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# Impact of COVID-19 on the primary level teaching-learning process in rural India

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**Purpose:** COVID-19 outbreak impacts people globally. It is not simply a global health matter; it has a terrible influence on the social life of humans, counting the worldwide education structure and other phases of present social configurations. Therefore, the present study's objective is to identify the impact of COVID-19 on the online education approach in teachers' perceptions.

**Methodology:** The study performs a mixed research approach for evaluating the teachers' perspectives in the online education system. The quantitative data are collected with the support of a questionnaire from 175 respondents (Public School teachers), and in-depth telephonic interviews are conducted among 25 schoolteachers using a semi-structured questionnaire for qualitative data. The quantitative analysis is performed using Statistical Package for Social Sciences (SPSS), and the qualitative analysis is coded and analyzed thematically.

**Findings:** The quantitative results show that the COVID-19 pandemic negatively impacted the online teaching method; teachers' adaptation here seems low. In contrast, communication with school leaders is provided a clear view of online teaching methods. The key findings from the qualitative analysis show that the adaptation online education system is complex owing to various struggles. Some institutions facilitate training sessions to teach in a range of adopting the online education system. Finally, the teachers need help making students actively participate in online classes.

**Discussion:** The study conducts original survey through both interview and questionnaire. The results are determined through thematic and data analysis.

## KEYWORDS

influence of COVID-19, online teaching, online education system, perception of teachers, and mixed approach

## 1 Introduction

The novel coronavirus disease (COVID-19) had a worldwide impact on health and the economy. While forecasting the spread of COVID-19 was one of the challenges at the height of the pandemic (Bonin et al., 2021; Sánchez Amate et al., 2021; Nousheen and Kalsoom, 2022), to prevent its transmission, the World Health Organization (WHO) suggested some standards, such as following social distancing and wearing protective masks. Pandemic-triggered lockdowns of varying degrees were implemented by governments worldwide to flatten the curve of COVID-19 infections (Zhang et al., 2020). Statistical models revealed 4–6 weeks of lockdown would considerably reduce COVID-19 transmission in India (Gupta and Sengupta, 2021; Suresh et al., 2022). The decision to implement lockdown impacted numerous sectors of the country. For instance, the social distancing and lockdown measures due to the pandemic led to the closure of training institutions, schools, and higher education facilities. The teaching establishments could not continue their activities during this crisis (Sofie et al., 2022). As a result, an alternate path for learning was introduced, such as online learning platforms used by the academic community. The disruption in learning forced schools to implement online

learning systems (Gupta and Sengupta, 2021; Xhelili et al., 2021), leading to massive open online courses and flexible learning. The lockdown greatly impacted student education and resulted in psychological stress among teachers and students (Chandra, 2020). Online learning programs were implemented worldwide to ensure students could continue their education unhindered throughout the pandemic (Arun and Iyer, 2020). For example, in early February 2020, China developed an online learning approach, holding concurrent online learning exercises to ensure students' learning process was not disrupted. In Bulgaria, in early April 2020, the Ministry of Education and Science launched an e-learning system (Aliyyah et al., 2020). Consequently, e-learning tools played a significant role during the pandemic, supporting universities and school students in learning even during the lockdown (Mishra et al., 2020; Harries et al., 2021).

In India, the spread of COVID-19 led the Kerala Education Ministry to establish new procedures for dealing with the unusual scenario (Maya et al., 2022); the Government of Kerala introduced an online learning platform named "First Bell," announced by VICTERS (Versatile ICT Enabled Resource for Students) (Mukherjee and Kuri, 2021). The new education system was implemented taking into consideration the health and safety of educators and students. First Bell created a spectrum of impact on teachers. The COVID-19 lockdown resulted in various degrees of influence over the academic achievement of the mainstream participants. Existing research mostly reveals the COVID-19 impact on education by collecting feedback from school management, teachers, social scientists, and key educationists (Mishra et al., 2020; Popa et al., 2020; Kumar and Verma, 2021). However, research on the teachers' perception of the learning and teaching process, adaptations of online education, and institutional support/response, is limited. Therefore, the present study aims to understand the perception and adaptability to the new learning process from teachers' perspectives. A holistic, contextual approach is necessary for capturing these interconnections and factors. The study will aid in understanding the teaching-learning process during situations such as the pandemic using a mixed research approach and suggest ways for the academic field to consider in future efforts.

The main aim and objective of the present study are as follows:

- To identify the effect of COVID-19 on teaching and learning procedures.
- To evaluate the adaptations of teachers in the online education system.
- To analyze the institutional support/response in online teaching and learning.
- To examine the lessons learned by the teachers to overcome the difficulties in online teaching practice.

## 1.1 Significance of the study

The COVID-19 pandemic triggered a massive transformation of the education system. During the lockdown period, students' educational life also suffered. To overcome this, an alternate path was chosen for learning, which is the online education system.

It transformed the learning method considerably. Therefore, the effect of this transformation needs to be evaluated, as various studies have focused on evaluating the impact of this transformation from the perspective of students, teachers, and administrators. However, the studies only elaborated on teachers' perception of the teaching-learning process; the online education adaptation and institutional support (or) responses are limited. Hence, this study analyzed the perception and adaptation of the online education system and institutional support using a mixed research approach. The study also provides policy recommendations to overcome the online education system's challenges.

## 1.2 Paper organization

A brief introduction to the present study is given in section 1. Following this, to identify the strengths and weaknesses of the study, section 2 includes a review of related studies. The methodology adopted in the present study is discussed in section 3. The results of the study are enumerated in section 4. Section 5 states the present research limitations, and the study's conclusions are discussed in section 6. Finally, policy recommendations are suggested in section 7.

## 2 Related studies

COVID-19 significantly impacted the day-to-day life of humans. It also greatly influenced the education system's transformation from a predominantly physical to a virtual mode of learning (Mouchantaf, 2020; Sánchez Amate et al., 2021). In particular, this sudden change impacted teacher and student behaviors. Thus, various researchers have investigated the impact of COVID-19 on the education system from the perspective of administrators (Mishra et al., 2020; Al-Karaki et al., 2021), teachers (Mishra et al., 2020), and students (Stevanović et al., 2021). The studies involved qualitative (Mahardika, 2022), quantitative (Joshi et al., 2020; Almajali et al., 2022), and mixed research approaches (Alexa et al., 2022). The following review outlines some of the relevant literature.

The study by Almonacid-Fierro et al. (2021) investigated the pedagogical teaching practices utilized and implemented by Chilean physical education teachers during the pandemic. It was undertaken from the perspective of a qualitative interpretive study. The data collection process was performed using 14 semi-structured interviews with the physical education teachers from the Maule-Chile region. The interviews were conducted via Skype, Zoom, and Team, as face-to-face interviews were impossible due to the pandemic. The outcome showed that confinement impacted the quality of students' and teachers' lives.

Farsi et al. (2021) explored the impact of COVID-19 on nursing education from the perspective of educators and administrators. They performed qualitative research with a conventional content analysis conducted from June to October 2020 at Tehran Nursing School. Using purposive sampling, 13 participants were enrolled. Data collection was performed through semi-structured and in-depth interviews, which were recorded, reviewed, transcribed,

coded, and analyzed using the Graneheim and Lundman approach. The respondents reported five main issues: adaptive coping, safe management in ambiguous situations, enduring education in an indefinite context, perceived situations, and educational facilitators. The central theme derived from the analysis was the close conflict of education with COVID-19. The opportunities and challenges of the pandemic on medical education were investigated by [Hayat et al. \(2021\)](#). The research used a qualitative approach, using conventional content evaluation to collect data using semi-structured and face-to-face interviews. The study population included four faculty members and 12 students from Shiraz University of Medical Sciences. Participants believed that the evaluation methods in e-learning were more suitable for formative and diagnosis analyses.

Medical schools shifted toward e-learning to compensate for the interruption in classroom education. Thus, traditional classroom learning was replaced with e-learning. These extensive and rapid changes in learning and teaching approaches had consequences. A mixed research approach was utilized by [Mohialdeen et al. \(2022\)](#). Interview data was processed and analyzed. The study population included qualitative data collected from 10 primary school parents and qualitative data collected from 564 questionnaires using topic coding and PLS-SEM (partial least squares structural equation model). Adopting these methods, the study explored the factors that impacted primary school parents' choice of online education and the mechanism of these aspects over choice intention. The result showed that learning attitude and online learning continuity development risks were two new variables affecting parents' cognition of online education. They had a significant impact on performance analysis and risk perception.

Likewise, [Petrila et al. \(2022\)](#) investigated the teachers and their perception of online education vs. the academic performance of students enrolled in distance education, specifically focusing on the negative influence of educational activities. The study was based on quantitative research and assessed the relationship between technological objective and personal subjective factors. A total of 881 Romanian teachers were asked to reflect on the effectiveness of online education during the pandemic, which resulted in correlational research with some stimulating inferences and instructions emphasized as a characteristic of a sustainable educational program. The study found that when teachers become knowledgeable in online education, it enhances the effectiveness of online education, making online education sustainable as an appropriate approach to training through virtual-enabled communication means. Similarly, [Videla et al. \(2022\)](#) evaluated the consequences of online teaching strategies for primary mathematics educators familiar with the online teaching processes. Schools in Chile have mostly adopted hybrid and virtual classes for the continuous educational system. An analysis was performed using a quantitative approach. The study collected samples from 105 primary school teachers using an online survey method. The results showed that there was a relationship between the teacher's technical knowledge level, their experience (in years), and the types of teaching strategies that were utilized.

Similarly, differences were found between educators in urban and rural sectors regarding the utilization of teaching strategies and the types of educational resources. [Bustamante et al. \(2022\)](#)

examined the perceptions of teachers and students from Spanish universities on adapting to e-learning before, after, and during the COVID-19 pandemic. Thematic analysis was performed by utilizing three discussion groups, with two groups having four teachers each and the remaining group comprising five teachers. The discussion group members were employed in university management. Additionally, 79 open-ended questionnaires were completed by the students. The study population was from eight Spanish universities – two private and six public. The results revealed a preference for face-to-face teaching over online teaching, stressing the advantages offered through closer interpersonal relationships.

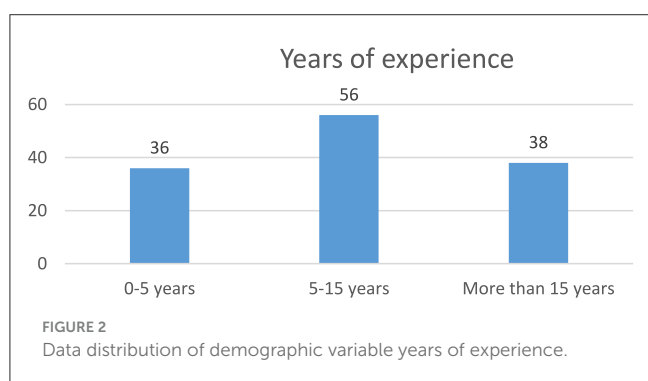
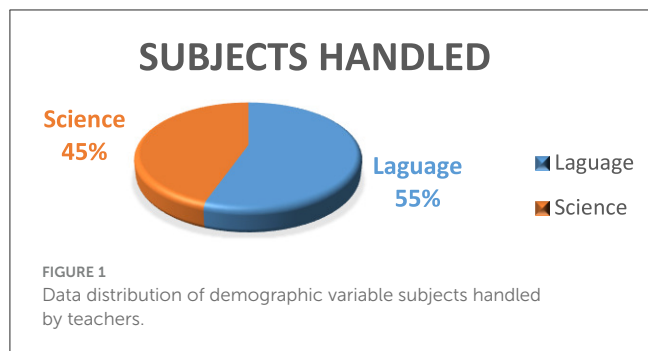
Similarly, [Dragolea and Topor \(2022\)](#) used the Kaizen technique and its principles as a tool for higher education to streamline the context of activities with the students. The survey technique was used to collect data from university teachers. The findings highlighted that adopting the Kaizen method in the universities for online teaching activity improved online educational progress, and progress could be attained through innovative educational techniques. The study also highlighted that the Kaizen technique had been extensively adopted in the private sector. The study concluded that implementing the online teaching technique maintains the quality of the services provided by the teachers to the students.

Likewise, the main objective of the study by [Fülöp et al. \(2023\)](#) was to evaluate the factors that articulate the university students' approval of technology. The study included Romanian university students who had taken part in online courses during the pandemic. The study collected data through a questionnaire survey from ~1875 students. The data was evaluated through structural equation modeling. The study identified factors that had a negative impact on the perceived usefulness of technology. Moreover, the perceived ease of use of technology also negatively impacted the students' behavior intention regarding the adoption of novel technologies.

Furthermore, [Munastiwi et al. \(2023\)](#) explored the challenges in adopting online education practices in elementary schools and teachers' strategies regarding online education issues. The problem-solving skill of the teacher was also evaluated. The study embraced exploratory techniques to identify the problems of the online teaching practice and strategy. The study found that online education practice faces social, cultural, and technical challenges in addition to digital competency issues. Teachers faced challenges in performing conventional education through online education practice. Moreover, teachers were ignorant of the competencies of the students to engage in the online learning platform. As per the findings, the problem-solving skill of the teacher was below the anticipated level. The study concluded that the competencies of teachers have to be enhanced to manage the challenges surrounding online education practice during situations such as the pandemic.

## 2.1 Research gap

The study used the quantitative research method to collect information from selected potential respondents using specific sampling techniques and a framed questionnaire ([Hodge, 2020](#)).



The results from the respondents were statistically analyzed to justify the framed objectives.

### 2.1.1 Participants

The respondents for the quantitative research method were 175 teachers working in various schools in the Kollam district of Kerala. A framed questionnaire was circulated to 200 teachers, and responses from 175 respondents were found to be appropriate. Therefore, it was chosen for the research purpose. The participants were in the age group of 30–50 years. Most of the respondents had 5–15 years of teaching work experience.

Figure 1 depicts the teachers' details in terms of the subjects they taught. Approximately 55% of the teachers in the survey were taught languages such as Malayalam, English, Hindi, and Sanskrit. The remaining 45% of the teachers taught science subjects such as physics, mathematics, commerce, chemistry, social science, and statistics.

Figure 2 details the years of experience of the teachers who participated in the survey. It is evident that 56 teachers had teaching experience of 5–15 years, 38 of them had teaching experience of more than 15 years, and 36 of the respondents had teaching experience of 0–5 years.

## 2.2 Data analysis

The present study used a mixed research technique, and the collected data were thematically and statistically investigated. The study used MS Excel and SPSS to examine the fetched data. The data saved in the Excel sheet was fed into the SPSS

tool to perform inferential and statistical analysis. Tests such as descriptive, regression, correlation, and cross-tabulation were conducted to investigate the present study's objectives.

## 2.3 Qualitative research

Suitable sampling was implemented for the research work, which comprised 25 school teachers from numerous schools in the Kollam district of Kerala. The participants of the qualitative section were teachers from government, government-aided, and public schools. The study involved high school teachers. The sample included 24 female teachers and 1 male teacher. Most respondents had work experience of 4 to 20 years in teaching. Three of the respondents worked as teachers in private schools, whereas the rest of the respondents worked in public or government-aided schools. In India, "aided school" refers to a private school recognized by and receiving government aid. The state government fully funds government schools, and private schools are non-government institutions maintained by voluntary organizations in Kerala. The majority of respondents in this study (84%) were employed in full-time, permanent academic positions as teachers, and the majority of respondents were government (24%) or aided school employees (60%). Most respondents (48%) were in their early-middle age and had more teaching experience in schools. The telephonic interview was scheduled according to the availability of the respondents. The qualitative data were first reacquainted with data, then the code for representing the data was created, the themes were explored, and then the themes were identified. Finally, the reports were produced. This process is represented in Figure 3.

## 3 Results

### 3.1 Quantitative results

Table 1 lists the results of the reliability test. The reliability of the present study was evaluated using Cronbach's alpha.

Cronbach's alpha evaluates how a group of items validates the unidirectional latent constructs. A benchmark value of Cronbach's alpha of 0.7 and above indicates the acceptable internal consistency of the model. The present study is reliable, as the value of Cronbach's alpha is 0.731, which depicts the considerable internal consistency of the present study.

#### 3.1.1 Regression analysis

Regression analysis aids in investigating the strength of the correlation between dependent and independent variables. This analysis aids in forecasting the value of a dependent variable from one or more independent variables.

The regression analysis in Table 2 shows the degree of correlation between the predictor and dependent variable. The regression analysis considered variables representing ease of relationship building through online education as the predictor variable and satisfaction with online teaching as the dependent variable.

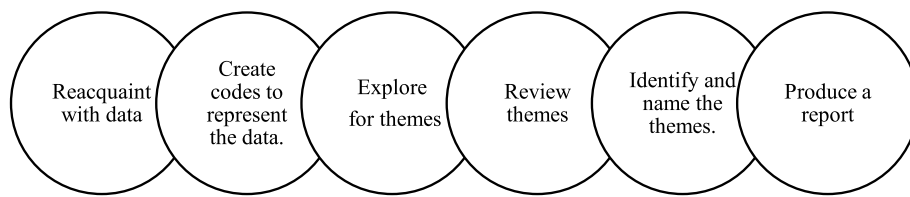


FIGURE 3  
Thematic analysis process.

TABLE 1 Reliability test.

Cronbach's Alpha	N of Items
0.731	10

TABLE 2 Model summary.

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. error of the estimate
1	0.156 <sup>a</sup>	0.54	0.017	0.754

<sup>a</sup>Predictors: (Constant), Compared to past years, it is easier to form relationships with your students during online classes.

TABLE 3 ANOVA.

Model <sup>a</sup>		Sum of squares	df	Mean square	F	Sig.
1	Regression	1.883	1	1.883	3.310	0.071 <sup>b</sup>
	Residual	75.072	132	0.569		
	Total	76.955	133			

<sup>a</sup>Dependent Variable: Are you satisfied with the online teaching model? <sup>b</sup>Predictors: (Constant) Compared to past years, it is easier to form relationships with your students during online classes.

The value of R<sup>2</sup> in the regression Table 3 helps to determine the degree of relation between the considered predictor and dependent variables. The value of R<sup>2</sup> is multiplied by 100 to evaluate the degree of correlation between the considered variables. The value of R<sup>2</sup> is 54%, which is the probability of the predictor variable contributing to the outcome of the dependent variable, that is, ease in sustaining a relationship with the student through online teaching practice.

Table 4 presents the significance and dependency of the considered parameters. The significance value is <0.05. Since the values of the significant variables in Table 4 are less than the p-value, the model is said to be significant. In addition, since the beta value of the parameter representing the ease of sustaining relationships with the students through online teaching practice is 2.299, its dependency on the dependent variable is said to be high.

### 3.1.2 Descriptive statistics

The ultimate purpose of descriptive statistics is to summarize the data fetched by the researcher. The results of the descriptive analysis aid in understanding the perceptions shared by the respondents. Here, the descriptive statistics have considered

variables representing the teachers' ability to concentrate on students' academic growth and social wellbeing, the need for the entire day during the online mode of education, and clear communication with the school leaders regarding the online mode of teaching.

The results of the descriptive statistics are presented in Table 5. The highest mean value of the parameter representing the communication of the school leadership is 2.40. This value indicates the positive perception of the teachers who participated in the survey. Most teachers agree that communication with the school authorities was clear about the online teaching model. The next highest mean value of the parameter representing the ability of the teachers to concentrate equally on students' growth and social wellbeing is 3.83, which illustrates the negative opinion of the respondents. Following the parameter representing the requirement of the additional day while teaching online has the next highest mean value of 3.50. This value also illustrates the teachers' negative perception of online teaching practice. The overall results of the descriptive statistics demonstrate that teachers found it hard to adapt to the online teaching mode during the COVID-19 pandemic.

### 3.1.3 Correlation analysis

Correlation analysis is a statistical method used to estimate the strength of the correlation between the considered parameters or variables. These correlations are calculated using the Pearson correlation coefficient. In this case, variables represent teachers' satisfaction regarding the frequency of communication with the school authorities, confidence in providing efficient instructions during the online mode of education, and satisfaction regarding the online mode of teaching. The outcomes of bivariate correlation analysis are listed in Table 6.

The results observed in the correlation analysis are listed in Table 6. Correlation analysis was performed to determine the correlation between the considered parameters. Pearson coefficient value depicts the correlation between the variables. Parameters with similar coefficient values are said to be directly proportional to each other. From the results, the Pearson coefficient value of the parameter represents the satisfaction level of the teachers based on their communication with school authorities during the COVID-19 pandemic, and their satisfaction level with the online teaching practice is 0.102. This indicates that whenever teachers are highly satisfied and clear about the communication with school authorities, their satisfaction with the online teaching practice is also high. The Pearson coefficient of the parameters representing

TABLE 4 Coefficients.<sup>a</sup>

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	2.299	0.286		8.026	0.000
	Compared to past years, it is easier to form relationships with your students during online classes	0.133	0.073	0.156	1.819	0.031

<sup>a</sup>Dependent Variable: Are you satisfied with the online teaching model?

the satisfaction of teachers regarding the communication with school authorities and the parameter representing the teachers' confidence in providing instruction through online teaching practice is 0.204. This value indicates that teachers' confidence in proffering online instructions is influenced by satisfactory communication with school authorities.

### 3.1.4 Cross tabulation

Cross tabulation is a beneficial tool employed to estimate the outcomes of one variable with another. In this study, a tabulation analysis was performed to compare the outcomes of the teachers' confidence regarding effective instruction sharing in online education and relationship building with students.

Table 7 provides the results of the cross-tabulation, the responses representing the negative perception of the respondents (teachers) regarding their confidence in delivering useful information during the online learning system, and sustaining the relationship with the students during online teaching practice. This is affirmed by a value of 61 corresponding negative responses (disagree) fetched from the respondents.

## 3.2 Qualitative approach

The qualitative data were fetched through an in-depth telephonic interview with 25 participants. Table 8 lists the themes that were observed when the interview was recorded. The data were extracted from the response, which is more effective. The raw data revealed that most of the respondents wanted more than the mechanism of online education practice during the pandemic. Further, they faced various hurdles such as managing the students, lack of interaction with students, and lack of network facilities.

## 3.3 Influence of COVID-19 on the teaching process at the primary level of education

According to respondents 2, 16, and 19, the in-person education system led to confidence and mental satisfaction while teaching. However, teachers might not get an adequate range of class hours for teaching. Due to this, they followed a regular timetable that is tracked in offline classes. Students shared their concerns about fatigue, eye strain, and poor connectivity with teachers. Also, teachers faced various network issues. If some students did not have

a home phone (or) network connectivity, it was extremely difficult for the teachers to share or instruct them in an online session.

## 3.4 Adaptations of online education by the teachers

From the responses coded from respondents 13 and 20, COVID-19 resulted in a significant transformation in the teaching process as the physical actions were transformed into virtual actions. The class preparation methods changed. Now, the teachers were learning more technical skills for presenting the class concepts. Before COVID-19, they were focused more on the lecturing concepts, but now they had to spend more time preparing videos, presentations, online exercises, and quizzes to engage students. This transformation was hectic for teachers with poor technical skills. Due to this, teachers were stressed, and their responsibilities also increased. Some teachers found that the students were more skilled, and they made fun of teachers with less technical skills, affecting their confidence level. Therefore, most teachers said they required adequate technical tools and training for better adaptation to the online education system.

## 3.5 Institutional support for online education

The responses derived from respondents 11, 12, and 19 indicated that the schools offered various workshops, capacity building, and online training programs for teachers, which supported them in enhancing their technical skills and motivated them to utilize the online platforms efficiently. Most of the teachers were satisfied with the assistance they received from the government and their educational institutions. The teachers said they were assisted by their headmaster, PTA, colleagues, and school administration in dealing with the online classes.

Respondents 6 and 12 talked about the VICTERS channel and the *Samagra* resource portal, which provides online teaching platforms. "First Bell" was offered to government and government-aided schools. It had an online classroom for students and teachers. For teachers, the *Samagra* resource portal was used for self-learning, and teachers could watch various digital content and take efficient classes.

TABLE 5 Descriptive statistics.

		N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Minimum	Maximum
						Lower bound	Upper bound		
Are you able to concentrate equally on the student's academic growth as well as social-emotional wellbeing?	Agree	15	3.07	1.100	0.284	2.46	3.68	2	5
	Neither disagree nor agree	13	3.23	1.013	0.281	2.62	3.84	2	4
	Disagree	94	3.56	0.911	0.094	3.38	3.75	1	5
	Strongly disagree	12	3.83	1.030	0.297	3.18	4.49	2	5
	Total	134	3.50	0.964	0.083	3.34	3.66	1	5
Do you agree that almost an entire extra day is required while teaching from home?	Agree	15	3.33	0.900	0.232	2.84	3.83	2	4
	Neither disagree nor agree	13	2.62	1.193	0.331	1.89	3.34	1	4
	Disagree	94	3.09	1.084	0.112	2.86	3.31	1	4
	Strongly disagree	12	3.50	0.905	0.261	2.93	4.07	2	4
	Total	134	3.10	1.071	0.093	2.92	3.29	1	4
The communication from school authorities was so clear about the school's online learning model.	Agree	15	2.40	0.910	0.235	1.90	2.90	1	3
	Neither disagree nor agree	13	2.08	0.954	0.265	1.50	2.65	1	3
	Disagree	92	1.91	0.991	0.103	1.71	2.12	1	4
	Strongly disagree	12	1.92	0.996	0.288	1.28	2.55	1	4
	Total	132	1.98	0.981	0.085	1.82	2.15	1	4

### 3.6 Lessons Learned from the pandemic

In the telephonic interviews, most teachers stated that their students' learning ability was reduced due to technical challenges, network bandwidth issues, and reduced interaction with students; some students did not attend online classes. With these struggles, the teachers were improving their teaching methodology to enhance students' learning ability and ensure the effectiveness of online sessions. Most of them shared that enhancing students' learning outcomes was extremely difficult. Moreover, it required more effort and extra time to prepare lectures. Yet, the results were not equivalent to their efforts. During the pandemic, each teacher

experienced a distinct situation. They faced various constraints. Regardless, most of them accepted that technology was something that every teacher should be aware of.

The overall results observed from the quantitative results were similar to the qualitative results. Teachers need help adapting to the online teaching mode introduced during the COVID-19 pandemic. Consequently, it can be disclosed that there is a slightly negative impact of the pandemic on the online teaching model. The adaptation level of teachers during online education was reported to be hard, which in turn induced stress in their work environment. However, teachers reported that they were adequately assisted by their headmaster, PTA, colleagues, and school administration,

TABLE 6 Correlation analysis.

		Are you satisfied with the frequency of communication from school leadership during the pandemic period?	Are you confident you can provide effective instruction in the online learning model?	Are you satisfied with the online teaching model?
Are you satisfied with the frequency of communication from school authorities during the pandemic period?	Pearson Correlation	1	0.204	0.102
	Sig. (2-tailed)		0.034	0.048
	N	134	134	134
Are you confident you can provide effective instruction in the online learning model?	Pearson Correlation	0.204	1	0.103
	Sig. (2-tailed)	0.034		0.023
	N	134	134	134
Are you satisfied with the online teaching model?	Pearson Correlation	0.102	0.103	1
	Sig. (2-tailed)	0.048	0.023	
	N	134	134	134

TABLE 7 Cross-tabulation.

Are you confident you can provide effective instruction in the online learning model? * Compared to past years, it is easier to form relationships with your students during online classes							
Count							
		Compared to past years, forming relationships with your students during online classes is easier.					Total
		Strongly agree	Agree	Neither disagree nor agree	Disagree	Strongly disagree	
Are you confident you can provide effective instruction in the online learning model?	Agree	0	3	0	10	2	15
	Neither disagree nor agree	0	1	2	7	3	13
	Disagree	1	13	5	61	14	94
	Strongly disagree	0	0	4	4	4	12
Total		1	17	11	82	23	134

which provided a clear idea regarding the online teaching model. Furthermore, they acknowledged that technology is a crucial entity that every teacher should learn and adapt to sustain online education during situations such as the pandemic. Hence, the results obtained in the present research meet the objectives framed. The outcomes also clearly explain the situation that every teacher was subjected to during COVID-19.

In the future, if online education is a possibility, educational administrators should be cautious enough to make necessary arrangements, and related training and resources should be allocated. Teachers should be educated on how to use technology to provide uninterrupted teaching services.

## 4 Discussion

The present research used a mixed-research methodology to collect qualitative and quantitative data. The data collected from respondents were analyzed using SPSS, and the study's inference was drawn. The findings of the quantitative study illustrate that the COVID-19 pandemic negatively impacted the online teaching method; teachers' adaptation to new technology appears to be low. In contrast, communication with school authorities provided a clear view of online teaching methods. The outcome of the qualitative study illustrates that adapting to the online education system is complex owing to various struggles. Some institutions



TABLE 8 Thematic Analysis according to the codes generated from the in-depth telephonic interviews.

Theme	Response
Influence of COVID-19 on the teaching process at the primary level of education.	COVID-19 has considerably affected my teaching mechanism. The class that I take has turned out to be monotonous. I need to find out if my students are attending the classes. Interactions with the students have also decreased. If I ask them to turn on the video to check them, they reply by complaining about the internet speed and range. They have a huge list of problems to share regarding technical issues. Thus, now interactions and intimacy with the students have considerably decreased. (6th Respondent) It was a tough time for me to adjust to the online class. It remains to be the same. While attending the classes before the COVID-19 pandemic period, I get a sense of satisfaction by interacting with my students and checking if they are paying attention to my class. However, in the present situation, the absenteeism factor has considerably increased. I can only focus on some students simultaneously. In the online class, I do not feel comfortable teaching. Because students of the present generation have changed a lot, their behavior and attitude have considerably changed. Due to all these reasons, I do not feel comfortable conducting online classes. (19th Respondent) The greatest challenge I faced during the online class was the network issue. This is because some students need smartphones or mobile at home, and they find it hard to join online classes. In addition, they do not have access to WhatsApp, so I find it challenging to conduct online classes. (2nd Respondent)
Adaptations of online education by the teachers	The teaching mechanism has considerably changed. Before the pandemic situation, I was teaching in a classroom using the blackboards, interacting with the students conducting tests for monthly exams, and training students for annual exams. After the pandemic, we are informed to use different online platforms, using PowerPoint presentations for teaching using Google Meet, Zoom software, etc. We use the PowerPoint presentation to conduct classes. Now the interaction with the children has been completely reduced. I am curious to know if my students are listening to my class. (13th Respondent)
Institutional support for online education. Respondents' thoughts on the VICTERS channel and the Samagra resource portal.	At the commencement of the pandemic lockdown, many workshops and training programs were conducted for teachers to enhance their teaching skills. The Government and our corresponding schools provided coaching within 8 days to assist us in conducting online classes. (19th Respondent) The support offered by the government has been named the VICTERS, which is an educational channel. We can take classes for primary and high school portions through this channel. Through this, we can do many homework for the students and forward them through WhatsApp messages. This greatly helped us to learn and review the teaching portion. (12th Respondent) Parents have always supported us throughout this pandemic, as they know how hard it is for us to take online classes. So they keep contacting us at all costs. (6th Respondent)
Lessons learned from the pandemic.	The results regarding the learning process are completely low. This is because of the need for more interest and network issues. So as a teacher, I only have very little satisfaction compared to the classes conducted offline. Also, we cannot concentrate on all the students simultaneously, and we do not know if every student listens to the classes. (22nd Respondent) Learning outcomes are very low when compared to offline classes. This is mainly due to technical glitches while conducting online classes. Also, I observe a need for more motivation, isolation, and a learning schedule among the students, and I cannot assess all the students simultaneously. (19th Respondent)

facilitated training sessions to teach in various ways, making it easier to adopt the online education system.

Mohialdeen et al. (2022) explored the factors that impact primary school parents' choice of online education and the mechanism of these aspects over the choice intention. They found that the learning attitude and online learning continuity development risks were two new variables affecting parents' cognition of online education. Likewise, the results from the current study illustrated that COVID-19 negatively impacted the online teaching method, and teachers' adaptation here seems low.

Similarly, Videla et al. (2022) demonstrated the relationship between the teacher's technical knowledge level, the years of experience, and the type of teaching strategies that were utilized. The current study's findings also established that the low level of technical awareness among teachers impacted their adoption of online teaching methods.

Almonacid-Fierro et al. (2021) investigated the pedagogical teaching practices utilized and implemented by Chilean physical education teachers during COVID-19. Their study showed that confinement impacted the quality of students' and teachers' lives. This study's findings also found that teachers needed help adapting to the online teaching mode implemented during the pandemic. Therefore, it can be surmised that there is a slightly negative impact of COVID-19 on the online teaching model. The adaptation level of teachers during online education was reported to be hard, which in turn induced stress in their work environment.

## 5 Limitations of the study

Every study has its limitations, and so does the present study. The present study aimed to collect a part of the data

through a qualitative method, and the data collection process was undertaken by conducting telephonic interviews with selected teachers because of the lockdown constraints of COVID-19. Because of this, the present study could not observe or record the nonverbal communication responses expressed by the respondents. Regarding the quantitative research technique, the study's sample size is small, with 175 respondents. In addition, the study focused only on teachers from the state of Kerala. Thus, the research is geographically restricted. However, the focus that was provided to trace the impact of COVID-19 on teachers is a unique attempt made by the present study.

## 6 Conclusion and implication

### 6.1 Theoretical implications

The COVID-19 pandemic played a huge role in redefining the twenty-first-century world. Specifically, in the field of education, the common traditional way of learning has transformed into an online or virtual classroom. Teachers who were comprehensively responsible for taking the online classes faced hurdles in terms of adaption and management. They were expected to multitask because of many other constraints. To investigate the impact of COVID-19 on the online teaching model, the present study employed a mixed method, both qualitative and quantitative research. The data for the qualitative research was collected through telephonic interviews with 25 school teachers. The results of both qualitative and quantitative research methodologies suggest a negative impact of COVID-19 on the teaching and learning process. The study also established that teachers found it hard to adapt to the online teaching model due to several reasons, such as

internet bandwidth and difficulty sustaining relationships with the students. It has also been observed that proper communication and support from the school authorities will help teachers in delivering proper education through an online teaching model. Educational institutes could implement various models, such as the Kaizen model for online teaching activity, which could improve the online learning process. The innovative online teaching model could enhance the educational progress of the students. The adaptation level of teachers during online education was reported to be hard, which in turn induced stress in their work environment. Thus, it is recommended that the headmaster, PTA, colleagues, and school administration provide a clear idea regarding the online teaching model. Furthermore, technology is a crucial entity that every teacher should learn and adapt to sustain online education during situations such as the pandemic.

## 6.2 Practical implications

The government must develop accessible and affordable national online learning apps (or) tools that meet certain subjects' lab requirements. India needs to design policies that provide open-source, free courses that are secure and user-friendly for teachers and students. Advanced network connectivity in rural areas must be ensured to prevent network-related challenges during virtual classes. Moreover, education administrators must be made aware of the necessary methods to implement the online education model. The management must provide appropriate training and resources for the teachers to use the online learning model effectively. Teachers should also be educated in the use of technologies for uninterrupted teaching services, which will facilitate their ability to adapt to online education, thereby addressing the stress induced due their struggle to adapt.

## 7 Suggestions for future research

Future investigators should formulate the study in such a way that it addresses the limitations of the present study. In addition, future research should focus on considering the students' perceptions regarding the online education system for higher secondary schools and gather the parents' opinions of primary school students.

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## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Ethics statement

Ethical approval was not required for the study involving human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was not required from the participants in accordance with the national legislation and the institutional requirements.

## Author contributions

SV: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft. PR: Conceptualization, Data curation, Formal analysis, Methodology, Supervision, Validation, Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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