using virtual classes for teaching purpose as shown in Table 2.

(3) Effect of COVID-19 on Adoption of Virtual Classes : Out of the total 215 respondents who were using virtual classes, 174 (i.e. 81%) had adopted the virtual classes after the lockdown due to COVID-19 and only 41 (i.e. 19%) were using virtual classes before COVID-19. It is seen that the reason behind the adoption of virtual classes is COVID-19 (Table 3).

(4) Motivating Factors Behind Adoption of Virtual Classes : Most of the respondents had to adopt virtual classes due to the concern of their students followed by self-motivation as shown in Table 4.

Table 2. Adoption Rate of Virtual Classes

Response	Number of Respondents	Percentage
Yes	215	63
No	126	37
Total	341	100

Table 3. Effect of COVID-19 on Adoption of Virtual Classes

Response	Number of Respondents	Percentage
After COVID-19	174	81
Before COVID-19	41	19
Total	215	100

Table 4. Motivating Factors

Response Option	*F*
Self-motivation	64
The obligation of the workplace	39
Colleagues	34
Concerned about students	78
Total	215

Table 5. Virtual Learning Apps Used

App Used	No. of Responses	Percentage
Google Classroom	64	29.8
Zoom	178	82.8
WebEx	2	0.9
YouTube Live	24	11.2
Microsoft Team	2	0.9
Apache Open Meeting	0	0.0
BigBlue Button	0	0.0
Skype Groups	18	8.4
Others	18	8.4

(5) Virtual Learning Apps : There are so many apps available for virtual classes and the study identified eight apps and found the Zoom app was being used by a maximum number of respondents followed by Google classroom, YouTube live, and Skype as shown in Table 5.

As seen in Table 5, the percentage is more than 100% as the respondents could choose more than one option from among the choices. Besides the apps mentioned in Table 5, some respondents also specified Whatsapp as their preferred mode to share the PPT and notes and some respondents preferred YouTube app for sharing their video links.

(6) Expected Benefits of Adoption of Virtual Classes : In the circumstances when face to face interaction is not possible, the study attempted to know the expected benefits of adoption of virtual classes. Seven expected benefits were listed and the respondents were asked to make their choices on a 5 - point scale (5 = *Strongly Agree* & 1 = *Strongly Disagree*). Table 6 shows a descriptive analysis of the expected benefits of the adoption of virtual classes. From Table 6, we can interpret that 'enhance creativity' is the most expected benefit with adoption of virtual classes followed by enhancing personal learning, convenient to use, able to connect with students, able to cover syllabus timely, increased enthusiasm of learners, and motivate students.

(7) Actual Benefits of Adoption of Virtual Classes : Table 7 shows a descriptive analysis of the actual benefits of the adoption of virtual classes. adoption of virtual classes. From Table 7, we can interpret that 'convenient to use' is the most beneficial with adoption of virtual classes followed by enhancing personal learning, able to cover syllabus timely, able to connect with students, increase the enthusiasm of learners, and motivate students.

(8) Paired Samples *t* - Test : To determine whether any significant difference exists between expected and actual

Table 6. Descriptive Statistics : Expected Benefits of Adoption of Virtual Classes

Response Option	*N*	Minimum	Maximum	Mean	Std. Deviation
Convenient to use	215	1	5	3.74	.817
Able to connect with students	215	1	5	3.69	1.102
Able to cover syllabus timely	215	1	5	3.66	.972
Enhancing personal learning	215	2	5	3.82	.857
Enhance creativity	215	2	5	3.89	.751
Motivate students	215	1	5	3.21	1.115
(Class attendance will increase)					
Increase the enthusiasm of learners	215	1	5	3.48	.926
Valid *N* (Listwise)	215				

Table 7. Descriptive Statistics : Actual Benefits of Adoption of Virtual Classes

Response Option	*N*	Minimum	Maximum	Mean	Std. Deviation
Convenient to use	215	1	5	3.72	.847
Able to connect with students	215	1	5	3.56	.974
Able to cover syllabus timely	215	1	5	3.62	.973
Enhancing personal learning	215	2	5	3.64	.864
Enhance creativity	215	2	5	3.69	.748
Motivate students	215	1	4	2.63	.875
(Class attendance will increase)					
Increase the enthusiasm of learners	215	1	5	3.39	.935
Valid *N* (Listwise)	215				

benefits from the adoption of virtual classes, paired sample *t*-test has been used. The outcome of the test is presented in Table 8 and Table 9.

(i) Paired Samples Statistics : In Table 8, paired samples statistics are given from which we can interpret that the actual mean score is less than the expected mean score for all of the response options. This indicates that the actual benefits are less as compared to the expected.

(ii) Paired Samples Test : From Table 9, we can interpret that mean of the difference between expected benefits and actual benefits is 0.17714 and the difference is significant also as the significant value is 0.049, which is below the value of .05. Hence, we can conclude that the actual benefits of virtual classes are less as compared to the expected benefits. The reason behind this could be the casual attitude of the students as very few students are attending these classes seriously and the effective monitoring system of attendance of virtual classes has to evolve.

To know out of the seven selected benefits individually, which factors are significant, we have further tested the individual item *t*-test of the same. The output of the test is mentioned in Table 10.

From Table 10, we can interpret that the mean difference is positive, which implies that the expected averages are more as compared to the actual average. Out of the seven selected benefits, the mean scores of motivate student, enhance creativity, and enhance personal learning are more as compared to the mean actual score and

Table 8. Paired Samples Statistics

	Response Options	Mean	*N*	Std. Deviation	Std. Error Mean
Pair 1	Convenient to use : Expected	3.74	215	.817	.056
	Convenient to use : Actual	3.72	215	.847	.058
Pair 2	Able to connect with students : Expected	3.69	215	1.102	.075
	Able to connect with students : Actual	3.56	215	.974	.066
Pair 3	Able to cover syllabus timely : Expected	3.66	215	.972	.066
	Able to cover syllabus timely : Actual	3.62	215	.973	.066
Pair 4	Enhancing personal learning : Expected	3.82	215	.857	.058
	Enhancing personal learning : Actual	3.64	215	.864	.059
Pair 5	Enhance creativity : Expected	3.89	215	.751	.051
	Enhance creativity : Actual	3.69	215	.748	.051
Pair 6	Motivate students : Expected (Class attendance will increase)	3.21	215	1.115	.076
	Motivate students : Actual (Class attendance will increase)	2.63	215	.875	.060
Pair 7	Increase the enthusiasm of learners : Expected	3.48	215	.926	.063
	Increase the enthusiasm of learners : Actual	3.39	215	.935	.064

Table 9. Paired Samples Test : Overall

		Paired Differences					*t*	*df*	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Average Expected Benefits - Average Actual Benefits	.17714	.18980	.07174	.00161	.35268	2.469	6	.049

the differences are also significant. For other factors, the mean differences are positive, but not significant. To overcome the challenges, we should find ways to make virtual classes more participative and attractive.

(9) Major Challenges Faced During the Adoption of Virtual Classes : To determine the major challenges faced for the adoption of the virtual classes, seven factors are identified as shown in Table 11 and the respondents were asked to select from a 5 - point scale (5 = *Strongly Agree* & 1= *Strongly Disagree*). The responses are shown in Table 11.

From Table 11, we can interpret that network issues, lack of training, and lack of awareness were the major challenges faced by the respondents to adopt virtual classes followed by lack of professional environment, lack of teaching material at home, and resistance to change. The above findings can be easily interpreted through Figure 1.

To overcome the challenges, universities and colleges should organize training programs for conducting virtual classes and the institutions should identify methods for effective implementation and monitoring of virtual classrooms.

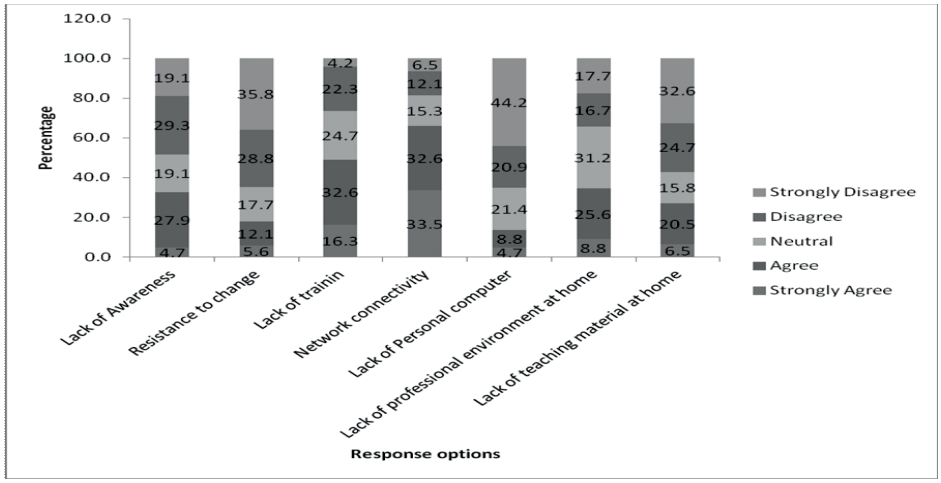
Table 10. Paired Samples Test : Individual

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	*t*	*df*	Sig. (2-tailed)
Pair 1	Convenient to use : Expected Convenient to use : Actual	.028	1.014	.069	–.108	.164	.404	214	.687
Pair 2	Able to connect with students : Expected								
	Able to connect with students : Actual	.135	1.477	.101	–.064	.333	1.339	214	.182
Pair 3	Able to cover syllabus timely : Expected								
	Able to cover syllabus timely : Actual	.037	1.356	.093	–.145	.220	.402	214	.688
Pair 4	Enhancing personal learning : Expected								
	Enhancing personal learning : Actual	.186	1.212	.083	.023	.349	2.250	214	.025
Pair 5	Enhance creativity : Expected Enhance creativity : Actual	.200	1.033	.070	.061	.339	2.839	214	.005
Pair 6	Motivate students : Expected (Class attendance will increase) Motivate students : Actual (Class attendance will increase)	.581	1.351	.092	.400	.763	6.312	214	.000
Pair 7	Increase the enthusiasm of learners : Expected								
	Increase the enthusiasm of learners : Actual	.088	1.159	.079	–.067	.244	1.118	214	.265

Table 11. Major Challenges Faced During the Adoption of Virtual Classes

	Strongly Agree		*Agree*		*Neutral*		*Disagree*		*Strongly Disagree*		TOTAL	
Response Option	***F***	**%**	***F***	**%**	***F***	**%**	***F***	**%**	***F***	**%**	***F***	**%**
Lack of Awareness	**41**	4.7	**60**	27.9	**41**	19.1	**45**	29.3	**28**	19.1	215	100.0
Resistance to change	**12**	5.6	**26**	12.1	**38**	17.7	**62**	28.8	**77**	35.8	215	100.0
Lack of training	**35**	16.3	**70**	32.6	**53**	24.7	**48**	22.3	**9**	4.2	215	100.0
Network connectivity	**72**	33.5	**70**	32.6	**33**	15.3	**26**	12.1	**14**	6.5	215	100.0
Lack of personal computer	**10**	4.7	**19**	8.8	**46**	21.4	**45**	20.9	**95**	44.2	215	100.0
Lack of professional environment at home	**19**	8.8	**55**	25.6	**67**	31.2	**36**	16.7	**38**	17.7	215	100.0
Lack of teaching material at home	**14**	6.5	**44**	20.5	**34**	15.8	**53**	24.7	**70**	32.6	215	100.0

Figure 1. Challenges Faced During the Adoption Process of Virtual Classes



(10) Drawbacks of Virtual Classes : As every challenge is an opportunity, similarly during these tough times of COVID-19, virtual classes have allowed the teaching fraternity to explore different alternatives. Though there are opportunities, there are also some drawbacks associated with it. Table 12 lists the major challenges confronted while conducting virtual classes. Through this study, it is found that student attendance is a major challenge as the mean score is a meagre 4.11, lack of personal touch with a mean score of 4.05 came second, and lack of interaction due to connectivity issues is close behind with a mean score of 4.03. To overcome the drawbacks, the HEIs should devise a mechanism for effective monitoring of student attendance, and the teachers should find out effective delivery methods to generate interest of students. At the same time, the benefits of online education should also be highlighted to the students, especially during challenging times like COVID - 19.

(11) Reasons for Not Adopting Virtual Classes : The study collected the responses of 126 respondents who were not using virtual classes to determine the reasons for not using virtual classes. The study found lack of awareness, lack of interest, and perception of the respondents about the users to be the most important reasons for not adopting virtual classes as shown in Table 13.

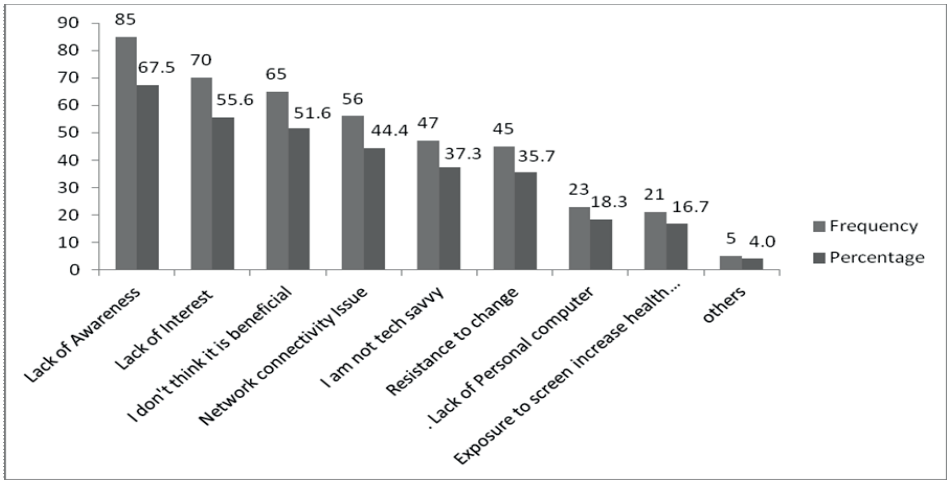
Table 12. Drawbacks of Virtual Classes

	N	Minimum	Maximum	Mean	Std. Deviation
Casual attitude among students	215	1	5	3.49	1.080
Less attendance	215	2	5	4.11	.699
Lack of personal touch	215	1	5	4.05	.877
Lack of interaction due to connectivity issues	215	1	5	4.03	1.018
Lack of discipline	215	1	5	3.14	1.082
Possibility of proxy attendance	215	1	5	2.68	1.201
Can get undue advantage due to technical glitches	215	1	5	3.23	1.009
Valid *N* (Listwise)	215				

Table 13. Reasons for Not Adopting Virtual Classes

Response	*F*	%
Lack of awareness	85	67.5
Lack of interest	70	55.6
I don't think it is beneficial	65	51.6
Network connectivity issues	56	44.4
I am not tech-savvy	47	37.3
Resistance to change	45	35.7
Lack of personal computer	23	18.3
Exposure to screen increases health issues	21	16.7
Others	5	4.0

Figure 2. Reasons for Not Adopting Virtual Classes



From Figure 2, we can see that lack of awareness is the most important reason behind non - adoption of virtual classes followed by lack of interest, perception regarding usefulness of virtual classes, network connectivity issues, not being tech - savvy, resistance to change, exposure to screen increases health issues, and others.

To overcome the above challenges, the teachers should shed their inhibitions and come forward without hesitation and with a positive mindset. At the same time, the HEIs should come forward and organize training sessions to handhold the faculty members that have some discomfort with the handling of technology.

Findings, Recommendations, and Conclusion

It is observed that even during the lockdown due to COVID-19, the learning of students is not stopped as many teachers have opted for virtual classes method for course delivery. COVID-19 has forced each one of us to look at the world of education differently.

Enhanced creativity is the most expected benefit with adoption of virtual classes followed by enhancing personal learning, convenient to use, able to connect with students, able to cover syllabus timely, increased enthusiasm of learners, and motivated students are the other expected benefits. The study observes that the actual

benefits of virtual classes are less as compared to the expected benefits. The primary reason behind this is the casual attitude of the students as there is less attendance in the classes and the monitoring system of virtual classes is less effective.

Network issues, lack of training, and lack of awareness are the major challenges faced by the respondents in the adoption of virtual classes followed by lack of professional environment at home, lack of teaching material at home, and resistance to change. To overcome these challenges, it is recommended that the HEIs should organize awareness and training programmes for the benefits of such teachers and show them the way of making these classes interesting.

Lack of awareness is the most important reason behind non-adoption of virtual classes followed by lack of interest, doubts over the usefulness of virtual classes, network connectivity, lack of technical capabilities, resistance to change, and exposure to screen related health matters are quoted as some of the reasons for non-adoption.

Less attendance, lack of personal touch, and lack of interaction due to connectivity are found as the significant drawbacks of virtual classes. The mechanism should be devised to make the students understand the benefits of virtual classes. Similarly, teachers should also come up with new innovative methods of lecture delivery for making the classes more interesting.

Majority of the respondents believe that virtual classes can't replace the real classroom teaching method. The virtual classrooms can very well complement the normal teaching method. These can be used for the doubt clearing sessions and during preparatory leaves when they are not available on the campus. At the same time, it can be useful for a smaller set of students, say about 15–20 students. The teachers further expressed their desire to conduct virtual classes in the future as well for the needy students to improve their results. The virtual classes are most beneficial during a time like COVID-19 and both teachers and students should make the most out of the situation.

Limitations of the Study and Scope for Further Research

As with other studies, the present study is also having some limitations. The sample size of the study was restricted to 341 respondents only. Maybe with a larger sample size, the results could vary. Further, the research was restricted to the Ghaziabad district only and cannot be applied to a pan - India context. If studies are conducted on a pan-India basis, the results could be different from the findings of the study.

The present study is done from the teachers' point of view. Further studies can be conducted from the students' point of view. Further, studies can be conducted for school teachers and students – whether they are also facing the above benefits, drawbacks, and challenges or they are having a different opinion. The study has covered Ghaziabad district only ; further studies can be conducted at the state or national level.

Authors' Contribution

Amit Kumar Arora was responsible for conceiving the idea for this particular research study. He developed the core model design for this particular empirical study along with Prof. R. Srinivasan. Dr. R. Srinivasan collected the relevant research literature of the studies already carried out in this topic and generated concepts and codes for this research design. Amit Kumar Arora developed the research methodology suitable for this particular study. He analyzed the data and interpreted the results with the use of SPSS 22.0 software. Dr. Srinivasan and Mr. Arora both identified the implications, limitations, as well as the future scope of this study.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter, or materials discussed in this manuscript.

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About the Authors

Amit Kumar Arora is serving as an Assistant Professor in KIET School of Management, KIET Group of Institutions, Delhi-NCR, Ghaziabad. He is an Associate Member of Cost and Management Accountants (ACMA), UGC-NET, M.B.A (Finance), M.Com, M.A. (Eco.), Ph.D. (P). He is having more than 15 years of academic and corporate experience. His areas of interest are costing, accountancy, finance, and economics. He is the author of two text books titled *Management of Working Capital* and *Financial Management*. His various papers have been published in reputed research journals including Journal of ICAI-CMA as well as Scopus and ESCI indexed journals.

R. Srinivasan, Professor & Head, KIET School of Management, Ghaziabad is a Ph.D. from FMS, University of Delhi in financial risk management. He has more than 32 years of experience in the IT industry and in teaching, research, and consultancy. He has been associated with various institutions like NMIMS, Amity University-Noida, IMI-New Delhi, IMT-Ghaziabad, IBA-Greater Noida, SOIL-Gurgaon, etc. in various senior positions. He is invited as an expert by various government departments like CSIR, NISG-Ministry of Corporate Affairs, etc. He has provided consultancy services to University of Applied Sciences, Frankfurt, Germany ; Nomura Research Institute, Gurgaon; and Technova Global Pvt. Ltd., Gurgaon. Dr. Srinivasan has around 20 research papers published in several leading international and national indexed/refereed research journals.