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RESEARCH ARTICLE

College Students' Perspective on Online Teaching and Learning Methods During Covid-19 Pandemic: A Study

Madhulika Gautam¹, Neha Agarwal² and Ayesha Sharma³

1. Asso. Prof.,
2. Res. Scholar
3. M.Sc. Student
Dayalbagh Educational
Institute (Deemed University)
Dayalbagh, Agra,
Uttar Pradesh, India
Corresponding author e-mail:
malikal204@gmail.com

ABSTRACT

The present study was conducted in Agra city of Uttar Pradesh to understand the college students' perspective on online teaching and learning methods. Multistage stratified random sampling was used to make a sample size of 120 college students who were involved in online classes. The study revealed that the quizzes were more effective activity during Covid-19 than pre-COVID-19 and this difference was found to be significant ($\chi^2 = 12.79$). Significant difference regarding the use of email ($\chi^2 = 35.62$), personal contact ($\chi^2 = 92.91$) and telephonic contact ($\chi^2 = 14.02$) for communication before and during Covid-19 was observed. Also, significant differences were observed in variables demonstration ($\chi^2 = 4.82$), photographs ($\chi^2 = 7.18$), slides ($\chi^2 = 22.95$), recordings ($\chi^2 = 16.56$) and other ICT tools ($\chi^2 = 17.14$) along with significant association was found regarding preference to e-library ($\chi^2 = 7.18$), e-pdf ($\chi^2 = 43.43$) and hand notes ($\chi^2 = 45.00$). Significant association was found regarding the preference for group discussion with detailed instructions by the teacher ($\chi^2 = 25.21$). The results also found some methods which made classroom more interesting during Covid-19 were photographs, recordings, slides, ICT tools. Teaching-learning material like e-pdf, e-textbooks, online quizzes etc were found adequate for students for online classes. Students responded enthusiasm, demonstration method, explaining through AV Aids, virtual availability and encouragement for discussion were very important methods for online classes. Thus, it becomes very important for teachers to identify the methods by which students can interact in class effectively and they can feel more opportunistic after getting interesting productive material which is available online.

Key words: AV aids; Covid-19; ICT tools; Learning; Pandemic; Teaching.

Like most of the domain, the coronavirus pandemic has generated changes in the teaching-learning process in higher education institutions and has influenced the interaction between teachers and students. In this regard, many governments took measures in order to avoid spreading the virus and to ensure the continuity of the educational process, and universities worldwide through online learning. In general, internet-based learning is considered as an option and an alternative to traditional learning. As a consequence of the pandemic, universities were constrained to carrying out their activity with students exclusively online. According to the *UNESCO report (2021)*, more than 90 per cent of the total student population in the world was affected due to the pandemic from which approximately 143 million (45%) of higher-

level students were affected by COVID-19. According to a survey by *TeamLeaseEdTech in 2021*, college-going students have faced 40 per cent - 60 per cent of learning loss due to COVID-19. *Mathivaan et. al (2021)* and *Naik et. al (2021)* indicated that lack of facilities, infrastructure, technical tools and internet access are the major drawback for conducting online sessions. So, it becomes very important to know the perspective of students about the online platform. The present study can help to know about the consequences of online teaching learning methods and materials during pandemic. As researches are not found on this vital aspect in India through researchers, an attempt has been made to throw some light on this problem. The objectives of the present study were laid down as follows:

- To study the use of different communication media to communicate with the teachers before and during Covid-19.
- To study students' preference for teaching-learning activities and study materials to be used in the class room.
- To identify the factors to make the classroom teaching learning process interesting.
- To study the availability of suitable teaching learning materials and their perceived importance by students during online classes.

METHODOLOGY

The present research falls under the descriptive method to obtain information concerning the current status of a phenomenon and, wherever possible, to draw valid general ideas from the facts discovered.

Sample selection of the study: A multistage stratified random sampling was applied for selection of sample. Since the present study deals with college going students; the random sampling has been used where online classes were going on. The sample consisted of 120 college students from B.Sc. and B.Tech. courses in equal proportion.

Techniques and Tools: A self-constructed research tool was administered in the present study to collect data. The tool was divided into three different sections. The first section was divided into two parts. The first part was based on the use of different communication media to communicate with teachers like e-mail, personal and phone. The second part was based on the preference of teaching-learning activities and study materials to be used in the classroom for students, like presentations, projects, quizzes, and assignments and e-textbook & pdf. The second section was used to assess the factors that make classroom teaching and learning process interesting (demonstration, discussion method, personal experience etc.). The third section was about the available online teaching learning materials and the improvement of productivity in online teaching learning methods (e-PDF, virtual lab, presentation, etc.). The tool was filled by students via Google forms. A total of 42 items were used to collect the data. A pilot study was conducted to ensure that the tests developed effectively reflect the levels of items made for assessing the views on online teaching and learning methods of the college-going students of the respective courses and also to ensure the feasibility of the test administration

in terms of language used, instructions, numerical items, total time requirement and such other factors. The test-retest method was used to determine the reliability of research tools employed in the present study. The scales were administered to a small sample of 8 college students from selected colleges in Agra in an interval of 15 days. The student's answers were examined with a view to locating the changes needed in the test. The scoring was done by giving zero to three points of credit for each response. The scores obtained were analysed using Spearman's rank correlation-coefficient was calculated to determine the reliability of the tool. The values for reliability and validity of the correlation coefficient obtained for the research tool are 0.84 and 0.77, respectively. The face validity was established by the judgement of three experts in test construction. Comments and suggestions regarding the dimensions of the research tool, the structure of statements, linguistic structure, and the sequencing of statements were incorporated into the final draught of the tool.

RESULTS AND DISCUSSION

It is evident from Table 1 that there was significant difference regarding the use of email ($\chi^2 = 35.62$, $df = 1$, $p < 0.05$), personal contact ($\chi^2 = 92.92$, $df = 1$, $p < 0.05$) and telephonic contact ($\chi^2 = 14.02$, $df = 1$, $p < 0.05$) for communication before and during Covid-19. Majority of the students (64.17%) used e-mail during Covid-19 as compared to only 25.83 per cent students used e-mail before Covid-19. Majority of the students (87.50%) used personal contact before Covid-19 as compared to only 25.83 per cent students used personal during Covid-19. This difference regarding

Table 1. Use of different communication media to communicate with the teachers before and during Covid-19 (N=120)

Variables	Before Covid-19		During Covid-19		χ^2
	No.	%	No.	%	
<i>e-mail</i>					
Yes	31	25.83	77	64.17	35.63*
No	89	74.17	43	35.83	
<i>Personal</i>					
Yes	105	87.50	31	25.83	92.92*
No	15	12.50	89	74.17	
<i>Phone</i>					
Yes	46	38.33	75	62.50	14.02*
No	74	61.67	45	37.50	

*Significant at < 0.05 level of significance

used personal before and during Covid-19 was found to be significant. Majority of the students (62.50%) used phone during Covid-19 as compared to very few (38.33%) students used phone before Covid-19. This difference regarding used of phone before and during Covid-19 was found to be significant. The finding of the study is in line with the findings of *Mathivaan et. al. (2021)* supported the finding of the present study as they found that online learning was advantageous as it provided flexibility and convenience for the learner.

It can be easily depicted from Table 2 that significant differences were observed in preference of students regarding quizzes ($\chi^2 = 12.80$, $df = 1$, $p < 0.05$) while students' presentation, projects and assignments showed to have no significant association. 70.83 per cent of students preferred presentations before COVID-19, while 60.00 per cent students preferred presentations during COVID-19. However, 67.50 per cent of students preferred projects before COVID-19 as compared to 59.17 preferred during COVID-19. Most of the students (72.50%) preferred Quizzes during Covid-19 as compared to only 50.00 per cent students who preferred Quizzes before Covid-19. 57.67 per cent of the students preferred assignments in the class during COVID-19, as compared to 50.00 per cent who preferred assignments in the class before COVID-19. These findings are in line with the findings of *Gautam & Agarwal (2022)* and *Jin et. al. (2021)* who pointed out that during the Covid-19 the use of online learning has increased significantly but the real effectiveness and completion rate has not been significantly improved.

Table 2. Students' preference of teaching – learning activity used in the classroom (N=120)

Variables	Before Covid-19		During Covid-19		χ^2
	No.	%	No.	%	
<i>Students Presentation</i>					
Yes	85	70.83	72	60.00	3.11 ^{NS}
No	35	29.17	48	40.00	
<i>Project</i>					
Yes	81	67.50	71	59.17	1.79 ^{NS}
No	39	32.50	49	40.83	
<i>Quizzes</i>					
Yes	60	50.00	87	72.50	12.80*
No	60	50.00	33	27.50	
<i>Assignments</i>					
Yes	60	50.00	68	57.67	1.07 ^{NS}
No	60	50.00	52	43.33	

*Significant at < 0.05 level of significance, NS =Non-significant

Table 3. Factors to make the classroom Teaching Learning Process interesting (N=120)

Variables	Before Covid-19		During Covid-19		χ^2
	No.	%	No.	%	
<i>Laboratory</i>					
Yes	65	54.17	65	54.17	0.00 ^{NS}
No	55	45.83	55	45.83	
<i>Demonstration</i>					
Yes	70	58.33	53	44.17	4.82*
No	50	41.67	67	55.83	
<i>Educational trip</i>					
Yes	65	54.17	53	44.17	2.40 ^{NS}
No	55	45.83	67	55.83	
<i>Discussion method</i>					
Yes	71	59.17	67	55.83	0.27 ^{NS}
No	49	40.83	53	44.17	
<i>Personal Experience</i>					
Yes	60	50.00	47	39.17	2.85 ^{NS}
No	60	50.00	73	60.83	
<i>Use of AV AIDS</i>					
Yes	60	50.00	59	49.17	0.017 ^{NS}
No	60	50.00	61	50.83	
<i>Photographs</i>					
Yes	34	28.33	54	45.00	7.18*
No	86	71.67	66	55.00	
<i>Slides</i>					
Yes	46	38.33	83	69.17	22.96*
No	74	61.67	37	30.83	
<i>Recordings</i>					
Yes	22	18.33	51	42.50	16.56*
No	98	81.67	69	57.50	
<i>ICT Tools</i>					
Yes	40	33.33	72	60.00	17.14*
No	80	66.67	48	40.00	
<i>Movies</i>					
Yes	48	40.00	45	37.50	0.16 ^{NS}
No	72	60.00	75	62.50	

*Significant at < 0.05 level of significance, NS =Non-significant

It is clear from Table 3 that significant differences were observed in variables demonstration ($\chi^2 = 4.82$, $df = 1$, $p < 0.05$), photographs ($\chi^2 = 7.18$, $df = 1$, $p < 0.05$), slides ($\chi^2 = 22.95$, $df = 1$, $p < 0.05$), recordings ($\chi^2 = 16.56$, $df = 1$, $p < 0.05$) and other ICT tools ($\chi^2 = 17.14$, $df = 1$, $p < 0.05$) while variables Laboratory, Educational Trip, Discussion Method, Personal Experience, Use of AV AIDS and movies showed to have no significant association with making TLP interesting pre-Covid-19 and during Covid-19. About 54.17 per cent of the students suggested involving the laboratory method in the teaching and learning process in the

classroom before and during COVID-19, respectively. Before COVID-19, the majority of students (58.33%) suggested involving the demonstration method into the teaching learning process in the classroom, whereas only 44.17 per cent of students suggested involving the demonstration method into the teaching learning process in the classroom during COVID-19. About 54.17 per cent of the students suggested involving educational trips in the teaching learning process before COVID-19, while 44.17 per cent of the students suggested involving educational trips in the teaching learning process during COVID-19. Similarly, 59.17 per cent of the students suggested involving a discussion method for the teaching learning process in the classroom before COVID-19 as compared to 55.83 per cent of the students suggested involving a discussion method in the classroom during COVID-19. Before COVID-19, half of the students (50.00%) suggested involving personal experience in the teaching and learning process in the classroom, whereas 39.17 per cent of students suggested involving personal experience method in the classroom during COVID-19. Also, 50.00 per cent of the students suggested involving the AV AIDS for teaching learning process in the classroom before COVID-19. Similarly, 49.17 per cent students suggested involving the AV AIDS in the classroom during COVID-19. The majority of students suggested involving photographs (45.00%), slides (69.17%), recording (42.50%), and ICT tools (60.00%) in the teaching and learning process in the classroom during COVID-19. However, very few students suggested involving photographs (28.33%), slides (38.33%), recording (18.33%), and ICT tools (33.33%) in the teaching and learning process in the classroom before COVID-19. Before COVID-19, 40.00 per cent of students suggested involving movies in the teaching learning process in the classroom, whereas 37.50 per cent of students suggested involving movies in the teaching learning process in the classroom during COVID-19. These findings are in line with the findings of Naik *et al.* (2021) who found in their study that lack of facility infrastructure, technical tools and internet access are the major drawback for conducting online sessions.

Table 4 reveals that before and during COVID-19, significant associations were observed regarding the students' preference for e-library, e-pdf and hand notes e-library ($\chi^2 = 7.18$, $df = 1$, $p < 0.05$), e-pdf ($\chi^2 = 43.43$, $df = 1$, $p < 0.05$) and hand notes ($\chi^2 = 45.00$, $df = 1$, $p < 0.05$) to be engaged in the classroom. While there was

Table 4. Preference of study material to engage in a classroom environment (N=120)

Variables	Before Covid-19		During Covid-19		χ^2
	No.	%	No.	%	
e-text book					
Yes	51	42.50	66	55.00	3.75 ^{NS}
No	69	57.50	54	45.00	
e-library					
Yes	34	28.33	54	45.00	7.18*
No	86	71.67	66	55.00	
e-pdf					
Yes	37	30.83	88	73.33	43.43*
No	83	69.17	32	26.67	
Hand notes					
Yes	97	80.83	46	38.33	45.00*
No	23	19.17	74	61.67	
*Significant at < 0.05 level of significance, NS =Non-significant					

no significant difference in the students' preference for e-textbooks. During COVID-19, 55.00 per cent of students preferred e-text books for study material to engage in a classroom teaching and learning process as compared to 42.50 per cent who preferred e-text books for study material prior to COVID-19. During COVID-19, the majority of the students preferred e-library (45.00%) and e-pdf (73.33%) for study materials to engage in the classroom teaching learning process, as compared to very few students who preferred e-library (28.33%) and e-pdf (30.83%) before COVID-19. Interestingly, 80.83 per cent of students preferred Hand Notes as study material to engage in a classroom teaching learning process before Covid-19 as compared to only 38.33 per cent of students preferred Hand Notes for study material to engage in a classroom teaching learning process during Covid-19. Mathivaan *et al.* (2021) observed Covid-19 had tremendous change in the educational sector in India. However, it has raised challenges and various opportunities.

It is evident from Table 5 that a significant association was found regarding the preference of students for “group discussion with detailed instructions by the teacher” ($c^2 = 25.22$, $df = 1$, $p 0.05$), while “group discussion on the topic given”, “group discussion with team cooperation & no instruction”, and “no group discussion but discussing the topic” had no significant association was found regarding student preference between pre and during COVID-19. Before COVID-19, the majority of students preferred

Table 5. Preference for group discussion in the classroom (N=120)

Variables	Before Covid-19		During Covid-19		χ^2
	No.	%	No.	%	
Group Discussion with detail instructions by teacher					
Yes	97	80.83	60	50.00	25.214*
No	23	19.17	60	50.00	
Group Discussion on the topic given					
Yes	44	36.67	30	25.00	3.829 ^{NS}
No	76	63.33	90	75.00	
Group Discussion with Team cooperation & no Instruction					
Yes	40	33.33	51	42.50	2.142 ^{NS}
No	80	66.67	69	57.50	
No Group Discussion but discussing about topic					
Yes	24	20.00	28	23.33	0.393 ^{NS}
No	96	80.00	92	76.67	

*Significant at < 0.05 level of significance, NS =Non -Significant

(80.83%) “group discussion with detailed instructions from the teacher”, while only 50.00 per cent of students preferred “group discussion with detailed instructions from the teacher” during COVID-19. Study conducted by *Sharma and Hardia (2013)* supported the finding of the present study. Only 25.00 per cent of the students preferred "only group discussion on the topic given by the teacher" in the classroom during the teaching learning process during COVID-19, while 36.67 per cent of the students preferred it before COVID-19. However, 42.50 per cent of the students referred " group discussion with team cooperation and no detailed instructions by the teacher in the classroom" during Covid-19 as compared to 33.33 per cent of the students preferred it before Covid-19. Only 23.33 per cent of the students preferred "No group discussion but just discussing the topic given by the teacher" in the classroom during Covid-19 as similarly, only 20.00 per cent of the students preferred "No group discussion but just discussing the topic given by the teacher" in the classroom during Covid-19.

It is clear from Table 6 students highlighted adequate availability “e-pdf” (61.67%), "e-textbook" (43.33%) and "online quizzes" (43.33%), while they also responded to having moderate availability for "presentation" (64.17 %), "pre-recorded videos" (42.50%), "e-Blackboard" (55.00 %), & " e-library "(45.00 %). However, students responded that they had

Table 6. Availability of suitable teaching-learning material during online classes (N=120)

Response	Adequate		Moderate		Inadequate	
	No.	%	No.	%	No.	%
e-pdf	74	61.67	36	30.00	10	3.33
Virtual lab	25	20.83	52	43.33	43	38.83
Presentation	37	30.83	77	64.17	6	5.00
Pre-Recorded Videos	47	39.17	51	42.50	22	18.33
e-Blackboard	37	30.83	66	55.00	17	14.17
e-library	38	31.67	54	45.00	28	23.33
e-textbook	52	43.33	51	42.50	17	14.17
online quizzes	58	48.33	45	37.50	17	14.17

inadequate availability “virtual lab” (38.83%) during online classes.

It can be observed from Table 7 that most of the students responded by considering "Enthusiasm" (77.50%), "Encouraging for Discussion" (47.50%), "Explaining through AV Aids" (55.83%), "Student Group Work" (47.50 %), and "Virtual Availability" (54.17%) as very important methods suited to teaching-learning methods for online classes. As well as 50.83 % of the students considered "Student Presentation" (50.83%) as an important method suited to teaching-learning methods for online classes. However, 17.50 per cent of students considered the "use of visual aids" as a less important method suited for online classes. *Kumar & Gautam (2022) and Nwankao (2015)* observed in his study "Students' Learning Experience and Perceptions of Online Course Content and Interactions" those participants rated interaction with course material as the most important, followed by interaction with the instructor. Next in importance was the character of the learner, followed by student-to-student interaction.

Table 7. Perception about the importance of suitable teaching-learning methods during online classes (N=120)

Suitable method	Very Important		Important		Less Important	
	No.	%	No.	%	No.	%
	Enthusiasm	93	77.50	18	15.00	9
Use of visual aids	48	40.00	51	42.50	21	17.50
Student presentation	43	35.83	61	50.83	16	13.33
Encouraging for Diss.	57	47.50	47	39.17	16	13.33
Explaining through AV aids	67	55.83	44	36.67	9	7.50
Student group work	57	47.50	52	43.33	11	9.17
Demonstration	86	71.67	29	24.17	5	4.16
Virtual availability	65	54.17	48	40.00	7	5.83

CONCLUSION

During COVID-19, the use of online learning has increased significantly, but the real effectiveness and completion rate have not been significantly improved. Lack of facilities, infrastructure, technical tools, and internet access are the major drawbacks to conducting online sessions. Increased enthusiasm for the subject and demonstration cum lecture method for the online teaching and learning method must be needed in the present pandemic situation to have a better teaching learning environment. Encouraging students to have group discussion with team cooperation can make online classes interesting, and students can gain insight to new informative things. Incorporating different teaching and learning methods and material availability can improve the learning process during covid situation. The government should increase funds to necessitate the purchase of learning resources, development of infrastructure, train and recruit adequate teachers.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

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