

RESEARCH PROJECT REPORT

(2021)

A STUDY OF THE PERCEPTION OF DIFFERENT STAKEHOLDERS TOWARDS VIRTUAL TEACHING-LEARNING MODE DURING COVID-19 PANDEMIC AT THE UPPER PRIMARY STAGE



Project Investigator: Ms. Vandana



District Institute of Education and Training
Karkardooma, Delhi-110092

Research Project Report

**A study of the Perception of Different Stakeholders Towards Virtual
Teaching-Learning Mode During Covid-19 Pandemic at the Upper Primary Stage**

Project Investigator

Ms. Vandana

Assistant Professor

Curriculum and Pedagogy (English)

2021

100 Copies

© District Institute of Education and Training,

Karkardooma, Delhi-110092

ISBN: 978-93-5607-262-6

Publisher: District Institute of Education and Training, Karkardooma

RESEARCH PROJECT REPORT

(2021)

A STUDY OF THE PERCEPTION OF DIFFERENT STAKEHOLDERS TOWARDS VIRTUAL TEACHING-LEARNING MODE DURING COVID-19 PANDEMIC AT THE UPPER PRIMARY STAGE



Project Investigator: Ms. Vandana



District Institute of Education and Training
Karkardooma, Delhi-110092

Foreword

The COVID-19 outbreak impacted people from all walks of life, with people being advised to self-quarantine in their homes to prevent the virus from spreading. The COVID-19 pandemic had caused havoc on schools and students all across the world. The lockdown had a significant impact on mental health, resulting in psychological issues such as frustration, stress, and despair. But the most affected sector was education which had been switched over from a conventional to virtual mode due to lockdown. This sudden transition from offline to online was not less than a challenge for different stakeholders like students, teachers and parents.

Keeping in view the significance of virtual teaching and learning in the pandemic period, the present research has been conducted to know the perception of different stakeholders in education.

I am glad that the present study entitled, "**A study of the perception of different stakeholders towards virtual teaching-learning mode during Covid-19 pandemic at the upper primary stage**" has been taken up which is very much required in the prevailing conditions of Covid Pandemic.

I believe that the present study will be useful for all stakeholders in education to bring quality education through online mode.

I extend my heartiest congratulations to Ms. Vandana, Project Investigator, Assistant Professor, Curriculum and Pedagogy, English for her utmost hard work and sincerity in carrying out this relevant research work.

**Dr. Anjul Sharma
Principal
DIET, Karkardooma**

Preface

The provision of education at all levels has risen exponentially during the last 50 years around the world. COVID-19 represents the most significant challenge all the expanded education institutions have ever faced. The COVID-19 pandemic caused abrupt and profound changes to teaching and learning. Students and educators at all levels of education have been quickly adapted to online learning due to the coronavirus pandemic.

Incorporating technology into the educational sector is not something new. But during the covid lockdown, it was the only mode by which every single student was getting an education. There is a great significance of virtual/online learning as it plays a pivotal role in imparting quality education.

The present research has been undertaken to determine the perspectives of various stakeholders, primarily HoS, teachers, students, and parents, on various aspects of online education, including their perceptions of virtual teaching and learning, benefits and drawbacks of virtual mode, complexities faced by various stakeholders during Covid-19 pandemic at the upper primary stage.

The findings of the present study reveal the significance of virtual teaching-learning amid covid pandemic and the experiences and perceptions of different stakeholders in the process of online teaching-learning mode.

The educational implications of the present study provide suggestive measures to make online education more effective by overcoming the persisting issues to ensure the resumption of educational activities during any adversity.

**Ms. Vandana
(Project investigator)**

Declaration

“This is to certify that the work embodied in this research project report titled “**A study of the perception of different stakeholders towards virtual teaching-learning mode during Covid-19 pandemic at the upper primary stage**” is original and free from any form of falsification, fabrication and plagiarism. I shall be solely responsible for any such dispute arising out of my research work”.

Ms. Vandana
(Project investigator)

Acknowledgement

I take this opportunity to extend my sincere gratitude and appreciation to all those who made this research project possible. To commence with, I pay my obeisance to the Almighty, the most gracious and merciful, to have bestowed upon me good health, courage, inspiration, zeal and the light.

With deep sense of gratitude I profoundly thankful to Sh. Rajanish Singh, Director, SCERT and Dr. Nahar Singh, Joint Director, SCERT to provide me an opportunity to take up this research project under their valuable guidance. I extend my special thanks to Dr. Anjul Sharma, Principal, DIET KKD for providing me sustained encouragement and motivation to carry out this research project successfully.

I am very much thankful to all the esteemed members of Programme Advisory Committee (PAC) for their worthy suggestions and approval of this project.

My warmest thanks to Dr. Sharda Kumari, Principal (Retired), R.K. Puram and Dr. Amit Ahuja, Assistant Professor, Guru Gobind Singh Indraprastha University, Dwarka for their contribution in the construction of the tools for the present study.

I am thankful to Anita Rastogi, Professor, Jamia Millia Islamia, and Dr. Subhash Chander, Assistant Professor, Delhi University for their worthy contribution in the vetting of the tools.

I want to pay my gratitude to Dr. Dhananjay V. Deshmukh, Assistant Professor, Indian Institute of Teacher Education, Gandhinagar, Gujarat and Dr. Subhash Chander, Assistant Professor, Delhi University for their valuable contribution in the reviewing of the final report of the present research. Their valuable suggestions have been incorporated in the present research work.

I also owe sincere thanks to all those researchers and authors whose works have been consulted and quote in my research project and which made a solid platform for my research work.

I am very much thankful to the Principals of the schools who had given me the permission to collect data for the study. Most important thanks to all the teachers and the students and their parents who had given me their response to my research tools.

I owe my sincere thanks to the faculty of DIET, KKD and Administrative staff who have contributed directly or indirectly for this project.

Last but not the least, I must express my profound gratitude to my loving and supportive parents who formed a part of my vision and taught me good things that really matter in life. Their infallible love and incessant support has always been my strength. Their patience and sacrifice will remain my inspiration throughout my life.

Ms. Vandana

Table of Content

Title	Page. No.
Foreword	iii
Preface	v
Declaration	vii
Acknowledgment	ix
Table of Content	xi
Introduction	1
➤ Need and Rationale of the Study	2
➤ Statement of the Problem	2
➤ Operational Definition of the Key Terms Used In the Study	3
➤ Research Questions	3
➤ Objectives of the Study	3
➤ Delimitation of the study	3
Conceptual Framework	4
Review of Related Literature	6
➤ Overall Analysis of Related Literature	7
Research Methodology	8
➤ Population	8
➤ Sample taken for the current study	8
➤ Sampling technique	8
➤ Tools Employed in the Present Study	9
➤ Tool Development	9
➤ Data Collection	10
➤ Administration of the Tools	10
Analysis and Interpretation of Data	12
Findings of the Present Study	33
Conclusions	37
Educational Implications	39
Limitations of the Study	41
Suggestions for Further Studies	41
References	42
Appendices	45
Review Report of the Present Research	53

Introduction

Since the turn of the millennium, the number of Internet users has exploded around the world. The constant global expansion of the Internet backbone, the never-ending improvement in Internet speed, and the on-going price reductions in Internet service have resulted in the Internet being utilized in practically every household around the globe. Not to add the rapid advancement of mobile Internet and the gadgets those support it, such as smartphones, which has resulted in Internet access being available practically anywhere on the planet. In the meantime, online video sharing took place. As a result, several online video-sharing platforms, such as YouTube, arose and quickly acquired popularity. However, due to the COVID-19 pandemic that broke out, a complete school system was compelled to shift from classrooms to the Internet.

The coronavirus pandemic had resulted in an unparalleled surge. The spread of COVID-19 posed a threat to humanity, as the pandemic had compelled numerous worldwide activities, including educational institutions, to shut down. Despite the challenges posed by this rapid transformation, educational institutions had been pushed to move to e-learning using accessible educational platforms in order to prevent the virus from spreading. Because of the unexpected closure of educational institutions as a result of COVID-19's emergence, authorities have proposed that in an emergency, alternate learning methods be used to ensure that students are not left without a way to study and the pandemic does not spread. While education can take place within (or outside) the classroom, the use of computer technology and the Internet is a crucial component of e-learning. E-learning is an important part of today's educational system because it alters the overall structure and is now one of the most popular themes amongst academics. An online educator compensates for the virtual classroom's absence of physical presence by providing a welcoming environment in which everyone feels comfortable participating in class. It contributes significantly to the transformation of our life into the digital world by providing flexible locations, class times, and high-quality content. It presents a path for humanity's progress during a period of physical isolation caused by a pandemic.

We may adapt our procedures and processes based on the demands of the learners using e-learning technologies. There are numerous online tools accessible, all of which are essential for a productive and efficient learning environment. In this time of crisis, educators can reach out to their students using a combination of audio, video, and text to keep their lectures personable. This can aid in the creation of a collaborative and dynamic learning environment in which students can provide rapid feedback, ask questions, and learn in an engaging manner. In times of crisis, such as man-made calamities, natural disasters, or pandemics like Covid-19, the Anywhere-Anytime characteristic of e-learning comes in handy. Closures of places and risky road trips can cause a lot of problems, but e-learning will allow us to acquire an education from the comfort of our own homes or workplaces. Technology allows individuals to connect and even work remotely without the need for face-to-face interaction during times of crisis, providing inventive and resilient solutions to prevent disruption. E-learning has flaws in the sense that it might obstruct contact between the learner and the educator, resulting in a loss of direct communication and personal touch. Many technical issues might obstruct and slow down the teaching–learning process for users. Students and learners are not all the same; their abilities and levels of confidence differ. Some people are uncomfortable learning online, which leads to irritation and uncertainty. Inadequate compatibility

between the design of technology and the psychological components required by the learning process, as well as insufficient customisation of learning processes, can block the teaching process and produce an imbalance.

Covid pandemic crisis ushered in a new era for online learning, allowing individuals to consider the positive aspects of e-learning technologies. This was a period when there was a lot of room for new discoveries and digital developments to emerge. Users of any age can utilize the online resources in critical scenario like Covid pandemic and benefit from the time and place flexibility that comes with online learning.

While digital or online education cannot completely replace traditional classroom instruction, it does have significant advantages. It enables for flexible and personalised learning at the learner's own pace, as well as the ability to continually enhance and expand knowledge via digital means. The rapid growth of internet usage, as well as many government programmes such as the Digital India campaign, have produced an atmosphere that is favourable to the transition to digital education. This will be supplemented by the Ministry of Human Resource Development's (MHRD) recent announcement of PM e-Vidya, a nationwide programme that will unite all activities connected to digital/online/on-air education. DIKSHA (one nation – one digital platform), TV (one class – one channel), SWAYAM (online MOOCS on various topics), IITPAL (platform for exam preparation), AIR (through community radio and the CBSE Shiksha Vani podcast), and AIR (through community radio and the CBSE Shiksha Vani podcast) and NIOS-developed study materials for differently abled children are among these. MHRD has also come up with an innovative idea which has been named as 'PRAGYATA' (guidelines for digital and online education) consisting of mainly eight steps: Plan, review, arrange, guide, yak (talk), assign, track and appreciate. The MHRD will extend and develop all of these areas of e-learning in a gradual manner, in a methodical and consistent manner.

Need and Rationale of the Study

The COVID-19 has resulted in schools shut all across the world. Globally, over 1.2 billion children are out of the classroom. As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms. Although there are many prospects for online learning in general, but pandemic time played a great role to flourish it, as most academic institutions have converted to this format. During the Corona Virus outbreak, online learning, remote working, and e-collaborations skyrocketed. Our Delhi Government has taken many initiatives to provide online education via different LMS platforms to access the students to continue their learning. Various steps have also been taken to provide educational material to those who do not have the facility of online mode. This research has been taken to find the perspective of different stakeholders mainly: HoS, teachers, students and parents regarding online education with respect to various aspects such as their perception regarding virtual teaching and learning, advantages and disadvantages of virtual mode, issues and challenges faced by different stakeholders and so on.

Statement of the Problem

Keeping the above-mentioned facts in mind, the investigator decided to conduct a research on
"A study of the perception of different stakeholders towards virtual teaching-learning mode during Covid-19 pandemic at upper primary stage"

Operational Definition of the Key Terms Used in The Study

Stakeholders: a sort of organization or system in which all members or participants are considered as having the same interest and role in its success. In the education system, stakeholders include administrators, teachers, staff members, students, parents, families, community members, local business leaders, and elected officials such as school board members, and state representatives who are invested in the welfare and success of a school and its students.

Virtual education: an electronic aided learning that uses the internet and technological tools for the acquisition and transmission of knowledge.

Pandemic: a widespread occurrence of an infectious disease over a large geographic area (such as many countries or continents), often impacting a significant proportion of the population.

Covid-19: a coronavirus-caused acute sickness in humans that is marked by fever and cough and can escalate to severe symptoms and, in some cases, death, especially in the elderly and those with underlying health issues.

Research Questions

The study was guided with the following research questions:

1. What are the different teaching methodologies used by the teacher to deliver content online at the upper primary stage?
2. What are the issues and challenges faced by different stakeholders in the teaching learning mode during covid-19 pandemic?
3. What are the experiences of students concerning online learning during Covid-19?
4. What is the perception of different stakeholders with respect to advantages and disadvantages of virtual teaching learning mode?

Objectives of the Study

The proposed study will serve the following objectives:

1. To explore various forms of virtual teaching-learning modes used by the teachers of upper primary stage during covid-19 pandemic.
2. To study the perception of different stakeholders with respect to virtual teaching and learning.
3. To explore various challenges faced by different stakeholders in adapting to the virtual teaching-learning process during covid-19 pandemic.

Delimitation of the Study

The present study was confined to:

- ❖ Schools of Directorate of Education (DoE), GNCT of Delhi
- ❖ District East
- ❖ Zone: 1, 2 and 3

Conceptual Framework

Because of Covid-19, countries all over the world had been put on lockdown, and educational institutions had been no exception. The country was experiencing huge crises in several areas as a result of the Covid-19 outbreak across the country, but the education sector was the worst hit. Educational institutions should use innovative approaches to combat the chronic crisis like covid-19 pandemic. During the lockdown period, many Indian state governments were looking into using an online learning platform to access online educational resources. They were trying to come up with strategies to help students keep up with their studies while the country was shut down because to Covid-19. The goal was to keep pupils' academic cycles on track and not let the lockout interfere with their study. The MHRD encourages students to continue their studies using online learning systems to ensure that there is no interruption in their education and that they have full access to classes as before. Students can use online learning platforms to not only have complete access to study materials, but also to participate in online classes and interact with teachers in the same way they would in a real classroom setting. Here are some online platforms initiated by MHRD to provide free access to online educational resources.

SWAYAM online courses: provides access to the top educational learning resources that were previously only available on the SWAYAM Platform and are now available to any learner for free and without the need to register. There are 1900 entire courses available, including teaching videos, weekly assignments, tests, and credit transfers, geared for students in grades 9 through 12, as well as those in higher education (undergraduate and postgraduate). Engineering, humanities, social sciences, law, and management courses, including robotics, are all connected with the curriculum.

SWAYAMPRAHBA: is a group of 32 DTH channels that provide high-quality educational curriculum-based course contents in a variety of disciplines, including arts, science, commerce, performing arts, social sciences and humanities subjects, engineering, technology, law, medicine, agriculture, and other subjects to all teachers, students, and citizens across the country who are interested in lifelong learning. Courses for school education (grades 9-12), higher education (undergraduate and postgraduate), out-of-school children, vocational education, and teacher training are broadcast on the channels. Arts, science, commerce, performing arts, social sciences, humanities, engineering, technology, law, medicine, and agriculture are among the subjects covered. On the website, one can see television broadcast schedules as well as archival shows.

National Digital Library: All academic levels, including researchers and life-long learners, all disciplines, all popular forms of access devices, and differently-abled learners can access the National Digital Library, which is a digital repository of a vast amount of academic content in various formats and provides interface support for leading Indian languages for all academic levels, including researchers and life-long learners, all disciplines, all popular forms of access devices, and differently-abled learners.

DIKSHA: The DIKSHA portal contains curriculum-aligned online learning content for students, instructors, and parents, including as video courses, worksheets, textbooks, and assessments. The content was generated by more than 250 instructors who teach in different languages under the supervision of the country's national board of education (CBSE) and the National Council of Educational Research and

Training (NCERT). Students are encouraged to venture beyond the book through QR codes in textbooks. Offline use is possible with the app.

e-Pathshala: NCERT's e-Pathshala is a multilingual online learning tool for students in grades 1 to 12. In many languages, including Hindi, Urdu, and English, the app contains books, videos, audio, and other content intended towards students, educators, and parents.

The National Repository of Open Educational Resources (NROER): This portal offers a variety of resources in many languages for students and teachers, including books, interactive modules, and videos, as well as a variety of STEM-based games. For classes 1–12, content is mapped to the curriculum, and teachers' materials are aligned.

Dealing with COVID-19, the education system's shared vision acknowledged that throughout the pandemic, instructors and students are motivated to modify online teaching-learning platforms to meet contemporary educational needs. Everyone, whether professors or students, was friendly and adept in using social media apps such as WhatsApp, Facebook, Twitter, and Instagram, which facilitated the use of online educational platforms such as ZOOM, Cisco WebEx, Google Meet, and others as an indication of positive learning transfer. There are also several valuable educational apps available, including Office 365, Google Classroom, and a variety of other user-friendly video conferencing software, all of which can be downloaded for free and are simple to use.

Review of Related Literature

Several studies have been conducted on virtual/online teaching and learning with respect to its utility factor among different stakeholders, perception of different stakeholders, advantages and disadvantages of online teaching and learning, challenges faced by different stakeholders in using various online platforms for teaching and learning purposes. Few studies have been mentioned below:

Aljawarneh et al (2010) compared different E-learning tools in terms of their goals, benefits, and limitations. The comparison aided in determining when each instrument should be used. According to the findings of the study, in the e-learning environment, teachers and students prefer MOODLE to Blackboard, because security is not integrated into the active learning development process, one of the key obstacles that the E-learning environment faces is security issues.

Goyal (2012) conducted a study to highlight the importance of e-learning in current teaching and to demonstrate its benefits and drawbacks. The possibility of using E-learning instead of traditional classroom teaching was also examined, as was the contrast with Instructor Led Training (ILT). The study also demonstrated the fundamental disadvantages of ILT in institutions and how E-learning might help overcome these issues.

Oludare et al (2012) did a study on the effectiveness of e-learning. The study indicated that e-learning is a new environment for academics, as it reveals how to make e-learning more effective in the educational setting, as well as the advantages of using it. According to the findings of the study, students were willing to learn more if they had less social connection with other students or lecturers.

Ms & Toro (2013) conducted a study was to look into the qualities, benefits, downsides, and elements that influence E-learning. The research was conducted with students in Lebanon and England in order to help instructors better understand what scholars wanted from learning management systems. According to the findings of the study, in the E-learning sector, some demographic characteristics such as habits and cultural background had an impact on student education. They suggested that instructors must be aware of these characteristics in order to construct instructional activities that would help students learn more effectively.

Samir et al (2014) did a study on many e-learning projects for educational purposes. The study's purpose was to show how to keep students interested in e-learning. According to the study, it might be difficult to measure students' motives for online learning because there is no face-to-face contact between them and their lecturers. One technique for improving students' motivation is to allow them to complete an online motivation assessment questionnaire.

Harandi (2015) did a study to determine the strength of the link between students' motivation and e-learning. Data was collected from students at Tehran Alzahra University, and data was analysed using Pearson's correlation coefficient. The study's findings revealed that various factors should be examined before using E-learning. However, because this study was limited to one culture, its findings may not be applicable to other cultures.

Ali et al (2018) explored the effectiveness of E-learning for university students. Data was collected through a questionnaire given to 700 students. Cronbach's alpha test was used to determine the factors' reliability and internal consistency. The exploratory feature analysis was used to remove the variables and compute the factors loading in the study. The findings showed that students believe E-learning is simple to use, time-saving, and cost-effective.

Aboagye et al (2020) conducted a study on students' concerns about how to deal with e-learning in the aftermath of the COVID-19 epidemic, as well as whether students are prepared to study online. According to the study's findings, learners must have access to a hybrid method that mixes traditional and e-teaching.

Mishra et al (2020) conducted a study in Mizoram University on online teaching-learning activities during the lockdown period, including establishing a link between the change management process and online teaching-learning process in the education system during the COVID-19 outbreak, in order to overcome the persisting academic disruption and ensure the resumption of educational activities and discourses as a normal course of procedure in the education system. In the study, it was found efforts were made by the university to provide students with free access to online educational resources so that they could make the most of their time during the lockdown. It was also found in the study that proper counselling services were offered by the university in order to maintain students' mental health and well-being in the pandemic.

Radha et al (2020) did a study to investigate the e-learning process among students who were already familiar with web-based technology in order to improve their self-study abilities. During the COVID-19 epidemic, e-learning became increasingly popular with students in all educational institutions, according to the findings of the study.

Overall Analysis of Related Literature

The above studies indicate that a number of researches have been conducted on the effectiveness of online teaching and learning. Overall analysis of above studies shows that to ensure student participation in e-learning, it is critical to concentrate on studying learner and student characteristics and engaging students. It's also important to consider the influence and scope of teacher acceptance of e-learning. Because of the age gap between the teachers and students, it is likely that the teachers received the majority of their education and teaching skills through traditional teaching and learning methods, which may explain why teachers' acceptance of e-learning differs from students' acceptance of modern e-learning and education in general. Blended approach is found to be more accepted among teachers and students. In sum total, online teaching and learning was a saviour at the time of pandemic. We need to become more technological friendly to prepare ourselves for such a pandemic crisis.

Research Methodology

Descriptive Survey Method

This is Qualitative Research. To carry out the present study, the descriptive survey method has been employed.

Population

- ❖ Delhi Government schools of the Directorate of Education (DoE).
- ❖ Types of Schools: single shift girls, single shift boys and Co-ed.
- ❖ HoS of DoE.
- ❖ Trained Graduate Teachers (TGTs) of DoE.
- ❖ Students of the upper primary stage studying in the schools of DoE.
- ❖ Parents/guardians of the students of the upper primary stage studying in the schools of DoE.

Sample taken for the current study

The sample of the current study was comprised of:

- ❖ 24 schools of Directorate of Education (Delhi)
- ❖ District East
- ❖ Zone 1, 2 and 3
- ❖ Stakeholders: HoS, teachers, students and parents
- ❖ HoS of each sampled school of DoE
- ❖ 10 Trained Graduate Teachers (TGTs) from each sampled school of DoE (Total= 240)
- ❖ 5 students of grade VIII of each sampled schools of DoE (Total= 120)
- ❖ Parents/guardians of the sampled students of grade VIII (Total= 120)

Sampling technique

Purposive sampling technique of the schools (based on geographically domain) has been used in the present study to select the schools of Directorate of Education (Delhi) from District East.

- ❖ Twenty-four schools had been selected randomly from the list available on the website of Directorate of Education (Delhi), District East and Zone 1, 2 and 3.
- ❖ From each zone, eight schools had been selected with geographical variations located especially on the outskirts namely: Trilokpuri, khichripur, , kalyanvas, chilla village, Rajgarh colony, Bhola Nath Nagar, Shankar Nagar, Chander Nagar and so on. Also including schools of Vivek Vihar, Laxmi Nagar, Shakarpur, Rani Garden.
- ❖ From each sampled twenty-four schools, ten TGTs had been selected for the interview (two TGTs for each subject of grade VIII i.e., English, Hindi, Mathematics, Social Science and Natural science)
- ❖ $24 \text{ schools} \times 10 \text{ TGTs (from each school)} = 240 \text{ TGTs}$
- ❖ TGTs had been selected by the HoS of the sampled school.

- ❖ From each sampled twenty-four schools, ten HoS had been selected for the interview.
- ❖ Five students of grade VIII from each sampled school (selected by the teachers) had been selected for the interview.
- ❖ Parents/guardians of the sampled students of grade VIII had been selected for an interview.

Tools Employed in the Present Study

The following tools had been used for the present study:

S. No.	Objectives	Tools Used
1.	To explore various forms of virtual teaching-learning modes used by the teachers of upper primary stage during covid-19 pandemic.	Structured Interview for ❖ Teachers
2.	To study the perception of different stakeholders with respect to virtual teaching and learning.	Structured Interview for ❖ HoS ❖ parents ❖ Students Questionnaire (Likert Scale) in Google Form for ❖ Teachers
3.	To explore various challenges faced by different stakeholders in adapting to the virtual teaching- learning process during covid-19 pandemic.	Structured Interview for ❖ HoS ❖ teachers ❖ parents ❖ Students

Tool Development

The tools used in the present study have been developed by the investigator with the help of two Resource Persons. For the tool development, Two Days Online Workshop was held on dated 12th, and 13th May, 2021 with the prior permission of Ms. Anjul Sharma, Principal, DIET Karkardooma. Due to Covid pandemic, online workshops had been conducted to follow the safety norms. The tools were developed for each and every objective. Four tools had been developed namely:

- ❖ Structured Interview for HoS having 10 questions
- ❖ Structured Interview for teachers having 5 questions
- ❖ Questionnaire (Likert Scale) in “Google Form” for teachers having 15 questions
- ❖ Structured Interview for parents having 10 questions
- ❖ Structured Interview for students having 5 questions

Reviewing/ Vetting of Tools

For the Reviewing/ Vetting of Tools, Two Days Online Workshop was held on dated 11th, and 26th June, 2021 by two Resource Persons with the prior permission of Ms. Anjul Sharma, Principal, DIET Karkardooma. Due to Covid pandemic, online workshops had been conducted to follow the safety norms.

In this workshop, each and every item of every tool was reviewed. As per the suggestions of experts, certain modifications had been done in the tools. Such as:

- ❖ Need of developing one more tool i.e., Structured Interview (for teachers) for the objective-1 which was developed by the investigator on the basis of the suggestions given by the experts.
- ❖ Few items from other developed tools had been deleted, added and modified as per the suggestions given by the experts.

Final draft of the tools

The final draft of the tools comprised of:

- ❖ Structured Interview for HoS having 9 questions
- ❖ Structured Interview for teachers having 6 questions
- ❖ Questionnaire (Likert Scale) in “Google Form” for teachers having 17 questions
- ❖ Structured Interview for parents having 7 questions
- ❖ Structured Interview for students having 8 questions

Data Collection

After the finalization of the tools, data was collected from different sample. Information gathered from the respondents was then analysed and interpreted.

- ❖ For collecting data from different schools, the investigator had prepared one official “Permission Letter” to seek permission from HoS of the sampled schools. In a letter, briefing of the current research project with its objectives was mentioned and HoS had been requested to permit and cooperate with the investigator to administer the tools on teachers, students and parents of their respective schools.
- ❖ “Permission Letter” was sent to the sampled schools on their school Mail ID by Ms. Anjul Sharma, Principal, DIET Karkardooma. Mail ID of the sampled schools was searched by the investigator from Edudel website.

Administration of the Tools

Data was collected by the investigator in the month of August-September. Tools were administered on the samples as per their convenience and suitability of time.

Structured Interview: Administered on HoS

To find the perspective of different HoS with respect to virtual teaching and learning and to assess the advantages and disadvantages of virtual teaching and learning, the investigator had prepared structured interview for the HoS. Investigator had contacted all the respective HoS of the (24) sampled schools. Structured Interview was used for data collection comprising of nine questions using both the medium i.e., telephonic interview as well as visiting the HoS personally in their respective schools. Telephonic interview was conducted as per the availability and suitability of the HoS as most of them wanted to avoid any sort of physical contact due to covid pandemic. Before conducting an interview, all the HoS of the concerned schools were assured by the investigator that their identity and responses would not be disclosed and kept confidential. Questions were asked from the HoS on different aspects such as: opinion of the HoS about virtual teaching and learning with respect to academic performance of the students, challenges faced by the teachers, students and parents during virtual teaching and learning, suggestions for the better and smooth running of online classes and so on.

Although, investigator had got full support and cooperation from the HoS, but investigator had to face some difficulties also while conducting an interview. For instance,

- ❖ leaving the interview by the HoS in the midst due to some urgency of official work. Then, again after fixing the timings, the interview was re-conducted.
- ❖ HoS of the few schools were not ready to give interview as they didn't find it relevant. In such cases, investigator first tried to convince HoS about the relevance of such research projects. Then, the interview was conducted only once they got convinced and satisfied. The investigator didn't put any pressure or force the HoS for the interview.

Structured Interview and Questionnaire: Administered on Teachers

In order to explore various online pedagogical methods used by the teachers of upper primary stage, to explore various issues and challenges faced by the teachers in virtual teaching and learning mode, to find their perspective with respect to virtual teaching and learning and to assess the advantages and disadvantages of virtual teaching and learning, the investigator had prepared Structured Interview and Questionnaire (Likert Scale) in “Google Form”. These tools had been used to collect data from (240) TGTs of five different subjects of the (24) sampled schools. Interview was conducted on TGT English, Hindi, Maths, Natural Science and S.St. Structured Interview consisted of six questions. Mode of interview was telephonic to avoid any physical contact with the teachers in the covid pandemic. Before conducting an interview, all the teachers of the concerned schools were assured by the investigator that their identity and responses would not be disclosed and kept confidential. Telephonic interview was conducted as per the availability and suitability of the teachers. Questions were asked from the teachers on different aspects such as: different teaching methodologies used by the teachers to teach their subjects through online mode, their experiences of teaching students from home as compared to teaching at school, method of assessing their students during online mode and so on.

Data was also collected from the teachers through Questionnaire (Likert Scale) in “Google Form” having 17 questions of five rating scale: Strongly agree, agree, cannot say, disagree and strongly disagree pertaining to different aspects with respect to: their liking towards teaching through online mode, internet connectivity, teaching learning activities in online mode and so on.

Structured Interview: Administered on Students

To find the perspective of students with respect to virtual teaching and learning and to assess the advantages and disadvantages of virtual teaching and learning, the investigator had prepared an online “Structured Interview” for (120) students of the sampled school grade VIII (five each from the school). Questions revolved around different aspects such as: their opinion on having a close knit of online study groups, different pedagogical methods used by their teachers, challenges or difficulties faced by them in learning different subjects during online mode and so on. Before conducting telephonic interview, all the students of the concerned schools were assured by the investigator that their identity and responses would not be disclosed and kept confidential. Interview was conducted as per the availability and suitability of the students. The investigator took the help of the teachers of the sampled schools to conduct Interview with the students.

Structured Interview: Administered on Parents

To find the perspective of parents with respect to virtual teaching and learning and to assess the advantages and disadvantages of virtual teaching and learning, the investigator had prepared a structured interview for (120) parents/guardians of the sampled students. Questions were asked from the parents on different aspects such as: their opinion if their children have learnt better in online mode than offline, their opinion on whether exams should be conducted or children should be merely promoted to the next class and so on. Telephonic interview was conducted as per the availability and suitability of the parents. Before conducting an interview, all the parents were assured by the investigator that their identity and responses would not be disclosed and kept confidential.

Analysis and Interpretation of Data

After collecting the required data, the investigator analysed and interpreted the whole data. Each and every response was carefully analysed and then interpreted.

Analysis of Objective 1

To explore various forms of virtual teaching-learning modes used by the teachers of upper primary stage during covid-19 pandemic.

Tool used: Structured Interview (for teachers)

Sample: (240) TGTs of Directorate of Education, Delhi.

Item 1: What are the different teaching methodologies do you use to teach your subject through online mode?

Data Analysis: After analysing all the responses of (240) interviewed TGTs, it was found that all of them were using different applications of online mode such as: WhatsApp, Zoom, Google Meet, Cisco Webex, Google Classroom. While (85.4%) teachers said that they prepare and use powerpoint presentations and use them to deliver the content, especially TGTs Natural science and TGTs Maths. Some of them also added they also use whiteboard, voice-over, self-made videos to explain the content to their students. Science teachers also conduct online experiments based on different topics such: germination of seeds, filtration technique followed by the students. On the other hand, (14.5%) teachers said that they also prepare their own TLM to deliver the content effectively.

Data Interpretation: All the teachers were using various online applications to teach their students. While some of them had included other methods to deliver the content effectively. The probable reason for this could be that due to lockdown, schools had been closed and teachers had no other option to teach, so they were using online mode and some of them were using online tools to the optimum so that their students could get a better experience of online class.

Item 2: Did you learn any skill or attend any workshop to teach through online mode? If yes, from which source and how?

Data Analysis: After analysing all the responses of (240) interviewed TGTs, it was found that (90%) had attended various online workshops on “Diksha and ChalkLit app” in their respective subjects. But at the same time, it was told by them that no online workshop was conducted on how to use online apps to teach the students. Though, in most of the schools, few offline sessions had been taken up by the computer IT which were attended by most of the teachers on how to use online apps. While (5.8%) teachers replied that they had learnt online skills with the help of their family members. Whereas, (4.1%) teachers took the help of YouTube and Google Chrome to learn how to use different online technology for teaching and learning.

Data Interpretation: Most of the TGTs had attended online workshops on various online app which were subject oriented. But no other workshop was held to train or update them on using various online apps. But most of the teachers learnt by themselves. Thus, it can be interpreted that teachers tried their best to hone their skills in using online applications by using net applications.

Item 3: How is your experience of teaching students from home as compared to teaching at school?

Data Analysis: After analysing all the responses of (240) interviewed TGTs, it was found that (91.6%) teachers viewed offline teaching much better than online. Most of them found that virtual teaching-learning is a good saviour at the time of lockdown but it cannot replace offline mode. The kind of interaction and comfort level offline mode provides is lacking online. For most of the TGTs Natural Science, it was not feasible to carry out experiments through online mode. Same problem was faced by most of the TGTs Maths. As per their online experiences, it was difficult to explain the formulas and problems without using blackboard. Most of the TGTs Hindi found that offline mode is much better.

Whereas, (8.3%) of the teachers also considered virtual mode a good platform for carrying out various online teaching-learning activities. Teachers also shared their teaching experiences in online mode and how it was different from offline. Most of the TGTs English found online mode a better mode as they could show lots of Eng videos to their students like animations, short stories in audio and visual mode, Eng songs, poems and so on. All these online activities could help the students to sharpen their English skills. TGTs Social Science also found that though, offline teaching learning activities are far much better but at the same time, online mode is also good as various diagrams, pictures and videos could be shown to the students such as: maps, landscapes, flora and fauna, virtual tour of any state.

Data Interpretation: From the above data analysis, it can be interpreted that most of the teachers have preferred offline mode and considered it as an effective way of transacting the content. Though, they are also supporting some of the features of virtual teaching and learning which are equally useful for the students but online mode cannot beat the effectiveness of offline mode. The probable reason for this could be the many. For instance: In offline mode, there is face to face interaction with the students, emotional connect, hands-on activities and many more which are absent in online mode.

Item 4: How effectively and innovatively you are using technology to impart your subject knowledge to your students?

Data Analysis: After analysing all the responses of (240) interviewed TGTs, it was found that all the teachers were using various features of online apps such as: WhatsApp, zoom platform and all other applications to deliver the content. (83.7%) teachers were using PPT to explain various topics in their subjects. While, (7.08%) teachers recommended their students to watch educational videos on YouTube. On the other hand, (9.16%) teachers had also prepared their own videos to explain the concepts to their students.

Data Interpretation: It can be interpreted from the above data analysis that almost every single teacher was using virtual technology for teaching. The probable reason for this could be that teachers want to deliver the content as effectively as they do in offline mode. They are trying their best to transact the content effectively by considering all the limitations of online mode.

Item 5: How do you assess your students during online mode?

Data Analysis: After analysing all the responses of (240) interviewed TGTs, it was found that all teachers were using various online methods to assess their students. (83.3%) teachers were using WhatsApp to send worksheets to be completed by their students. Group assessment was also used by some teachers where they used to give some group work on Google meet or WhatsApp and used to observe students' responses and their participation level. Teachers checked assignments on WhatsApp and feedback was given to them accordingly. While (10.4%) teachers used Google Classroom to send assignments. (3.7%)

used to assess their students through online quizzes and games. (2.5%) teachers were using mail for assessment. Students sent their complete assignments on the mail of teachers which were later checked by the respective teachers.

Data Interpretation: Most of the teachers responded that they use worksheets and various online worksheets and assignments to assess their students. The probable reason for this could be that worksheets are the most effective tool for assessing children. Worksheets are sent by the teachers on various apps such as: Google Classroom, WhatsApp and on the students' mail too. Checking of worksheets is also quite easy.

Item 6: What are the challenges and issues you have faced while teaching online?

Data Analysis: After analysing all the responses of (240) interviewed TGTs, it was found that (87.5%) teachers said that the most challenging issue faced by them was the poor net connectivity. Disruption of the net, poor or low net connectivity, distorted voices were some of the major issues faced by the teachers. (5.41%) teachers were also concerned about the low ratio of online attendance of the pupils. According to them, students joined the classes but then they got busy with some other work. Other issues faced by (4.58%) teachers were the late or non-submission of online assignments by the pupils. While, (2.5%) teachers were also unable to form any contact with the students as most of the students didn't have smartphones or they had left the town and moved to their villages due to which they couldn't attend the online classes.

Data Interpretation: Most of the teachers responded that the major issue faced by the teachers was the poor net connectivity. The probable reason for this could be that while taking classes, teachers might have faced that issue.

Analysis of Objective 2

To study the perception of different stakeholders with respect to virtual teaching and learning.

Tools used:

Structured Interview for

- ❖ HoS
- ❖ students
- ❖ parents

Questionnaire (Likert Scale) for

- ❖ teachers in Google Form

Tool 1: Structured Interview (for HoS)

Sample: (24) HoS of Directorate of Education (DoE), Delhi

Item 1: What is your opinion about virtual teaching and learning with respect to academic performance of the students?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that (75%) HoS said that virtual teaching and learning has not affected the academic performance of the students and students are doing well in academics and has attained good marks in all subjects. While (25%) HoS replied that students are not performing well in their studies in online mode.

Data Interpretation: Most of the HoS responded that even in online mode, students have shown good results in academics. The plausible reason for this response might be that students have continued to show the same dedication towards their studies as in offline mode and did hard work to attain good result.

Item 2: In your opinion, during the pandemic period, is online teaching an only option for carrying out teaching-learning activities or are there other possibilities also?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that all the HoS replied that in the pandemic period, only online mode is the best option to carry out teaching-learning activities. No other possibility is safe and recommended also.

Data Interpretation: All the HoS responded that online teaching is the only option for carrying out teaching-learning activities with no other possibilities. The probable reason for this response might be that it was unsafe to conduct any teaching-learning activity in offline mode during the time of covid-19 as it could lead to spread of virus and students could catch infection.

Item 3: How does online teaching impact learning among students?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that (79.1%) HoS replied that students are learning new features of different applications and they can become techno-savvy too, if they continue to use technology for their studies. Academically also, students are doing very well. We always encourage them to self-study. On the other hand, (20.8%) HoS said that students find it difficult to use the latest apps which hinders learning. Also, some of the students do not have smart phones either.

Data Interpretation: Most of the HoS responded that online teaching has brought improvement in learning among the students. The probable reason for this response could be that various online applications provide ample options which can be used to enhance learning, if used effectively.

Item 4: How does virtual mode of teaching and learning affect teaching pedagogy?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that all the HoS replied that due to online mode of teaching and learning, even teachers are learning new applications of various apps and their knowledge is also being enhanced. They are becoming more proficient now in using new features such as: google sheet, google classroom, zoom app, google meet and so on to teach their students.

Data Interpretation: All the HoS responded that the virtual mode of teaching and learning has brought positive change in pedagogy used by the teachers of their respective schools. The plausible reason for this response could be that there are many innovative ways which are available online to teach the students in a joyful and interesting way.

Item 5: In the existing scenario, how could the curriculum be modified?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that (87.5%) HoS replied that in the time of pandemic, curriculum should be abridged. While (12.5%) HoS said that there is no need to bring any change in curriculum.

Data Interpretation: Most of the HoS responded that in the existing scenario, curriculum could be modified. The probable reason for this response might be that online mode of teaching and learning is entirely different from offline. And moreover, students find it difficult to study in virtual mode due to ample reasons such as: poor net connectivity, non-availability of smart phones etc.

Item 6: What is your opinion regarding the duration and timetable of online classes?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that all the HoS responded that the duration and timetable of online classes has been changed for the convenience and flexible learning of the students.

Data Interpretation: All the HoS responded that there was a need of changing timetable and duration during online classes. The probable reason for this response might be that in online mode, students attend classes on mobile phones which are not easy to arrange for every single student. Spending too much time on the screen of a mobile phone also leads to straining of eye muscles.

Item 7: According to you, how could teachers and parents be collaborated for better learning?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that (45.8%) HoS responded that online meetings can be held with the parents where HoS and teachers can interact with them and update them with the progress of their wards in academics. Also, in online meetings, parents can also share if their wards find any issue in studying online. While (20.8%) HoS replied that parents can be called in the school along with their wards to meet HoS and the teachers in small groups while following all safety measures to share the status of their children in studies through face-to-face interaction. Whereas only (20.8%) HoS responded that parents can also be guided by the teachers to keep an eye on the academic activities of their wards.

Data Interpretation: Most of the HoS responded that teachers and parents can collaborate for better learning by organizing regular online PTM and interacting with them on a regular basis. The probable reason for this response might be that it is necessary to keep a good connection with parents as well. They should be regularly apprised with the academic performance of their wards.

Item 8: Do you think it is the responsibility of the parents to provide gadgets like- mobile phones to their wards for online learning?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that (83.3%) HoS said that parents or guardians should provide or arrange mobile phones for their wards to attend online classes. While (16.6%) HoS responded that the Government should provide mobile phones to the students for their online classes. As most of the parents cannot afford smartphones due to their low socio-economic conditions.

Data Interpretation: Most of the HoS replied that it is the responsibility of the parents to provide gadgets like- mobile phones to their wards for online learning. The plausible reason for this response might be that the Government cannot provide mobile phones to every student as the strength of students studying in the Government schools is very big.

Item 9: According to you, what are the challenges in virtual teaching-learning mode?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that according to (79.1%) HoS, one of the biggest challenges in virtual teaching-learning mode is the poor or low internet connectivity. While (20.8%) HoS responded that unavailability of smartphones is also one of the hurdles for online classes.

Data Interpretation: Most of the HoS replied that poor or low internet connectivity is one of the biggest challenges in virtual teaching-learning mode. The plausible reason for this response might be that in some areas, there is a problem of net connectivity. Because of poor net connection, students got disconnected from the ongoing online classes which led to the disruption of the flow of the teaching and learning.

Tool 2: Structured Interview (for students)

Sample: (120) students of Directorate of Education (DoE), Delhi

Item 1: Do you have any previous experience of teaching-learning in virtual mode before Corona period?

Data Analysis: After analysing all the responses of (120) students, it was found that (91.6%) students said that they had a little bit experience about the use of technology. Some of them also said that they had enrolled themselves in some online courses also to gain knowledge. While (8.3%) students replied that before the pandemic period, they had never touched mobile phones for any other purpose except attending calls or calling their relatives or near and dear ones.

Data Interpretation: Most of the students responded that they did have a little bit experience of teaching-learning in virtual mode before the Corona period. The probable reason for this response could be that now-a-days, students have become more aware of using technology. They are keener in learning new features and applications of various apps.

Item 2: Do you think having a close-knit online study groups would be useful so that there is a peer support available to those who need more help?

Data Analysis: After analysing all the responses of (120) students, it was found that (94.1%) students responded that having a close knit online study groups would be very much helpful and useful for peer support. Whereas (5.8%) students said that there should not be any close-knit online study groups rather individual study or self-study is more useful and effective.

Data Interpretation: Most of the students responded that online study groups are helpful and useful so that there is peer support available to those who need more help. The plausible reason for this response could be that students might have studied in small online groups so that they could learn better with other classmates and peers and could help those who were weak in a particular subject.

Item 3: What kind of pedagogical methods are used by your teachers?

Data Analysis: After analysing all the responses of (120) students, it was found that all the students replied that their teachers use different online apps for teaching. Teachers take classes on various online platforms such as: WhatsApp, google meet, zoom. Some of them also added that their science teachers also conduct experiments and demonstrations by showing a “Live video”. Teachers also teach via you tube, lecture method and PPT.

Data Interpretation: All the students responded that their teachers use various online platforms to teach them. The probable reason for this response could be that their teachers might have used different online methods to explain the content to their students.

Item 4: What kind of projects are given to you?

Data Analysis: After analysing all the responses of (120) students, it was found that (85%) students replied that online written assignments are given to them by different subject teachers mainly on WhatsApp and on google classroom and also in google form. While, (8.3%) students said that their teachers ask them to prepare self-explanatory videos on different topics as a project. (6.7%) students replied that they also make PPT on various concepts. All these projects are being given to them from time to time.

Data Interpretation: Most of the students replied that they mostly ask to prepare written assignments on various topics in different subjects. The possible reason for this response might be that the students are

more comfortable in submitting online projects or any assignment in written form. It is also easy for them in comparison to prepare PPT or videos.

Item 5: How does your revision take place during online mode?

Data Analysis: After analysing all the responses of (120) students, it was found that (65%) students replied that for revision, their teachers generally give them online written assignments and tests in small groups as well individually after the completion of specific chapters. While (20%) students said that their teachers give certain topics to discuss in small groups. This helps the students to reiterate and revise the content which has already been completed by the teachers. Whereas (15%) students responded that no revision takes place in their online classes.

Data Interpretation: Most of the students responded that their revision takes place in the form of online written assignments and tests. The probable reason for this response might be that taking online assignments or tests after the completion of each unit is the best way to recapitulate the taught content.

Item 6: How does your teacher evaluate your work?

Data Analysis: After analysing all the responses of (120) students, it was found that all the students said that their teachers evaluate their work by taking frequent online tests on various online platforms such as: WhatsApp, google classroom or using google form.

Data Interpretation: All the students responded that for evaluation, their teachers take frequent tests. The plausible reason for this response might be that by evaluating, teachers can have an idea how much their students have learnt and how effectively teachers are teaching them.

Item 7: Do you get any feedback from your teachers in your assignments?

Data Analysis: After analysing all the responses of (120) students, it was found that all students said that they get feedback from their teachers regularly. Their teachers constantly monitor the progress of each and every student. Some of them also added that their teachers also interact with their parents. Feedback helps in the further improvement of their studies.

Data Interpretation: All the students responded that they get feedback from their different teachers in assignments. Feedback helps them to work upon their mistakes. The probable reason for this response could be that the students might have seen an improvement in their studies.

Item 8: What challenges or difficulties are you facing in learning different subjects during online mode?

Data Analysis: After analysing all the responses of (120) students, it was found that (90%) students responded that net problem was the biggest challenge faced by them. Some of them added that sometimes, the voice of the teacher becomes distorted. Sometimes, because of low or poor connectivity, they find it difficult to attend the classes. While (5.8%) of them said that they are unable to understand any online content. On the other hand, (4.1%) of them replied that they are unable to attend all online classes as they have only one mobile phone in their home and their parents carry mobile phones with them.

Data Interpretation: Most of the students responded that in online mode, the challenge or difficulty which they face the most is the net issue due to which they are unable to continue their online classes smoothly. The probable reason for this response could be the poor and low connectivity of the net which makes them unable to attend or join the classes in a smooth manner.

Tool 3: Structured Interview (for parents/guardians)

Sample: (120) parents/guardians of the sampled 120 students of DoE, Delhi.

Item 1: Do you think your children have learnt better in online mode than offline?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that (73.3%) parents said that their wards learnt better in offline mode as compared to online. Few of them said that in online mode, their wards are unable to concentrate and pay attention to their studies. While, (26.65%) parents responded that their wards have learnt better in online mode than offline. According to the parents, teachers teach very well in online mode also and their wards have learnt different techniques on how to use online medium to the optimum for their learning.

Data Interpretation: Most of the parents replied that their wards had learnt better in offline mode than online. The plausible reason for this response might be that in offline mode, teachers interact face to face with the pupils and all teaching-learning activities are carried out effectively with a proper emotional connect, which is lacking in online mode.

Item 2: How do you support your ward during virtual learning?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that (58.3%) parents said that they are unable to give any support to their wards as they are busy with their own work to earn bread and butter for the family. They also added that they cannot help their wards in their studies as they are illiterate. On the other hand, (18.3%) parents responded that they support their wards during virtual learning and pay proper attention to their wards. Some of them also said that they regularly track the progress by having conversation on academic issues with their wards. Whereas, only (23.3%) parents replied that their wards don't need any support or help in virtual learning as their wards do self-study.

Data Interpretation: Most of the parents responded that they are unable to provide any support to their wards as they are engaged in other work. The probable reason for this response could be that most of the parents were having no job due to the lockdown period and they were trying to search for a job somewhere, especially fathers. Most of the mothers were working as maids. So, they might find it difficult to spare time for their wards. Also, most of the parents are unable to read and write. So, they couldn't lend any help or support to their wards during online classes.

Item 3: Is there any additional study material provided to your child during virtual teaching and learning?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that all the parents responded that during virtual teaching and learning, their wards had been given some additional study material by the schools such as: books and worksheets. Some of them also added that apart from study material, ration and other essential things had also been provided to them by the schools.

Data Interpretation: Most of the parents replied that additional study material had been provided to their wards during virtual teaching and learning. The plausible reason for this response might be that schools were providing required subject related books and worksheets to the students during the lockdown period.

Item 4: If online class continues this year, what kind of support do you need from the school or government?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that (90%) parents said that if online class continues this year, then they want financial aid for mobile net recharge

from the school or government. They also said that the whole data of the mobile gets finished in online class and it needs to get recharged frequently which requires money and they don't have enough money to spend on mobile net recharging. While, (5.8%) parents responded that they want to lessen the pressure of studies for their wards as due to online classes, the burden of studies has been increased which creates unnecessary stress for their wards. Whereas, only (4.1%) parents said that some welfare schemes should be initiated by the school or government to support families during covid period.

Data Interpretation: Most of the parents replied they expect school or government to provide economical support in the form of paying amount for net recharge. The possible reason for this response could be that at the time of covid, online class was held in every school. Attending different online classes for a long time, completing online assignments and other academic work consumes lots of mobile data. And parents might have to recharge the net frequently which demands money. There might be a scarcity of money in some families. That is why, most of the parents want financial support for net recharge for the studies of their wards.

Item 5: What do you think, should exams be conducted or children should be merely promoted to the next class?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that (91.6%) parents replied that exams should be conducted for every student. Some of them also added that there should be no compromise in the studies of children and they should not be merely promoted to the next class. Whereas, only (8.3%) parents said that in the pandemic period, exams should not be conducted. Only short tests can be taken during the time of covid as exams create tension for the students and some of them are already going through tough phase So, it's better not to conduct any exam for the children.

Data Interpretation: Most of the parents replied that exams should be conducted for their wards. The plausible reason for this response might be that parents are aware of the fact that children need to be evaluated at the end of year. Only after evaluation, it can be decided how much their wards have learnt in the online classes.

Item 6: What challenges are you and your children facing during online classes?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that all the parents said that during online classes, one of the biggest challenges faced by them and their wards was the poor net connectivity. Some of them also added that online classes also led to frequent mobile data consumption.

Data Interpretation: Most of the parents responded that low and poor net connectivity was the main challenge their wards had to face during online classes. The probable reason for this response could be that in some areas, there is a problem of net connectivity. Because of poor net connection, students got disconnected from the ongoing online classes which led to the disruption of the flow of the teaching and learning.

Item 7: According to you, what are the advantages and disadvantages of online class?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that (94.1%) parents said there is no loss of studies for the children even during the time of lockdown. Concept of online classes came as a saviour. They also added that attending online classes for a long time leads to low eye

vision and body fatigue which is not good. While, (5.8%) parents responded that one of the advantages of online classes is that their children have become more focused and responsible for their studies. Parents also said that with the onset of online classes, their wards are learning in an innovative manner. At the same time, they said that one of the main disadvantages of online classes is that their children have become addicted to mobile phones.

Data Interpretation: Most of the parents replied that due to online classes, there was no loss of studies but at the same time, attending online classes led to strain in eye muscles. The possible reason for this response might be that education had been provided to the children in spite of lockdown. But sitting in front of the computer or glancing at the screen of mobile phones for a long time also leads to many health issues. But there was no alternative other than providing online education to the children at the time of lockdown.

Tool 4: Questionnaire (Likert Scale) for teachers in Google Form

Sample: (240) TGTs of Directorate of Education (DoE), Delhi

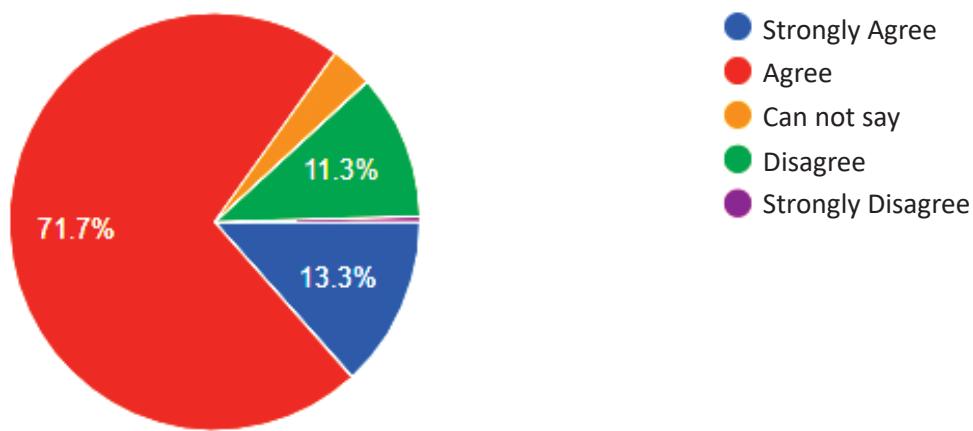
Item 1: I like to teach my students through online mode.

Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()

Data Analysis:

1) I like to teach my students through online mode.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (71.7%) like to teach through online mode. The probable reason for this response might be the availability of various applications for teaching and learning. Online mode provides flexibility to both the teachers and the students.

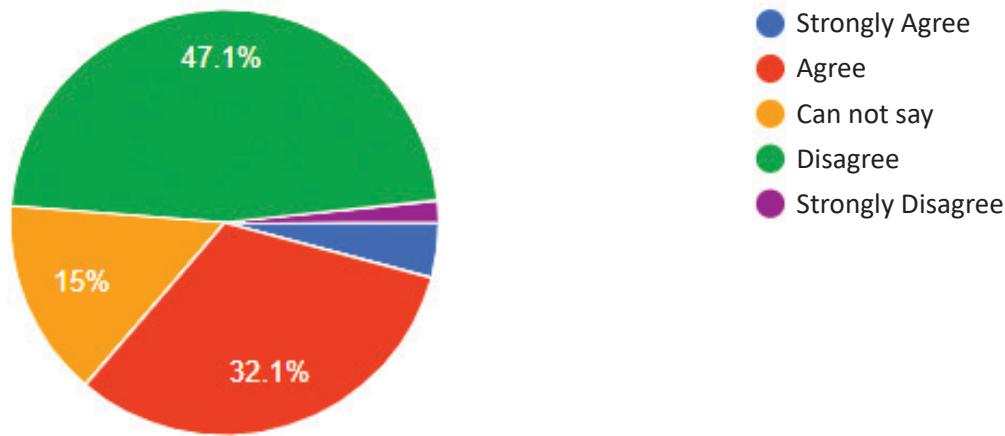
Item 2: I remain more focused in online mode than offline.

Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()

Data Analysis:

2) I remain more focused in online mode than offline.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (47.1%) do not remain more focussed in online mode. The probable reason for this response might be the various factors which are found in offline mode but absent in online. In offline mode, teachers have physical connect with the students and much better emotional bond with them which is usually lacking in online mode. Some other factors which act as a distraction in online mode are: log in/log out from the ongoing online class due to net issues, less/no response from the students and many more.

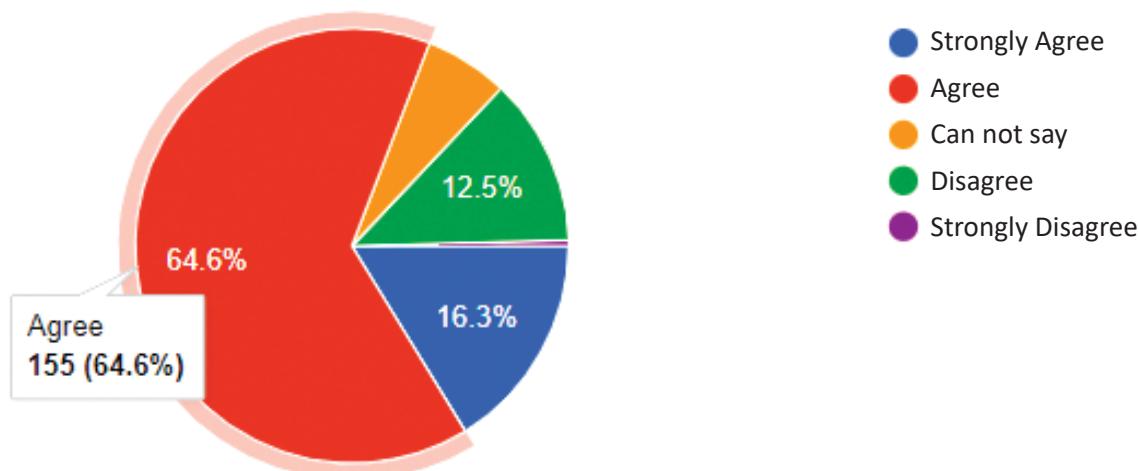
Item 3: While teaching through online mode there is low student teacher interaction.

Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()

Data Analysis:

3) While teaching through online mode there is low student teacher interaction.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (64.6%) agree that while teaching through online mode there is a low student teacher interaction. The plausible reason for this response could be many such as: students are unable to attend or join online classes due to expired data or low net connectivity, not feeling much confident in handling online applications, lack of interest in the students towards online classes.

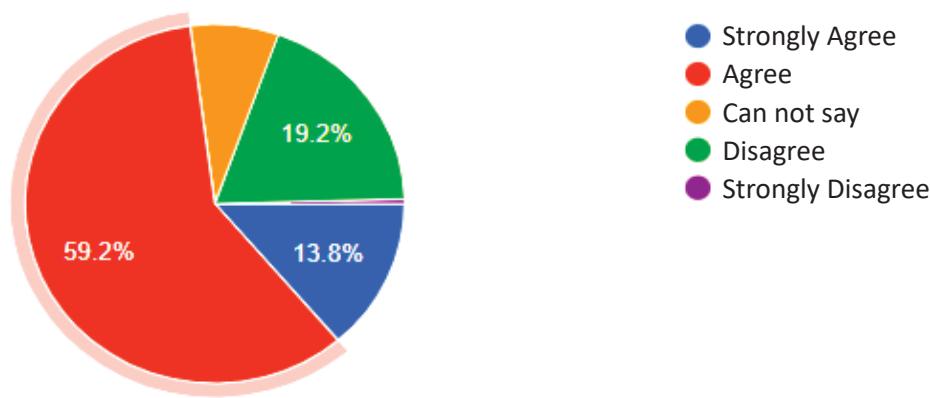
Item 4: Teaching through online mode requires more time as compared to offline mode.

Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()

Data Analysis:

- 4) Teaching through online mode requires more time as compared to offline mode.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (59.2%) agree that teaching through online mode requires more time as compared to offline mode. The probable reason for this response might be that more time is required to prepare the content for online class. For instance, preparation of powerpoint presentation, voice over, recording of lecture, checking and evaluating online assignments. All these teaching methods and pedagogy needs time to prepare and in execution too.

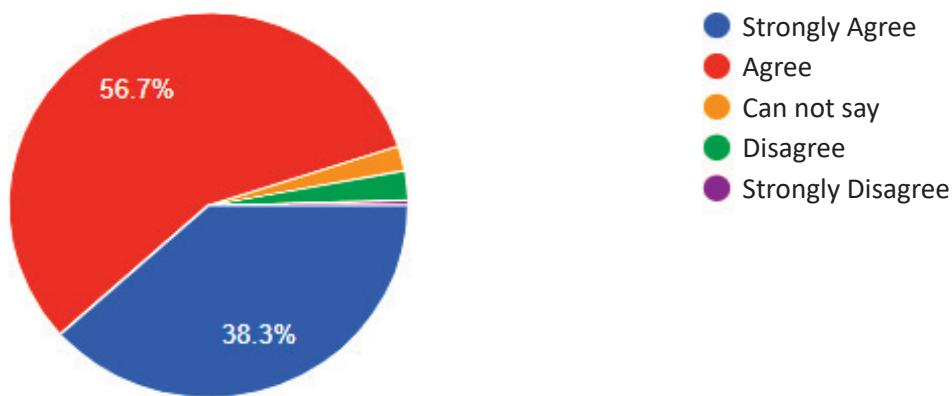
Item 5: Disruption of Internet connectivity distracts learning of my students during online mode.

Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()

Data Analysis:

- 5) Disruption of Internet connectivity distracts learning of my students during online mode.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (56.7%) agree that disruption of internet connectivity distracts learning of my students during online mode. The probable reason for this response could be that low or poor connectivity breaks the continuity of ongoing content delivery. Students get alienated when they log out from the online class and it becomes difficult to come at par once they join the class again.

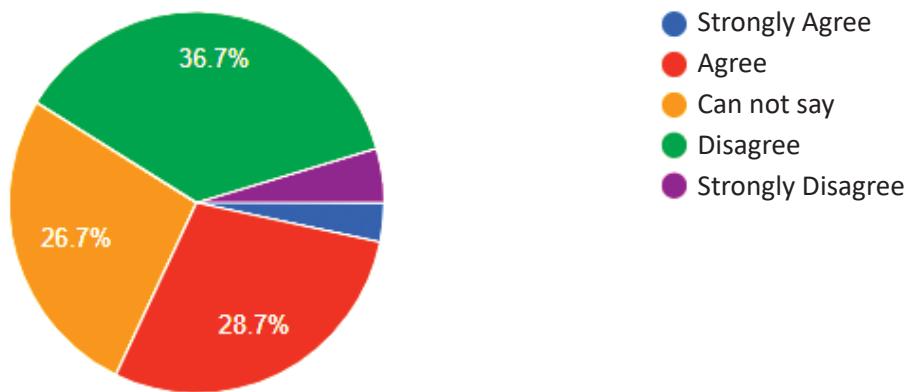
Item 6: The students enjoy my classes more during online mode as compared to offline mode.

Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()

Data Analysis:

- 6) The students enjoy my classes more during online mode as compared to offline mode.

240 responses



Data Interpretation: From the above data analysis, it has been found that according to most of the teachers (36.7%), the students do not enjoy online classes more as compared to offline mode. The plausible reason for this response might be the lack of direct interaction and communication between teachers and students in virtual mode. Also, teaching and learning activities conducted with the students in offline mode are comparatively more interesting and effective than in virtual mode.

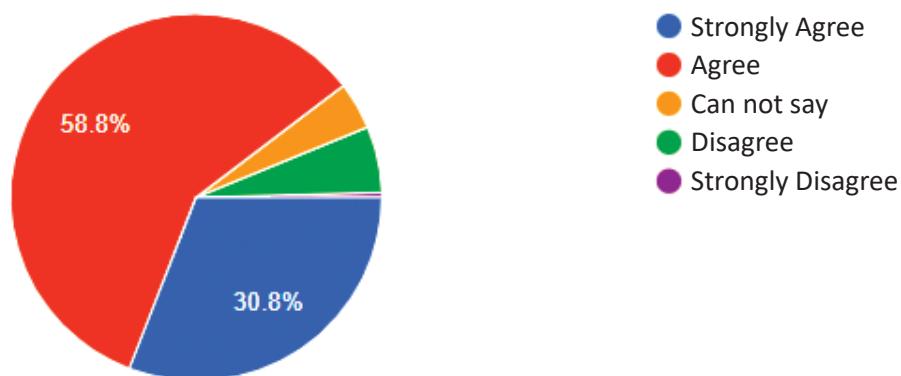
Item 7: Frequent internet drop disrupts the flow of my online teaching.

Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()

Data Analysis:

- 7) Frequent internet drop disrupts the flow of my online teaching.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (58.8%) agree that frequent internet drop disrupts the flow of their online teaching. The probable reason for this response might be that internet drop breaks the flow of the content which is being delivered by the teachers. As they have to restart everything from the beginning. Students also find it difficult to align themselves with the content.

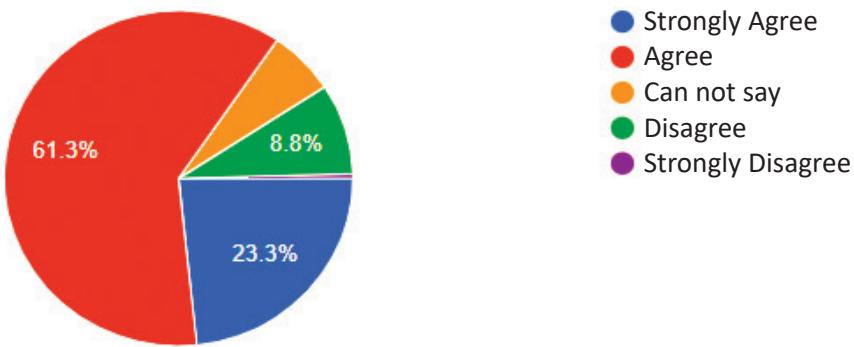
Item 8: Requirement of gadgets like mobile phones, laptop etc. prevent a large number of students from attending my classes.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

- 8) Requirement of gadgets like mobile phones, laptop etc. prevent a large number of students from attending my classes.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (61.3%) agree that gadgets like mobile phones, laptop etc. prevent a large number of students from attending their classes. The probable reason for this response is somewhat very obvious. To attend online class, students need smartphones, desktop, laptop or tablet. Some students are unable to afford these gadgets due to the low socio-economic condition of their families. Hence, unavailability of these gadgets prevent some students from attending online classes.

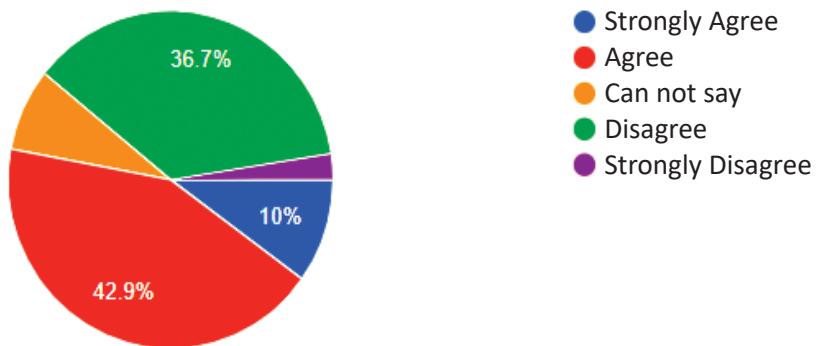
Item 9: Checking of online assignments, uploaded by the students, is a very difficult task for me.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

- 9) Checking of online assignments, uploaded by the students, is a very difficult task for me.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (42.9%) find it difficult to check online assignments uploaded by the students. The plausible reason for this response might be that to check online assignments, teachers need to see each and every word written by the students very carefully which affects eye muscles also. Spending a long time on screen leads to fatigue too. Sometimes, words are not clear and images of the assignments are also not captured clearly by the students. All these factors might make it difficult for the teachers to check the assignments.

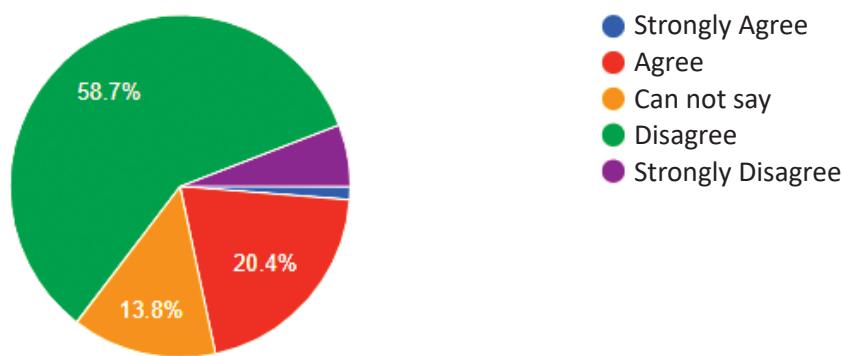
Item 10: Students are more engaged in online class as compared to offline mode.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

10) Students are more engaged in online class as compared to offline mode.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (58.7%) disagree with the statement that students are more engaged in online class as compared to offline mode. The probable reason for this response could be that in offline mode, teachers have more better emotional connect with the students and face to face interaction. Also, in offline mode, students are engaged and participate in class activities with interest and enthusiasm. This interest is somewhat lacking in online mode.

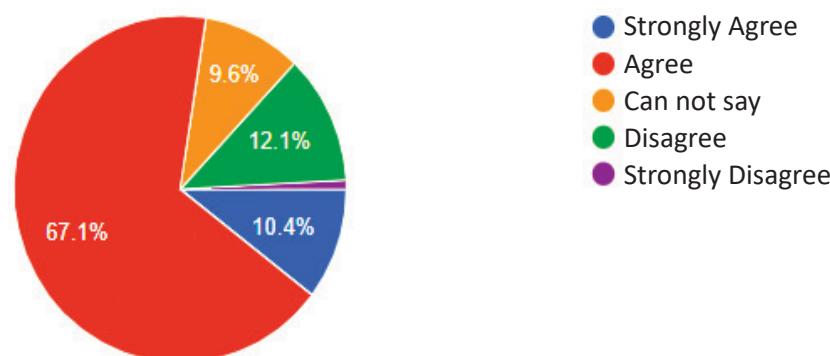
Item 11: Students are more distracted in online teaching and learning than offline.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

11) Students are more distracted in online teaching and learning than offline.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (67.1%) agree that students are more distracted in online teaching and learning than offline. The plausible reason for this response could be that in online mode, students often lagged behind due to poor or low net connectivity. Some students often leave their mice unmute which also creates disturbance. Logging in and out again and again creates gaps in the learning also.

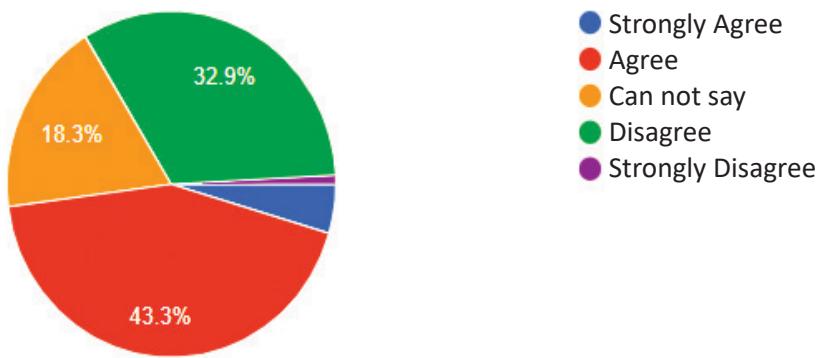
Item 12: Online teaching causes more fatigue among teachers.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

12) Online teaching causes more fatigue among teachers.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (43.3%) agree that online teaching causes more fatigue among teachers. This might be due to taking online classes frequently while maintaining a proper record of the students' attendance. Online classes need more preparation to deliver the content effectively to the students. Then, teachers also have to execute the lesson properly which again demands lots of attention. Checking online assignments in bulk also causes fatigue among teachers as it strains eye muscles.

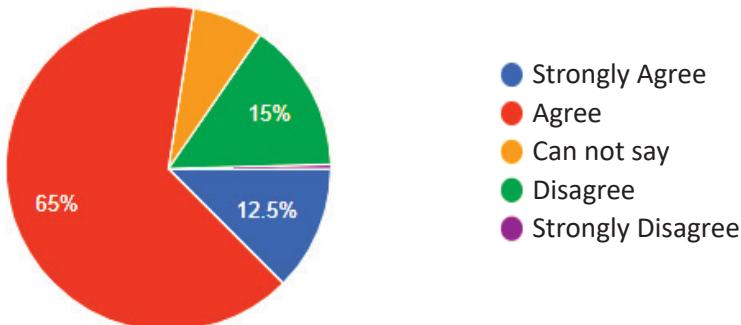
Item 13: Online teaching gives more opportunities to share a variety of learning resources with my students in my subject.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

13) Online teaching gives more opportunities to share a variety of learning resources with my students in my subject.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (65%) agree that they can share a variety of learning resources with the students in their subjects. The probable reason for this response might be the availability of various online applications which provides a good platform for the teachers to adopt new ideas which they can adopt in their teaching.

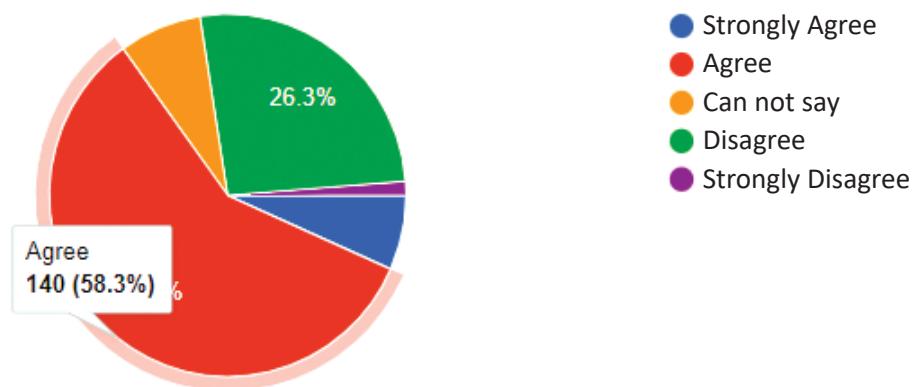
Item 14: In online mode, conducting hands-on teaching learning activity in my subject is difficult.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

14) In online mode, conducting hands-on teaching learning activity in my subject is difficult.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (58.3%) find it difficult to conduct online hands-on teaching learning activity in their subjects. The probable reason for this response might be that it might be difficult for the teachers to arrange the required materials for their teaching activities and setting up of activities or conducting an experiment is also a problematic task for the teachers especially for the science teachers.

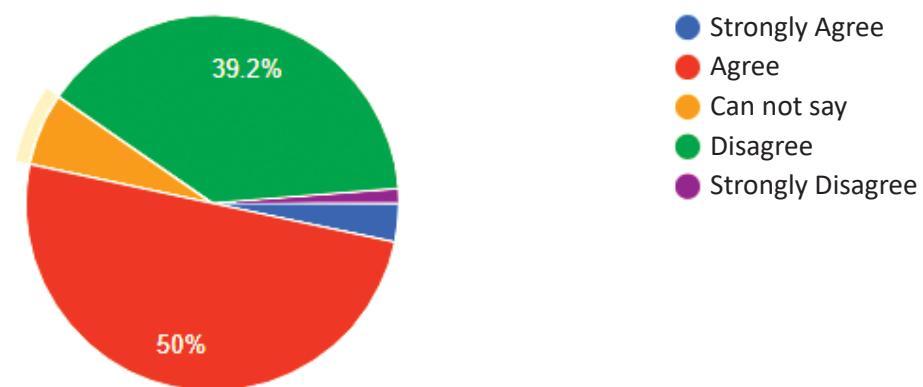
Item 15: I transact my teaching content through lecture method during online mode.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

15) I transact my teaching content through lecture method during online mode.

240 responses



Data Interpretation: From the above data analysis, it has been found that (50%) teachers use lecture method to deliver the content during online mode. The plausible reason for this response could be that the lecture method is one of the effective methods for transacting content. It is also suitable for teaching elementary stage students but teachers should use other methods equally to bring quality in their pedagogy.

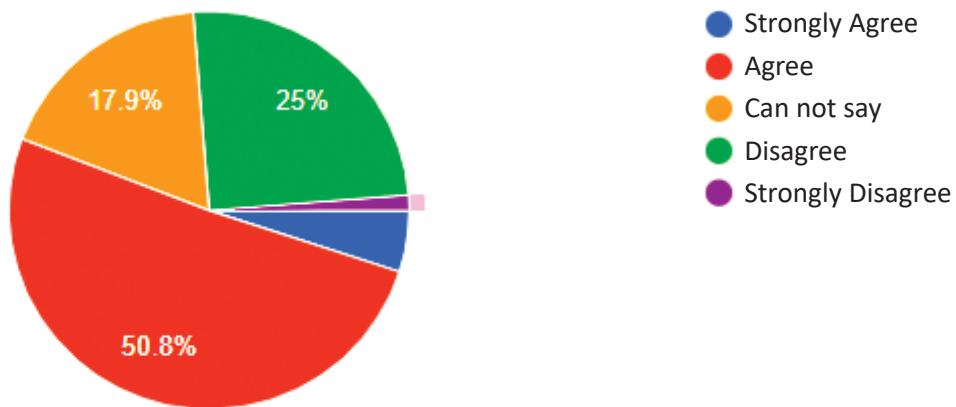
Item 16: Online learning is more conducive for group learning.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

16) Online learning is more conducive for group learning.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (50.8%) find online mode conducive for group learning. The probable reason for this response might be that in online mode, teachers can easily make small groups to teach specific content. For instance, on the ZOOM online app, teachers can make break-out rooms for the students and can assign separate assignments to them or it's also suitable for discussion in small groups on some particular topic.

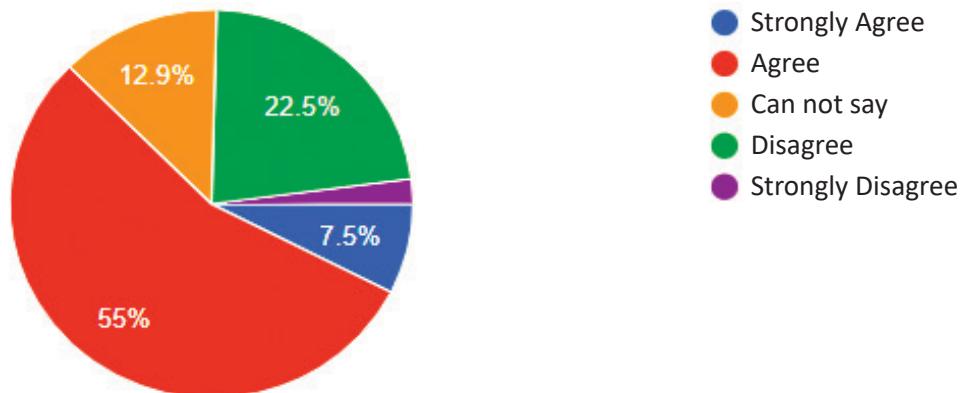
Item 17: Online teaching and learning gives more opportunities for individualised feedback.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

Data Analysis:

17) Online teaching and learning gives more opportunities for individualised feedback.

240 responses



Data Interpretation: From the above data analysis, it has been found that most of the teachers (55%) agree that online teaching and learning gives more opportunities for individualised feedback. The plausible reason for this response might be that due to the in-built applications of various online apps, teachers can interact with their students personally and individually and they can provide them feedback separately.

Analysis of Objective 3

To explore various challenges faced by different stakeholders in adapting to the virtual teaching-learning process during covid-19 pandemic.

Structured Interview for

- ❖ HoS
- ❖ teachers
- ❖ students
- ❖ parents

Tool 1: Structured Interview (for HoS)

Sample: (24) HoS of Directorate of Education (DoE), Delhi

To explore various challenges faced by different stakeholders in adapting to the virtual teaching- learning process during covid-19 pandemic, various questions were asked from HoS regarding any difficulty or challenge which might occur during online teaching learning. Same tool was used for the analysis of objective-3 which had been used for objective-2 by the investigator i.e., Structured Interview (for HoS). Only those questions were used from the tool which had relevance for the analysis of objective-3

Questions included:

Item: According to you, what are the challenges in virtual teaching-learning mode?

Data Analysis: After analysing all the responses of (24) interviewed HoS, it was found that according to (79.1%) HoS, one of the biggest challenges in virtual teaching-learning mode is the poor or low internet connectivity. While (20.8%) HoS responded that unavailability of smartphones is also one of the hurdles for online classes.

Data Interpretation: Most of the HoS replied that poor or low internet connectivity is one of the biggest challenges in virtual teaching-learning mode. The plausible reason for this response might be that in some areas, there is a problem of net connectivity. Because of poor net connection, students got disconnected from the ongoing online classes which led to the disruption of the flow of the teaching and learning.

Tool 2: Structured Interview (for teachers)

Sample: (240) TGTs of Directorate of Education, Delhi.

To explore various challenges faced by different stakeholders in adapting to the virtual teaching- learning process during covid-19 pandemic, various questions were asked from the teachers regarding any difficulty or challenge which they had faced during online teaching learning. Same tool was used for the analysis of objective-3 which had been used for objective-1 by the investigator i.e., Structured Interview (for teachers). Only those questions were used from the tool which had relevance for the analysis of objective-3.

Questions included:

Item: What are the challenges and issues you have faced while teaching online?

Data Analysis: After analysing all the responses of (240) interviewed TGTs, it was found that (87.5%) teachers said that the most challenging issue faced by them was the poor net connectivity. Disruption of the net, poor or low net connectivity, distorted voices were some of the major issues faced by the teachers. (5.41%) teachers were also concerned about the low ratio of online attendance of the pupils. According to them, students joined the classes but then they got busy with some other work. Other issues faced by (4.58%) teachers were the late or non-submission of online assignments by the pupils. While, (2.5%) teachers were also unable to form any contact with the students as most of the students didn't have smartphones or they had left the town and moved to their villages due to which they couldn't attend the online classes.

Data Interpretation: Most of the teachers responded that the major issue faced by the teachers was the poor net connectivity. The probable reason for this could be that while taking classes, teachers might have faced that issue.

Tool 3: Structured Interview (for students)

Sample: (120) students of Directorate of Education (DoE), Delhi

To explore various challenges faced by different stakeholders in adapting to the virtual teaching- learning process during covid-19 pandemic, various questions were asked from the students regarding any difficulty or challenge which they had faced during online teaching learning. Same tool was used for the analysis of objective-3 which had been used for objective-2 by the investigator i.e. Structured Interview (for students). Only those questions were used from the tool which had relevance for the analysis of objective-3.

Questions included:

Item: What challenges or difficulties are you facing in learning different subjects during online mode?

Data Analysis: After analysing all the responses of (120) students, it was found that (90%) students responded that net problem was the biggest challenge faced by them. Some of them added that sometimes, the voice of the teacher becomes distorted. Sometimes, because of low or poor connectivity, they find it difficult to attend the classes. While (5.8%) of them said that they are unable to understand any online content. On the other hand, (4.1%) of them replied that they are unable to attend all online classes as they have only one mobile phone in their home and their parents carry mobile phones with them.

Data Interpretation: Most of the students responded that in online mode, the challenge or difficulty which they face the most is the net issue due to which they are unable to continue their online classes smoothly. The probable reason for this response could be the poor and low connectivity of the net which makes them unable to attend or join the classes in a smooth manner.

Tool 4: Structured Interview (for parents/guardians)

Sample: (120) parents/guardians of the sampled 120 students of DoE, Delhi.

To explore various challenges faced by different stakeholders in adapting to the virtual teaching- learning process during covid-19 pandemic, various questions were asked from the parents regarding any difficulty or challenge related to online teaching learning. Same tool was used for the analysis of objective-3 which

had been used for objective-2 by the investigator i.e., Structured Interview (for parents). Only those questions were used from the tool which had relevance for the analysis of objective-3.

Questions included:

Item: What challenges are you and your children facing during online classes?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that all the parents said that during online classes, one of the biggest challenges faced by them and their wards was the poor net connectivity. Some of them also added that online classes also led to frequent mobile data consumption.

Data Interpretation: Most of the parents responded that low and poor net connectivity was the main challenge their wards had to face during online classes. The probable reason for this response could be that in some areas, there is a problem of net connectivity. Because of poor net connection, students got disconnected from the ongoing online classes which led to the disruption of the flow of the teaching and learning.

Item: According to you, what are the advantages and disadvantages of online class?

Data Analysis: After analysing all the responses of (120) interviewed parents, it was found that (94.1%) parents said there is no loss of studies for the children even during the time of lockdown. Concept of online classes came as a saviour. They also added that attending online classes for a long time leads to low eye vision and body fatigue which is not good. While, (5.8%) parents responded that one of the advantages of online classes is that their children have become more focused and responsible for their studies. At the same time, they said that one of the main disadvantages of online classes is that their children have become addicted to mobile phones.

Data Interpretation: Most of the parents replied that due to online classes, there was no loss of studies but at the same time, attending online classes led to strain in eye muscles. The possible reason for this response might be that education had been provided to the children in spite of lockdown. But sitting in front of the computer or glancing at the screen of mobile phones for a long time also leads to many health issues. But there was no alternative other than providing online education to the children at the time of lockdown.

Findings of the Present Study

Major Findings of The Present Study

In view of the analyses and interpretation of data, the following findings have been drawn out.

Objective 1: To explore various forms of virtual teaching-learning modes used by the teachers of upper primary stage during covid-19 pandemic.

Tool used: Structured Interview (for teachers)

Sample: (240) TGTs of Directorate of Education, Delhi.

In the present study, it was found that upper primary stage teachers (TGTs) of the respective Government Schools of DoE (Delhi), were using various online applications to teach their students during the period of covid-19 pandemic which they haven't used ever before such as: using WhatsApp for teaching and learning, google meet, google classroom, zoom and so on. Some of the teachers also learnt how to prepare google sheets and google forms. Other than this, some of them had also learnt how to teach using powerpoint presentations, whiteboard, self-made videos and so on. Teachers of different subjects were using all these methods to deliver the content effectively. It was also found that most of the teachers had learnt the use of all such applications for teaching-learning purposes by themselves only and taking the support of their family members as well as via you-tube.

Teachers created their own lesson plans for online instruction that differed slightly from one another. The majority of teachers began by producing study e-materials in accordance with the curriculum, scheduling online lessons according to the timetable, and uploading study materials after each session. A few lecturers have recorded their video lectures and published them to a WhatsApp group and the LMS portal for students who were unable to attend class due to unforeseen circumstances, as well as to provide equal access to learning. Some teachers claimed to have prepared modules for each unit they needed to teach. They had online classes after uploading that module, which were more about resolving their questions.

Most of the teachers preferred offline mode to teach their students. According to most of the teachers, online mode cannot beat the effectiveness of offline mode. It was also found that in order to evaluate the work of their students, teachers used online worksheets, and they also sent online assignments to google classrooms and on their student's mail. Teachers had also admitted that poor and low internet connectivity was the main hurdle in their teaching due to which they couldn't teach smoothly. Teachers raised the issue of performing online practical sessions during the lockdown time, stating that it was difficult because it required methodical demonstration of the entire process in front of the pupils.

Objective 2: To study the perception of different stakeholders with respect to virtual teaching and learning.

Tool 1: Structured interview for HoS

Sample: Twenty-four (24), HoS of Directorate of Education, Delhi.

In the present study, it was found that according to most of the HoS of the respective Government Schools, students had shown good results in academics even in online mode, Also, HoS suggested that in the

pandemic period, only online mode was the best and only option to carry out teaching-learning activities. No other possibility was safe and recommended also during the covid period. According to them, online teaching has brought improvement in learning among the students and the virtual mode of teaching and learning has brought positive change in pedagogy used by the teachers of their respective schools. Most of the HoS also recommended that teachers and parents could collaborate for better learning by organizing regular online PTM and interacting with them on a regular basis. but at the same time, they felt that it is the responsibility of the parents to provide gadgets like- mobile phones to their wards for online learning.

Tool 2: Structured interview for students

Sample: (120) students of Directorate of Education (DoE), Delhi

In the present study, it was found that students of the respective Government Schools had a little bit of experience of teaching-learning in virtual mode before the Corona period. Most of them also found that online study groups are very much helpful for clearing the concepts. According to them, their teachers were using various online platforms to teach them such as: WhatsApp, google meet, zoom. In terms of students' opinions on online teaching-learning, they stated that during COVID-19, online learning allowed them to stay in touch with their studies outside of the four walls of the classroom, which prevented crowding in the classroom and provided an alternative for completing the syllabus. Because they were not used to learning with cell phones and computers, some students reported a lack of interest and attention during online lessons. This proved to be a huge setback for them. As a result, they believe that developing soft skills, particularly listening skills, should begin as soon as feasible. They also admitted that they regularly submit online assignments given to them by different subject teachers. At the same time, as per the responses of most of the students, their revision takes place in the form of online written assignments and tests. They also admitted that they get regular feedback from their different teachers in assignments. Feedback helps them to work upon their mistakes. According to the pupils, the average time spent on online activities was around 5 hours per day. On average, students said they use 1.5–2.0 GB of data per day because it was included in their low-cost prepaid plan. As a result, when the students' maximum data limit was reached, they felt powerless to continue their online classes. Students found the videos that their teachers uploaded fascinating since they could watch them again, pause them, and take notes as needed. Students responded half-heartedly to the teachers' pace of online teaching and were also satisfied with the teachers' intellectual preparedness for online teaching. Students expressed dissatisfaction with their ability to comprehend conceptual information and discourse activities in online classrooms, and they also revealed that they were unable to match their learning behavior or capacity to the teachers' teaching speed.

Tool 3: Structured interview for parents/guardians

Sample: (120) parents/guardians of the sampled 120 students of DoE, Delhi.

In the present study, it was found that according to most of the interviewed parents, their wards were learning much better in offline mode than online. Most of the parents also expressed their helplessness in providing any sort of academic support to their wards as they had to engage in other household and job-related work. It was also found that most of the parents expect from the school or government to provide economical support in the form of paying an amount for net recharge. According to most of the parents due to online classes, there was no loss of studies but at the same time, attending online classes led to strain in eye muscles.

Tool used: Questionnaire (Likert Scale) in **Google** Form for teachers

Sample: (240) TGTs of Directorate of Education, Delhi.

In the present study, it was found that though most of the upper primary stage teachers (TGTs) of the respective Government Schools of DoE (Delhi), liked to teach through online mode during covid pandemic period but they couldn't remain much focused in online mode. According to most of them, they preferred offline mode much as compared to online. It was also found that teachers had faced an issue of low percentage of students' attendance in online mode.

Most of the teachers also agreed that teaching through online mode requires more time for the preparation of content as compared to offline mode. Teachers also admitted that while teaching via online mode, disruption of internet connectivity distracts the learning of students. Teachers also felt that their students used to take much interest in offline mode learning as compared to online teaching-learning. Most of the teachers expressed their concern for some of their students for not attending online classes due to the non-availability of smartphones.

It was also found that most of the teachers found checking online assignments a bit difficult as compared to offline answer sheets. According to most of them, students are engaged more in offline than online mode. They also expressed that online teaching causes more fatigue. It was also found that most of them were happy they could share a variety of online learning resources with the students. Most of the teachers also considered that online teaching and learning gives more opportunities for individualized feedback. Teachers used to get constant feedback from students about the benefits and drawbacks of online teaching transactions and would keep working until they achieved the required level of student satisfaction.

Objective 3: To explore various challenges faced by different stakeholders in adapting to the virtual teaching- learning process during covid-19 pandemic.

Tool 1: Structured interview for HoS

Sample: Twenty-four (24), HoS of Directorate of Education, Delhi.

In the present study, it was found that according to most of the HoS of the respective Government Schools, poor or low internet connectivity is one of the biggest challenges in virtual teaching-learning mode. Because of poor net connection, students frequently get disconnected from ongoing online classes which leads to the disruption of the flow of the teaching and learning.

Tool 2: Structured interview for teachers

Sample: (240) TGTs of Directorate of Education, Delhi.

In the present study, it was found that as per most of the teachers of the respective Government schools, the most challenging issue faced by them was the poor net connectivity. Disruption of the net, poor or low net connectivity, distorted voices were some of the major issues faced by the teachers. The most difficult aspect of teaching online was maintaining a consistent network connection. The connection is steadier if the students' videos and audios are turned off, but that manner of teaching appears to teach to a blank wall. Furthermore, it was thought that some pupils lacked the necessary resources to participate in online activities, furthering the digital divide. As a result, there were both technological and ideological issues with online instruction. Teachers cited a lack of knowledge, a lack of opportunities for meaningful contact, a lack of opportunities for innovative instruction, and the mechanical administration of classes as major obstacles. Teachers were found to be unable to understand students' faces and moods, making it difficult to adjust the teaching style. Furthermore, both teachers and students reported a loss of motivation due to the inability to receive fast feedback during this online teaching-learning transition phase. Some teachers

raised major concerns about the research scholars' laboratory operations during the lockdown time and advocated simulation approaches in laboratory practical. It was discovered that some teachers were in a quandary since they didn't know whether the pupils turned on the computer for the sake of it, were actively there at the time, or were sitting somewhere; they had no idea about involvement.

Tool 3: Structured interview for students

Sample: (120) students of Directorate of Education (DoE), Delhi

In the present study, it was found that according to the students of the respective Government school students, the net problem was the biggest challenge faced by them due to which they were unable to continue their online classes smoothly.

It was found that the majority of students came from the low socioeconomic conditions in their families. As a result, during the lockdown period, when they required a laptop for online learning, they were unable to do so because they lacked a desktop or laptop at home, and mobile phones were not found to be sufficiently effective for participation in online classes. Furthermore, the students were experiencing financial difficulties at home during the lockdown. Some girl students admitted that they did not have a suitable learning environment at home and that they were allocated household chores during the lockdown period, which had a negative impact on their studies and left them depressed and despondent.

Tool 4: Structured interview for parents/guardians

Sample: (120) parents/guardians of the sampled 120 students of DoE, Delhi.

In the present study, it was found that according to the interviewed parents during online classes, one of the biggest challenges faced by them and their wards was the poor net connectivity. They had also admitted that online classes also led to frequent mobile data consumption.

Conclusions

The main concern of the present research work was to study the perception of different stakeholders towards virtual teaching-learning mode during Covid-19 pandemic at the upper primary stage. A study was done on four stakeholders namely: HoS, Teachers, students and parents (DoE, district east, Delhi). For the current research study, three main objectives were framed by the investigator. Different tools had been used by the investigator in respect of these objectives. Based on the main findings of the study, following conclusions have been drawn:

- ❖ Because of Covid-19 pandemic, education was moved online. Most countries throughout the world had implemented a lockdown and temporarily closed educational institutions as a result of the covid-19 outbreak. During the pandemic, online learning was the most effective solution. The internet was used for online education. Teachers used virtual classrooms to teach from home with all the required resources, making online sessions just as productive as in-person sessions. Online classes had given students a high-quality education while allowing them to remain in the comfort of their own homes, as well as assisting in the prevention of virus spread during covid pandemic.
- ❖ On the basis of the responses of interviews with the chosen samples, it can be concluded that online classes had proven beneficial to the students, particularly during the period of lockdown. Teachers benefitted as well because they were able to communicate with their students and share their knowledge. Students have also become more tech-savvy as a result of online schooling. They learned more about a variety of apps and tools.
- ❖ Due to virtual education, students can use various sites to access online study materials, participate in virtual lectures, interact with other students, take virtual tests, and much more. They can study whenever they choose. If students require additional explanations, they can quickly access these recordings and have their questions answered right away. When it comes to choosing an online education programme, students have a lot of alternatives. They can readily choose things and topics that interest them.
- ❖ Responses of the chosen samples also revealed that there are some disadvantages of online education. In virtual teaching and learning, there is no face-to-face interaction between teachers and pupils. This obstructs the development of communication skills and personality. In some locations, internet connectivity is also a major concern. The cost of the internet is also rising, and not everyone can afford online education. Students have more flexibility with online education, which is not healthy for them because it lacks discipline. Though online education has both advantages and disadvantages, but during the time of lockdown, it was extremely beneficial in offering ongoing and uninterrupted learning.
- ❖ Because online teaching-learning in a pandemic was a new experience for both teachers and students, it was natural to express their dissatisfaction with the stressful scenario in which they found themselves.
- ❖ Before covid-19 pandemic, most of the stakeholders were not aware of the educational utility of various online apps. Online apps were mostly used only to stay connected with the near and

dear ones but after lockdown, everyone had learnt how to use online applications for teaching and learning purposes. Several online teaching-learning platforms, such as WhatsApp, Zoom, Google Meet, Facebook, and YouTube streaming, were used to meet the needs of both teachers and students from the beginning of the lockdown.

- ❖ On the basis of the responses of interviews with the chosen samples, it was revealed that out of all the apps, the bulk of sampled teachers were using WhatsApp to conduct online curriculum transactions. It can be concluded that teachers were used to using WhatsApp in their daily lives, and it was also convenient for pupils to use it at any time.
- ❖ Those teachers who attended orientation programmes and workshops were beneficial in learning how to use the latest online teaching-learning modes.
- ❖ More and more families are now relying on technology and digital solutions to keep their children learning, entertained, and connected to the outside world as a result of school closures and strict containment measures, but not all children have the necessary knowledge, skills, and resources to keep themselves safe online.
- ❖ During the time of covid-19 pandemic, online learning was the best option. Learning and knowledge was imparted electronically via numerous media in the Covid-19 pandemic condition.
- ❖ Based on the main findings, it can be concluded that during the lockdown phase for Covid-19, virtual teaching and learning was the only solution as advocated for the following reasons: students had obtained knowledge while staying at home and maintaining proper social distance and helped in minimizing the spread of Covid-19, it provided students with additional interactive support that allowed them to learn at their own speed and at any time, it had a flexible schedule. It could be accessed from any location with an internet connection, and students could use their own devices (mobile, computers, tablets) to engage in the teaching-learning process.

Educational Implications

The pandemic scenario had wreaked havoc on practically every aspect of life, but it had turned out to be a blessing in disguise. Online learning, which initially appeared to be a panacea for the problem, is now being viewed as a new paradigm in education. The pandemic showed us that, in a situation like COVID-19, it is critical to extend and sustain online education.

Below are some of the suggested implications of the present study for the government, policymakers and different stakeholders to effectively use and implement virtual teaching and learning mode during any pandemic crises, if it occurs in future.

- ❖ To deal with the complexity of online education, developing multimodal techniques to fulfil course content objectives for improved learning outcomes may be a better option.
- ❖ Unfazed, governments must ensure the availability of reliable communication tools, high-quality digital academic experiences, and promote technology-enabled learning for students in order to bridge the gaps that existed in the education system prior to and after the COVID-19 disaster, which is also inescapably required for uninterrupted learning.
- ❖ Following the pandemic, a few steps should be taken to build a curriculum that reflects the perceptible shift in students' topic knowledge and learning experiences, as well as enabling them to think critically. Excellent domain knowledge, proficient computer knowledge, communication skills, clarity of expression, emotionally connect with students, and other necessary skills to deal with the demands of the online platforms, as well as the ability to resolve minor issues during and after the online classes, online teaching skills and techniques are needed to teach during untimely and critical scenarios like covid pandemic.
- ❖ Teachers should foster healthy relations and, if feasible, illuminate the environment of groups, applications, or any platform via phone call. The practical expansion of ICT facilities needs to be fostered in order to better handle this type of issue. The most important teaching skill that has to be improved is making learning a personalized experience for students, even when it occurs online.
- ❖ Students use Internet technology to communicate electronically with their teachers and classmates via e-mail, WhatsApp, videoconferencing, instant messaging, and other means. However, videoconferencing may be utilized effectively in online learning to improve group collaboration and foster a feeling of community among students, perhaps replacing face-to-face classroom learning to some extent.
- ❖ Parents' awareness is also seen as a requirement throughout any transition phase which can be improved with time.
- ❖ In critical situations like pandemics, proper counselling services should be provided by the educational institutions in order to maintain students' sound mental health, and well-being of students to overcome any of their stress including socio-emotional imbalance, personal adjustment to daily life activities at home, in order to overcome the negative impacts of the isolation time.
- ❖ During such a crisis, parents also have a very important role to play. Parents can engage their wards in various life skills activities at home and inculcate moral values in their children. Various activities

can be designed by the parents which they can do along with their children. such as: they can assist their wards with properly arranging their books and clothes in a designated area, they can make a home schedule for their wards that includes a half-hour for written work, one hour for manual labour (drawing, painting creative work) a total of one hour for domestic tasks (watering plants, eating lunch, cleaning our desk, and washing tables), they can plan a regular playtime with their wards to strengthen bond with them (carom, chess, memory games), children can developing culinary art abilities by preparing refreshments for their parents. More such activities can be designed by the parents for their wards with the help of teachers to create a stress-free environment at home for the children during such crisis.

- ❖ Efforts should be made to provide students with free access to online educational resources so that they can make the most of their time during such pandemic crises.
- ❖ To make e-content more usable, tasks such as reporting must be completed, and presentations and instruction delivery must be carefully planned.
- ❖ Also, online learning necessitates a solid IT infrastructure. Infrastructure must be strong enough to offer uninterrupted services both during and after a crisis.
- ❖ A common academic plan for different educational institutions should be developed, as well as a proper Education Continuity Plan (ECP) to keep the learning process going on during the pandemic. Education institutions should have access to infrastructure that allows them to control the digital learning process during future health emergencies. There is a need to ensure appropriate funds for education system improvement and to give capacity building training to higher education institution stakeholders. Interventions should be launched with a targeted approach to establish a positive learning environment for pupils from vulnerable communities. The open-source digital learning and learning management system could be utilized by institutional teachers to conduct online learning during any crisis.
- ❖ It's unrealistic to anticipate the same amount of focus and participation in virtual mode as in the offline classroom. Alternative instructional and assessment strategies must be developed and implemented. All of these can help a country's future educational system.

Online education has been implemented as a feasible option well within its constraints and restrictions as a time-suited gap method for addressing the needs under the COVID-19 pandemic. It is debatable if it will be effective in the future. It has recently proven beneficial in the evaluation of student performance. It may take some time to understand how frantic attempts at online teaching-learning satisfy the criteria for a net balance of collective repercussions. Finally, as students come from various socioeconomic backgrounds and use the same pedagogical technique, there is an urgent need to bridge the gap between the haves and have-nots, remote rural and metropolitan affluent. This country's destiny lies in the hands of students. Even today, students attending government schools outnumber those attending private schools, and as these students grow into adults, they must be prepared to take responsibility for making this country a better place than it is now. Disruptions such as the COVID – 19 should not be permitted to get in the way of such preparation. Because online programmes are in high demand, they should be viewed as a compliment and a good option to learn during a crisis such as: pandemic. Traditional classroom studies, on the other hand, have always been and will continue to be the ideal style of learning for children who want to progress not only mentally but also socially.

Limitations of the Study

- ❖ The sample size of the study could have been increased for better generalization of the study findings.
- ❖ The present study included samples from the Government schools of East Delhi. The study can be replicated in different districts of Delhi, and this would enable better generalizations of the findings.

Suggestions for Further Studies

Keeping in view the present study, the investigator would like to highlight some research problems which may be taken by other investigators for further studies. The study can be made more effective and fruitful if in future the following suggestions are kept in mind while conducting research similar to it:

- ❖ The present study was conducted in District East. Similar study can be conducted in another District of Delhi with large sample.
- ❖ The present study was conducted with the students of upper primary stage. Similar study can be taken up with the students of primary grade in the case if only students will be taught entirely through online mode.

REFERENCES

Aboagye E, Yawson JA, Appiah KN. COVID-19 and E-learning: The Challenges of Students in Tertiary Institutions. *Social Education Research*. 2020;2(1):1–8. doi: 10.37256/ser.212021422. [CrossRef] [Google Scholar]

Ali M, Khaled Hossain SM, Ahmed T. Effectiveness of E-learning for university students: Evidence from Bangladesh. *Asian Journal of Empirical Research*. 2018;8(10):352–360.

Bailey, C. J., & Card, K. A. (2009). Effective pedagogical practices for online teaching: Perception of experienced instructors. *Internet and Higher Education*, 12, 152-155.

Bell, B. S., & Fedeman, J. E. (2013). E-learning in postsecondary education. *The Future of Children*, 23(1), 165-185.

Brindley, J., Blaschke, L. M., & Walti, C. (2009). Creating effective collaborative learning groups in an online environment. *The International Review of Research in Open and Distributed Learning*, 10 (3).

Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/675/1313>

Bryant, J., & Bates, A. J. (2015). Creating a constructivist online instructional environment. *TechTrends*, 59(2), 17-22.

Callaway, S. K. (2012). Implications of online learning: Measuring student satisfaction and learning for online and traditional students. *Insights to a Changing World Journal*, 2. Retrieved from www.franklingpublishing.net

Cavanagh, S. (1997). Content analysis: Concepts, methods and applications. *Nurse Researcher*; 4(3), 5-16.

Cole, M. T., Shelley, D. J., & Swartz, L. B. (2014). Online instruction, E-learning, and student satisfaction: A three year study. *The International Review of Research in Open and Distance Learning*, 15(6), 111-131.

Coppola, N. W., Hiltz, S. R., & Rotter, N. G. (2002). Becoming a virtual professor: Pedagogical roles and asynchronous learning networks. *Journal of Management Information Systems*, 18(4), 169-189.

Crawford-Ferre, H. G., & Wiest, L. R. (2012). Effective online instruction in higher education. *The Quarterly Review of Distance Education*, 13(1), 11-14.

Dziuban, C. D., P. D. Moskal and E. K. Dziuban. (2000). Reactive behavior patterns go online. *Journal of Staff, Program, and Organizational Development* 17(3): 171–182.

Gabriel, M. A., & Kaufeld, K. J. (2008). Reciprocal mentorship: An effective support for online instructors. *Mentoring and Tutoring: Partnership in Learning*, 16(3), 311-327.

Gallagher, S., & LaBrie, J. (2012). Online learning 2.0: Strategies for a mature market. *Continuing Higher Education Review*, 76, 65-73.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87-105.

Garrison, D. R., Anderson, T., & Archer, W. (2009). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15(1), 7-23.

Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, 10, 157-172.

Harandi SR. Effects of e-learning on Students' Motivation. *Procedia—Social and Behavioral Sciences*. 2015;181:423–430. doi: 10.1016/j.sbspro.2015.04.905. [CrossRef] [Google Scholar]

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *Internet and Higher Education*, 3, 41-61.

Keengwe, J., & Kidd, T. T. (2010). Towards best practices in online learning and teaching in higher education. *MERLOT Journal of Online Learning and Teaching*, 6(2), 533-541.

Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*, 55, 808-20.

Kehrwald, B. (2008). Understanding social presence in text based online learning environments. *Distance Education*, 2 (1), 89-106.

Kupczynski, L., Ice, P., Wiesenmayer, R., & McCluskey, F. (2010). Student perceptions of the relationship between indicators of teaching presence and success in online course. *Journal of Interactive Online Learning*, 9(1), 23-43.

McAuley, A., Stewart, B., Siemens, G., & Cormier, D. (2010). The MOOC model for digital practice. Retrieved from http://www.elearnspace.org/Articles/MOOC_Final.pdf

Ms P, Toro U. A review of literature on knowledge management using ICT. *Higher Education*. 2013;4(1):62–67. [Google Scholar]

Oludare Jethro O, Moradeke Grace A, Kolawole Thomas A. E-learning and Its Effects on Teaching and Learning in a Global Age. *International Journal of Academic Research in Business and Social Sciences*. 2012;2(1):2222–6990. [Google Scholar]

Pelz, B. (2008). (My) three principles of effective online pedagogy. *Journal of Asynchronous Learning Networks*, 14(1), 103-16.

Radha R, Mahalakshmi K, Sathish V, Saravanakumar AR. E-learning during lockdown of Covid-19 pandemic: A Global Perspective. *International Journal of Control and Automation*. 2020;13(4):1088–1099. [Google Scholar]

Rao, K., & Tanners, A. (2011). Curb cuts in cyberspace: Universal instructional design for online courses. *Journal of Postsecondary Education and Disability*, 24(3), 211-229.

Richardson, J. C. and K. Swan. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks* 7(1): 68–88.

Saba, F. (2012). A systems approach to the future of distance education in colleges and universities: Research, development, and implementation. *Continuing Higher Education Review*, 76, 30-37.

Sadera, W. A., Robertson, J., Song, L., & Midon, M. N. (2009). The role of community in online learning success. *Journal of Online Learning and Teaching*, 5(2), 277-284.

Schroeder, R. (2012). Emerging open online distance education environment. *Continuing Higher Education Review*, 76, 90-99.

Sher, A. (2009). Assessing the relationship of student-instructor and student-student interaction to student learning and satisfaction in a web-based online learning environment. *Journal of Interactive Online*

Learning, 8(2), 102-120.

- Shea, P.A., Swan, K., Li, C. S., & Pickett, A. (2005). Developing learning community in online asynchronous college courses: The role of teaching presence. *Journal of Asynchronous Learning Networks*, 9(4), 59-82.
- Shea, P. J., A. M. Pickett and W. E. Pelz. (2003). A follow-up investigation of “teaching presence” in the SUNY Learning Network. *Journal of Asynchronous Learning Networks* 7(2): 61–80.
- Shea, P., & Bidjerano, T. (2009). Community of inquiry as a theoretical framework to foster “epistemic engagement” and “cognitive presence” in online education. *Computer and Education*, 52, 543-553.
- Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76(1), 93-135.
- Wallace, R. (2003). Online learning in higher education: A review of research on interactions among teachers and students. *Education, Communication & Information*, 3(2), 241-280.
- Whipp, J. L., & Lorentz, E. R. A. (2009). Cognitive and social help giving in online teaching: An exploratory study. *Educational Technology Research and Development*, 57, 169-192.
- Yang, J., Yu, H., Chen, S. J., & Huang, R. (2014). Strategies for smooth and effective cross-cultural online collaborative learning. *Educational Technology & Society*, 17(3), 208-221.
- Yuan, J., & Kim, C. (2014). Guidelines for facilitating the development of learning communities in online courses. *Journal of Computer Assisted Learning*, 30, 220-232.

APPENDICES

APPENDIX-A

Objective: To explore various forms of virtual teaching-learning modes used by the teachers of upper primary stage during covid-19 pandemic.

Tool used: Structured Interview Schedule

Respondents: Teachers (TGTs) of Directorate of Education, Delhi.

Items:

- 1) What are the different teaching methodologies do you use to teach your subject through online mode?
- 2) Did you learn any skill or attend any workshop to teach through online mode? If yes, from which source and how?
- 3) How is your experience of teaching students from home as compared to teaching at school?
- 4) How effectively and innovatively you are using technology to impart your subject knowledge to your students?
- 5) How do you assess your students during online mode?
- 6) What are the challenges and issues you have faced while teaching online?

APPENDIX-B

Objectives:

- a) To study the perception of different stakeholders with respect to virtual teaching and learning.
- b) To explore various challenges faced by different stakeholders in adapting to the virtual teaching-learning process during covid-19 pandemic.

Tool Used: Structured Interview Schedule

Respondents: HoS of Directorate of Education, Delhi

Items:

- 1) What is your opinion about virtual teaching and learning with respect to academic performance of the students?
- 2) In your opinion, is online teaching an only option for carrying out teaching-learning activities or are there other possibilities also?
- 3) How does online teaching impact learning among students?
- 4) How does virtual mode of teaching and learning affect teaching pedagogy?
- 5) In the existing scenario, how could the curriculum been modified?
- 6) What is your opinion regarding the duration and timetable of online classes?
- 7) According to you, how could teachers and parents be collaborated for better learning?
- 8) Do you think it is the responsibility of the parents to provide gadgets like- mobile phones to their wards for online learning?
- 9) According to you, what are the challenges in virtual teaching-learning mode?

APPENDIX-C

Objectives:

- a) To study the perception of different stakeholders with respect to virtual teaching and learning.
- b) To explore various challenges faced by different stakeholders in adapting to the virtual teaching-learning process during covid-19 pandemic.

Tool Used: Structured Interview Schedule

Respondents: Students of grade VIII (Directorate of Education, Delhi)

Items:

1. Do you have any previous experience of teaching-learning in virtual mode before Corona period?
2. Do you think having a close knit of online study groups would be useful so that there is a peer support available to those who need more help?
3. What kind of pedagogical methods are used by your teachers?
4. What kind of projects are given to you?
5. How does your revision take place during online mode?
6. How does your teacher evaluate your work?
7. Do you get any feedback from your teachers in your assignments?
8. What challenges or difficulties are you facing in learning different subjects during online mode?

APPENDIX-D

Objectives:

- a) To study the perception of different stakeholders with respect to virtual teaching and learning.
- b) To explore various challenges faced by different stakeholders in adapting to the virtual teaching-learning process during covid-19 pandemic.

Tool Used: Structured Interview Schedule

Respondents: Parents of the sampled students

Items:

1. Do you think your children have learnt better in online mode than offline?
2. How do you support your ward during virtual learning?
3. Is there any additional study material provided to your child during virtual teaching and learning?
4. If online class continues this year, what kind of support do you need from the school or government?
5. What do you think, should exams be conducted or children should be merely promoted to the next class?
6. What challenges are you and your children facing during online classes?
7. According to you, what are the advantages and disadvantages of online class?

APPENDIX-E

Objective: To study the perception of different stakeholders with respect to virtual teaching and learning.

Tool Used: Questionnaire (Likert Scale) in Google Form

Respondents: Teachers (TGTs) of Directorate of Education, Delhi.

Items:

- 1) I like to teach my students through online mode.
Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()
- 2) I remain more focused in online mode than offline.
Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()
- 3) While teaching through online mode there is low student teacher interaction.
Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()
- 4) Teaching through online mode requires more time as compared to offline mode.
Strongly agree () Agree () Cannot say () Disagree () strongly Disagree ()
- 5) Disruption of Internet connectivity distracts learning of my students during online mode.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()
- 6) The students enjoy my classes more during online mode as compared to offline mode.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()
- 7) Frequent internet drop disrupts the flow of my online teaching.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()
- 8) Requirement of gadgets like mobile phones, laptop etc. prevent a large number of students from attending my classes.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()
- 9) Checking of online assignments, uploaded by the students, is a very difficult task for me.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()
- 10) Students are more engaged in online class as compared to offline mode.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()
- 11) Students are more distracted in online teaching and learning than offline.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()
- 12) Online teaching causes more fatigue among teachers.
Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

13) Online teaching gives more opportunities to share a variety of learning resources with my students in my subject.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

14) In online mode, conducting hands-on teaching learning activity in my subject is difficult.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

15) I transact my teaching content through lecture method during online mode.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

16) Online learning is more conducive for group learning.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree ()

17) Online teaching and learning gives more opportunities for individualised feedback.

Strongly agree () Agree () Can not say () Disagree () strongly Disagree

Review Report of the Present Research

Suggestions/Comments of Reviewer-1

- ❖ Very relevant topic considering the current scenario. It would bring important learning for future organization of different programmes.
- ❖ Different variables and pillars to the study are well introduced. Proper emphasis is given to different aspects.
- ❖ Rationale of the study is well justified with the connections it makes with the current realities and future possibilities.
- ❖ Some of the definitions can be relooked at specially the definition of covid 19.
- ❖ Research questions and objectives are well framed and trace the important areas the study would focus to explore. Objectives are very specifically framed.
- ❖ Conceptual framework highlights some of the important areas related to the area undertaken. Some addition related to virtual teaching learning can be included in the conceptual framework to highlight generic ideas of virtual learning. Some of the relevant programmes in virtual mode are well explained in the framework.
- ❖ Related studies are relevant and are contemporary. Some of the studies have emerged in 2021 related to the pandemic and online learning. Few relevant ones can be added.
- ❖ Sampling technique and methodology are very well written. It's easy to comprehend the methodology used.
- ❖ The tools used are well developed and are effective in eliciting the desired information from the participants.
- ❖ Process followed for tool construction is also very well defined and very objective.
- ❖ Description of the interviews and other tools is adequately presented.
- ❖ Data analysis and interpretation is the strong point of the research. It is very systematically done with very elaborate interpretations. They are well connected with the relevant reasons emerging from different responses. This gives strength to the work. The spread of interpretations based on the tools is well managed in the research. It brings forward very relevant points from the field. The challenges faced by different stakeholders bring forward the real picture of the present context.
- ❖ The mixed realities of benefits and challenges of the virtual learning are well explained through the interpretation of the responses of different stakeholders.
- ❖ Educational implications are well presented in the research report.

Dated: 10/01/2022



Dr. Subhash Chander
Assistant Professor
Department of Education
University of Delhi

Suggestions/Comments of Reviewer-2

- ❖ The introduction was written very well which helps to understand the concept of the virtual teaching-learning process and other e-learning processes.
- ❖ The conceptual framework/sequence was very nice. All the concepts in the introduction are sequenced and linked with each other.
- ❖ We can mention the government initiatives which promote virtual Teaching-Learning / E-learning of students/teachers and other stakeholders.

Need/Rationale of the Study

- ❖ We can also take the suggestions or possible solutions for the problem, challenges, and issues they faced by the different stakeholders.
- ❖ The topic of the study means the area which is selected for the study is very much needed for the field of education in the present and future situation.
- ❖ Perception of different stakeholders is very important to implement the virtual teaching-learning during and after the Covid-19 Pandemic.
- ❖ Statement of the problem is very stated by the researcher. After looking towards the title it gives a clear idea about the direction of the study.
- ❖ The researcher has operationalized terms in the context of the present study and can relate with the variables of the study.
- ❖ The researcher stated the objectives very clearly and precisely.
- ❖ The researcher included the maximum government initiatives which promote virtual learning. The researcher can also include the PRAGYATA project introduced by the government during the pandemic COVID-19.

Methodology of the Study

- ❖ The researcher mentioned the methodology research project in detail which includes the research method of the study, Population of the study, sample, and sampling techniques. The methodology selected by the researcher is suitable for the present research.
- ❖ The researcher prepared the tools for the collection of data for analysis. The researcher has followed the standardization process to standardize the tools.
- ❖ The researcher opted for the standard process to collect the data.

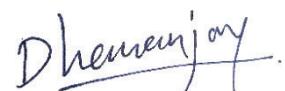
Analysis of Data

- ❖ The researcher used the appropriate method to analyse the data. The researcher has done the objective-wise data analysis and interpretation of data. Interpreted data gives a clear idea about the result of the study.
- ❖ The researcher also did the item analysis and interpretation for each item of the interview, which gives the clear and in-depth result of the study and perception of stakeholders towards the virtual learning.

Conclusion

- ❖ The researcher has concluded the result of the research collectively. The concluded result gives a clear idea about the study.
- ❖ The implication of the study gives a clear idea about the application of the research in the field. This will also help the stakeholder to define the role of each stakeholder in the promotion of virtual learning.
- ❖ This study is required for the present situation. All the education system is dependent on the virtual teaching-learning processes.

Dated: 17/01/2022



Dhananjay V. Deshmukh

Assistant Professor

Head, Department of Developmental Disabilities

Indian Institute of Teacher Education

Gandhinagar, Gujarat-382016



District Institute of Education and Training
Karkardooma, Delhi-110092