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Understanding Teachers' Experiences of the Effects and Outcomes of COVID-19 on the Quality of Education in Elementary Schools

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A B S T R A C T

Purpose: The COVID-19 pandemic has had significant effects and outcomes on primary education. Therefore, the aim of this study was to understand teachers' experiences of the effects and outcomes of COVID-19 on the quality of education in elementary schools.

Methodology: This qualitative study was phenomenological in nature. The research population consisted of elementary school teachers in Zanjan County, from which 24 were selected as samples through purposive sampling based on the principle of theoretical saturation. The samples were subjected to semi-structured interviews, the validity of which was confirmed through triangulation and the reliability was calculated as 0.88 using the intercoder agreement coefficient. Data analysis of the present study was conducted using thematic analysis in MAXQDA software.

Findings: The results of this study indicated that understanding teachers' experiences of the effects and outcomes of COVID-19 on the quality of education in elementary schools consisted of 14 sub-themes under 2 main themes. The main theme of the virtualization of education included 9 sub-themes: deficiencies in facilities and infrastructure, lack of information and experience among teachers, decreased quality of learning, increased stress among families, behavioral and psychological problems of students, health and physical problems of students, economic problems, educational gaps, and the organization of psychological strengthening courses. The main theme of developing new policies and strategies in education and teaching included 5 sub-themes: a new approach to modern education, new policies in school development, new strategies in teacher training, new work procedures and goals, and the integration of technology in the workplace and life.

Conclusion: According to the results of this study, it was determined that COVID-19 opened a new window for the education system to adjust and change educational policies and develop the necessary infrastructure to improve the quality of education.

Keywords: *COVID-19, quality of education, educational gap, elementary school.*

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1. Introduction

The widespread outbreak of COVID-19 induced significant changes in the educational systems of various countries, affecting a large number of students and causing the closure of their schools and universities, which in turn increased the difficulties faced by them, their families, and teachers. Some learners lost access to their classes, while others shifted to online learning, often encountering problems related to internet access and issues concerning psychological well-being and motivation. As of April 27, 2020, the school closures impacted nearly 1.725 billion students. According to a report by UNICEF, 186 countries implemented national closures, affecting approximately 98.5% of the world's student population (UNESCO, 2020). School closures not only affected teachers, students, and families but also had extensive economic and social costs, revealing numerous social and economic issues such as homelessness, challenges in digital learning, economic hardships, food insecurity, healthcare access, childcare services, housing, services for individuals with disabilities, and internet services. Moreover, the COVID-19 pandemic conditions were particularly severe for vulnerable families and those unable to work, harming the learning environment, nutrition, and childcare (Owusu-Fordjour et al., 2020). Additionally, the pandemic significantly impacted students' academic, social, professional, and emotional lives, with educational adjustments including shifts to online lectures and learning, library closures, changes in communication with teachers and administrative staff, new assessment methods, and increased coursework (Kamarianos et al., 2020). The effectiveness of online learning depends on the designed materials, instructor engagement in the online environment, and the interaction between the lecturer and students or among students themselves (Bao, 2020). When studying online from home, students should have the opportunity to ask questions and expect timely responses. For instance, students reported finding it harder to maintain concentration during online teaching compared to in-person classes and experienced poorer academic performance. Moreover, about 80% of students from countries like Germany (76%), Portugal (77%), Malaysia (78%), and Mexico (73%) reported a significant increase in the volume of homework in their online classes. These findings provide insights for teachers regarding the state of online classes from the students' perspective, emphasizing the need to address the requirements of online teaching (Aristovnik et al., 2020).

It is also important to note that the sudden shift from face-to-face to online educational activities due to the COVID-19 pandemic resulted in the emergence of three educational gaps: 1) the access gap (availability or lack of internet connection and technology), 2) the usage gap (time spent and quality of use), and 3) the teacher skill gap (Hodges et al., 2020). Therefore, teachers' familiarity with information and communication technologies is crucial as these technologies are effective in completing tasks, holding work meetings, and providing virtual care. For example, all forms of telephone conferencing and video calling tools, such as WhatsApp, help those in quarantine stay in touch with their family members and conduct work meetings simultaneously (Li et al., 2020). Given the significant impact of COVID-19 on various aspects of people's lives, including education, the lack of both international research and particularly domestic studies to guide educational planning during this period will be associated with numerous damages and losses, as education itself serves as a psychological and social support that promotes overall well-being during disasters and calamities. Psychosocial care based on education for different age groups can help them gain skills and act appropriately during the COVID-19 pandemic. Indeed, education is a key pioneer of the society's psychosocial well-being, and teachers and professors, as primary elements of education in society, have a significant impact on individuals and communities (Upoalkpajor & Upoalkpajor, 2020).

Abolmaali Alhosseini (2020) in his review research on the psychological and educational consequences of the coronavirus disease in students showed that students have experienced psychological problems such as anxiety, depression, post-traumatic stress disorder, stress, frustration, fear, anger, loneliness, and boredom on an individual level due to the disease and quarantine. Interpersonally, they faced issues like difficulties in communicating with family members, limited interaction with friends and teachers, insufficient social support, and reduced family income, and educationally, they encountered problems such as weak cognitive and social presence in online learning processes, increased cognitive load, lack of motivation, time management issues, and concerns about evaluation (Abolmaali Alhosseini, 2020). Mohammadi et al. (2020) in their study aimed at exploring the experiences of parents of primary school students regarding the challenges of virtual education through social networks during the coronavirus outbreak, classified the advantages and disadvantages of virtual education in social networks into five categories: educational (advantages: preventing academic delay and

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creating opportunities for creativity; disadvantages: reluctance to do class assignments and reduced adherence to classroom discipline and order), social (advantages: students' autonomy and increased parental supervision; disadvantages: elimination of group activities and students' laziness and distractibility), cultural (advantages: introduction of virtual education to the education system and creating a new experience; disadvantages: loss of teacher charisma and some parents' fatigue and boredom), economic (advantages: reduced commuting costs and time savings on commutes; disadvantages: time investment for supplementary education and the cost of necessary hardware), and technical (advantages: enhancement of parents' media literacy; disadvantages: lack of visual appeal in videos and lack of proficiency in information technology). Owusu-Fordjour et al. (2020) in a study on the impact of the COVID-19 pandemic on education in Ghana showed that some students are unable to study effectively at home during school closures due to the outbreak and that the online learning system has been ineffective. Parents were also unable to assist with accessing online education platforms and could not fully supervise their children's learning at home (Mohammadi et al., 2020). Upoalkpajor and Upoalkpajor (2020) in their qualitative study on 100 teachers and high school students showed that the COVID-19 pandemic had a significant impact on education in Ghana, with schools seeking research and resources to rebuild the damages in education caused by the pandemic (Upoalkpajor & Upoalkpajor, 2020).

In the educational system due to the COVID-19 pandemic, it is necessary to examine the changes that have occurred in order to mitigate the negative consequences and take advantage of the opportunities and positive outcomes. The COVID-19 disease has left significant effects and outcomes on primary education. Therefore, the aim of this study was to understand teachers' experiences of the effects and outcomes of COVID-19 on the quality of education in elementary schools. Thus, this research seeks to answer the question: What are the effects and outcomes of COVID-19 on the primary education system in Zanjan counties?

2. Methods and Materials

2.1. Study Design and Participants

This qualitative study was of the phenomenological type. In other words, given the nature of the study topic, the present research approach is qualitative and phenomenological, aimed at descriptive analysis and understanding individuals' experiences of phenomena they have encountered in their professional or personal lives. In a qualitative approach, the researcher attempts to understand human phenomena and examine the meaning that individuals attribute to the experiences they undergo. The researcher's goal in conducting a phenomenological research design is to study and understand people's perceptions of their work world (van Manen, 2017). The research population consisted of elementary school teachers in Zanjan County, from which 24 were selected as samples through purposive sampling based on the principle of theoretical saturation. Sampling continued until the research reached saturation, and no new sample could add any findings to the previous ones. In purposive sampling, samples are selected based on criteria and standards, which in this study, the entry criterion for the interviews was having at least 4 years of teaching experience in the education system in general and at least one year of teaching during the COVID-19 pandemic specifically.

The research process was as follows: initially, with the help of professors and existing theoretical foundations, questions for interviewing the experts were designed. The next step involved identifying samples based on criteria and standards, followed by arranging the necessary coordination with them for the interviews. The interviews were conducted individually, and after each interview, they were analyzed, and this process continued until new samples could not add new findings to the previous ones. In other words, the sampling and interviewing process continued until the research reached saturation. Finally, after each interview, the interviewees were appreciated for their participation in the research.

2.2. Data Collection

Samples were subjected to semi-structured interviews. On average, the duration of the interview with each respondent was 70 minutes, and the interviews were recorded with the permission of the interviewees, then the data were analyzed using content analysis method. In this study, validity was confirmed through triangulation, and reliability was calculated as 0.88 using the intercoder agreement method. Also, the research's validity was confirmed by reviewing educational sciences professors and participants. In the review conducted by professors, data collection, analysis, and discussion were reviewed, and in the review conducted by the interviewees, the interview texts, codings, themes, and findings were provided to them,

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and they were asked to apply any corrections or changes, with the majority expressing satisfactory consensus on the work process.

2.3. Data Analysis

In this study, the data derived from the semi-structured interviews of the present research were analyzed using thematic analysis in MAXQDA software.

3. Findings and Results

This study conducted interviews with 24 individuals. The frequency and percentage frequency of gender and education of the interviewees in this study are presented in Table 1.

Table 1

Demographic Information of Academic and Organizational Experts

Variable	Level	Frequency	Percentage of Frequency
Gender	Male	13	54.17%
	Female	11	45.83%
Education	Bachelor's Degree	7	29.17%
	Above Bachelor's Degree	17	70.83%

According to the current research results, 54.17% were male and 45.83% were female, and the education level of 29.17% was Bachelor's, and 70.83% was above Bachelor's.

Themes of understanding teachers' experiences of the effects and outcomes of COVID-19 on the quality of education in primary schools are presented in Table 2.

Table 2

Themes of Teachers' Experiences of the Effects and Outcomes of COVID-19 on the Quality of Education in Elementary Schools

Main Theme	Sub-theme
Virtualization of Education	Deficiencies in facilities and infrastructure
	Lack of information and experience among teachers
	Decreased quality of learning
	Increased stress among families
	Behavioral and psychological problems of students
	Health and physical problems of students
	Economic problems
	Educational gap
	Organization of psychological strengthening courses
Development of New Policies and Strategies in Education and Teaching	New perspective on modern education
	New policies in school development
	New strategies in teacher training
	New work procedures and goals
	Integration of technology in the workplace and life

According to the results of the current study, understanding teachers' experiences of the effects and outcomes of COVID-19 on the quality of education in elementary schools consisted of 14 sub-themes in 2 main themes. The main theme of the virtualization of education included 9 sub-themes: deficiencies in facilities and infrastructure, lack of information and experience among teachers, decreased quality of learning, increased stress among families, behavioral and psychological problems of students, health and physical problems of students, economic problems, educational gap, and the organization of psychological strengthening courses. The main theme of developing new policies and strategies in the field of education and teaching included 5 sub-themes: a new perspective on modern education, new policies in school development, new strategies in teacher training, new work procedures and goals, and the integration of technology in the workplace and life. Thus, the themes of understanding teachers' experiences of the effects and outcomes of COVID-19 on the quality of education in primary schools were presented in Figure 1.

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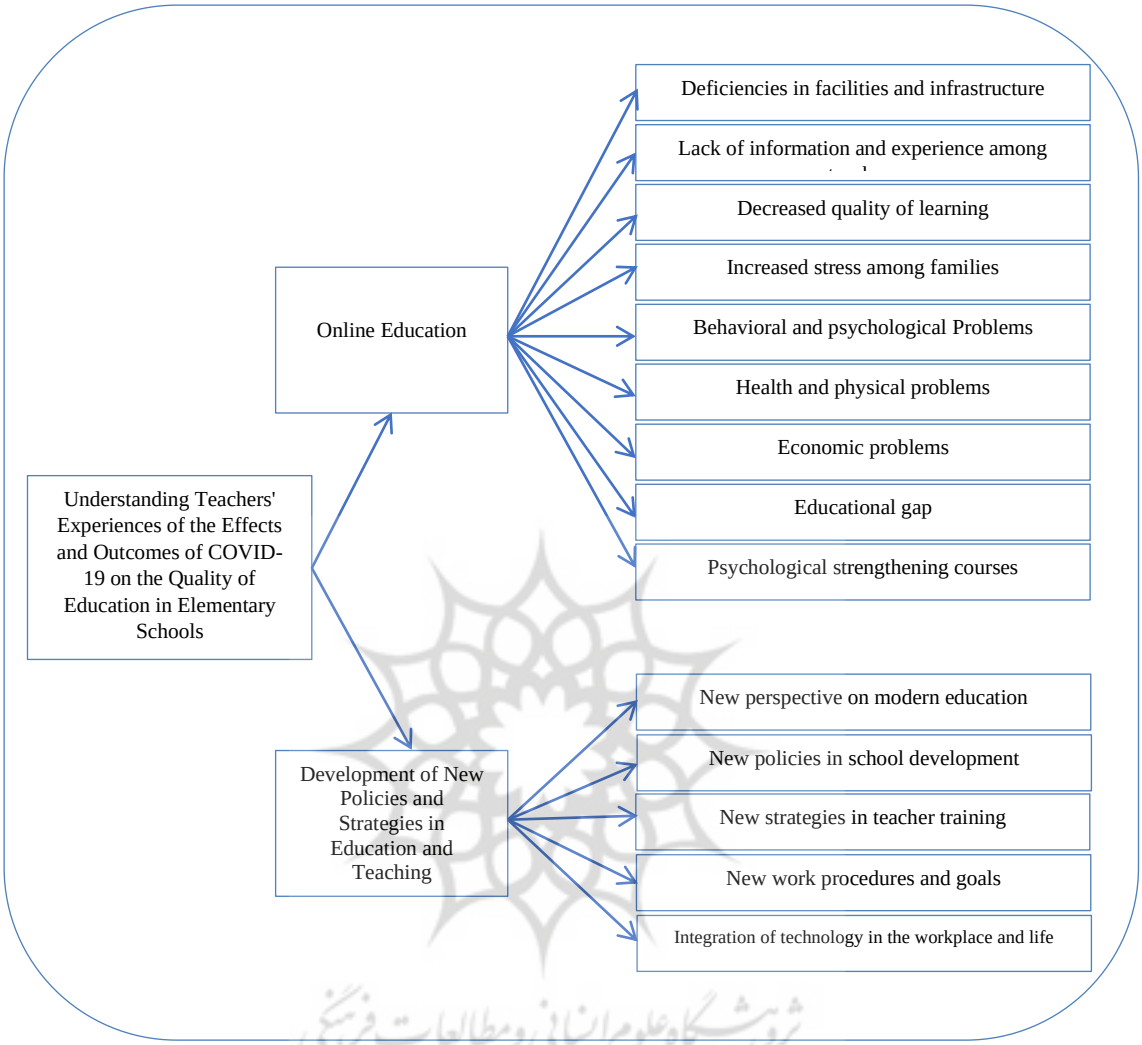
Figure 1

The Model of Virtual Education with Respect to Educational Equity Using a Phenomenological Approach in Golestan Province Schools



4. Discussion and Conclusion

The aim of this study was to understand teachers' experiences of the effects and outcomes of COVID-19 on the quality of education in primary schools. Findings from semi-structured interviews with experts revealed that teachers' understanding of the impacts and outcomes of COVID-19 on the quality of education at the primary level comprised 14 sub-themes under 2 main themes. The primary theme of the virtualization of education included 9 sub-themes: deficiencies in facilities and infrastructure, lack of information and experience among teachers, decreased quality of learning, increased stress among families, behavioral and psychological problems of students, health and physical problems of students, economic problems, educational gaps, and the organization of psychological strengthening courses. The primary theme of developing new policies and strategies in the field of education and teaching included 5 sub-themes: a new approach to modern education, new policies in school development, new strategies in teacher training, new work procedures and goals, and the integration of technology in the workplace and life. These findings were in line several studies (Abolmaali Alhosseini, 2020; Mohammadi et al., 2020; Owusu-Fordjour et al., 2020; Upoalkpajor & Upoalkpajor, 2020).

In elaborating on the sub-theme of deficiencies in facilities and infrastructure, it could be said that Budi et al. (2020) demonstrated that out of 142 respondents, 10% lacked a laptop or personal computer, 16% had no internet

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access, and 49% could not participate in classes due to unstable internet access (Budi et al., 2020). Asanov et al. (2021) reported that only 59% of students in Ecuador had access to the internet and a computer or tablet (Asanov et al., 2021). Ramos-Huenteo et al. (2020) in their study showed that the current educational teaching-learning process requires internet access and other technical resources, which are only available to a specific group of students (Ramos-Huenteo et al., 2020). It seems that schools faced a lack of infrastructure and should strive to provide it to take advantage of online education benefits. Regarding this finding, due to the cultural reluctance to adopt new technologies in Iran, there was no active engagement with technology, and thus, the necessary infrastructure was not pre-established. This situation led to an abrupt encounter with virtual education without prior training and infrastructure planning, inflicting numerous damages on the educational and learning system.

In elaborating on the sub-theme of the lack of information and experience among teachers, it can be said that in the same vein, Inga-Paida et al. (2020) mentioned the inadequate knowledge of teaching staff in the field of information and communication technologies as one of the negative factors in the field of education during the pandemic (Inga-Paida et al., 2020). Additionally, Sevilla Santo, Martin Pavon, and Jenaro Rio (2018) stated that older teachers, having more traditional perceptions of education, are less able to adapt to the new educational demands of the pandemic era (Sevilla Santo et al., 2018). Also, the educational level at which teachers teach influences their attitudes towards the situation and how they address the specific needs of students (with special educational needs). The reluctance to adopt technology and the lack of teacher training for applying new methods of distance education led teachers to enter this type of education without sufficient information. The Ministry of Education did not provide specific information or facilities for teachers, and mostly information regarding software and educational tools was obtained through internet searches or sharing among colleagues, which also required validation.

In elaborating on the sub-theme of decreased quality of learning, a survey by Singh et al. (2020) showed that of 192 students, 43.9% reported that online lectures during the pandemic were of lower quality compared to in-person classes (Singh et al., 2020). Morgan et al. (2022) in a qualitative study showed that distance education has become associated with decreased learning quality and a lack of sense of belonging to the university among students. Online learning also deprives some students of the valuable experience of collaborative learning and the school lifestyle (Morgan et al., 2022). Engzell, Frey, and Verhagen (2021) also assessed whether school closures due to COVID-19 had an impact on the performance of primary schools. Their findings, consistent with the current study, showed a learning loss equivalent to a fifth of a school year. This loss was greater among students from less literate families (Engzell et al., 2021). Regarding this finding, it should be noted that the lack of teacher proficiency in using distance learning methods and the lack of training for teachers and students in this regard led to an initial resistance to distance education, and this negative mindset towards this imposed phenomenon also resulted in students' rejection of the education provided in this manner.

In elaborating on the sub-theme of increased stress among families, research has shown that providing shelter, food, healthcare, and social welfare, all parts of what children, adolescents, and their parents or guardians rely on schools for, hence with school closures, the burden of these responsibilities will fall on families (Wolfson & Leung, 2020). Karasel Ayda et al. (2020) stated that families' level of knowledge about online education applications was insufficient and could lead to a decrease in families' participation in online education (Karasel Ayda et al., 2020). Additionally, Timmons et al. (2021) showed that from parents' perspective, remote learning was time-consuming, and they realized that they need to pay attention to their children's needs in online learning. They were also concerned about the quality of teaching. Lack of interaction with classmates and friends, decreased physical activity among students, emergence of unpleasant thoughts about staying at home, fear of illness and death, academic problems, emergence of tension between family members, domestic violence, and various other psychological harms are among the consequences of COVID-19 in families that establishing supportive bases in the family, intimate exchange and communication with close family members, relatives, and friends, and proper information dissemination about the pandemic can somewhat mitigate this issue (Timmons et al., 2021).

In elaborating on the sub-theme of behavioral and psychological problems among students, in a survey, 34.71% of parents reported the emergence of behavioral problems in their children and attributed it to virtual education (Bobo et al., 2020). There is preliminary evidence suggesting that children aged 6 to 18 experienced a significant increase in "clinginess, irritability, and fear" during school closures in the pandemic (Singh, Roy, Sinha,

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Parveen, Sharma, and Joshi, 2020). There is also evidence that the economic instability caused during this period leads to an increase in depression and anxiety (Fegert et al., 2020). The increase in children's anxiety and depression during the coronavirus era is one of the psychological problems associated with the outbreak. Unlike primary schools, there are relatively more studies that have directly examined the psychosocial well-being of high school students. In secondary schools, students experienced symptoms related to depression, anxiety, and stress, and some students even reported thoughts and attempts of suicide (Zhang et al., 2020). Certain groups of students (especially ethnic minorities, those from lower socio-economic statuses, and girls) were more prone to these psychological problems (Gazmararian et al., 2021). Regarding this finding, it should be said that for many children, school is where their social relationships are formed and where their early social development takes place. Many children have been forced to endure isolation and separation from their peers since the start of the pandemic, which could reduce their ability to socialize. In this context, Putri et al. (2020) showed that resorting to distance learning deprives students of interaction with peers and teachers, as well as their social life. According to studies, psychological symptoms of depression, stress, and anxiety increased by up to 30% among all individuals involved with the coronavirus outbreak (Putri et al., 2020). Therefore, to address the mental health of children and adolescents arising from issues during the coronavirus outbreak, child and adolescent psychologists should consider examining indicators affecting mental health and addressing mental health, especially during the coronavirus outbreak.

In elaborating on the sub-theme of health and physical problems of students, it can be said that research conducted by Ammar et al. (2020) showed that daily sitting time has increased from 5 hours to 8 hours a day, and due to quarantine conditions and staying at home, overeating and the number of meal occasions have significantly increased (Ammar et al., 2020). There is also growing evidence that diets high in sugar and fat can have a detrimental effect on cognition and learning (Yeomans, 2017). Most children are spending more time in front of televisions or other screens, and it is well known that increased use of these electronic devices is associated with poor sleep, sedentary habits, mental health issues, and physical problems (Nagata et al., 2020). Being confined at home during school closures has negatively impacted students' physical activity, eating habits, delays in sleep and wake times, and sleep quality (Genta et al., 2021). Regarding this finding, sedentary behavior, forced and sometimes improper nutrition during the COVID era, changes in exercise routines and attendance at gyms and schools, and the avoidance of walking due to fear of infection, etc., have led to physical problems such as obesity, highlighting the need for stakeholders to address the wrong habits that have formed.

In elaborating on the sub-themes of economic problems and educational gaps, studies have shown that the COVID-19 pandemic has increased the existing educational gap between students from different socio-economic groups and created disparities among children with different levels of learning and children with special educational needs (Nicolson et al., 2020). The lack of skills and necessary equipment for online learning was especially prevalent in families with several school-age children or in migrant families (Mupenzi et al., 2020). Additionally, children from families with better socio-economic status had more learning time compared to children from deprived families. Furthermore, psychological well-being is also affected by inequality, where students with parents who have a lower level of education experience less psychological well-being and more stress and academic problems (Bono et al., 2020). The outbreak of COVID-19 and the challenges of dominating the virtual space in education and the lack of access for all students to it, diminishing education and reducing the educational functions of schools, and the poverty of some families have caused the reproduction of educational inequality during the outbreak era, and this matter was much more pronounced for specific groups like exceptional children.

In elaborating on the sub-theme of conducting psychological strengthening courses, in this context, Truzoli, Pirola, and Conte (2021) showed that coping style, psychological resources, and self-efficacy of students were protective factors in their experience of online education. These researchers have emphasized the need for educational support and the provision of psychological services in crisis for teachers (Truzoli et al., 2021). It is also suggested that resilience and positive coping styles are protective against symptoms of depression, anxiety, and stress, especially for disadvantaged groups such as female students with poor academic performance, isolated children, low-income families, indigenous groups, people with disabilities, and other vulnerable groups (Asanov et al., 2021; Gazmararian et al., 2021). Bono et al. (2020) also stated that fostering generosity and gratitude among students can aid their psychological well-being and coping abilities (Bono et al.,

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2020). Liu, Liu, and Liu (2020) recommend governments and other stakeholders to implement guidelines for the prevention and control of mental health disorders among primary school students (Liu et al., 2020). Given the increase in psychological problems among students, teachers, and families during the COVID-19 pandemic, and for them to return to normal life after these issues, psychological strengthening courses can serve as an effective solution to help heal and improve their mental state. These courses could include training in psychological skills, stress and anxiety management techniques, methods for improving self-awareness, and enhancing family relationships among family members, etc., and help improve social relationships, increase self-confidence, reduce stress and anxiety, and improve their academic performance.

The main theme of developing new policies and strategies in the field of education and teaching included 5 sub-themes: a new perspective on modern education, new policies in school development, new strategies in teacher training, new work procedures and goals, and the integration of technology in the workplace and life.

In elaborating on the sub-theme of a new perspective on modern education, it can be said that Hernandez-Ortega and Alvarez-Herrero (2021) stated that during the COVID-19 pandemic, many weaknesses that the existing educational system had carried became apparent, and hence, the results obtained in various studies reflect attention to a new educational perspective (Hernández-Ortega & Álvarez-Herrero, 2021). Adedoyin and Soykan (2020) also expressed that the necessary shift towards online learning has been effective in opening new horizons in effective learning (Adedoyin & Soykan, 2023).

In elaborating on the sub-theme of new policies in school development, in this context, Inga-Paida et al. (2020) have listed concerns among the teaching staff about the insufficiency of existing technological management and also the lack of sufficient knowledge in this area (Inga-Paida et al., 2020). Thus, it has been stated that policymakers need to develop infrastructure and resources necessary to reduce inequalities (Timmons et al., 2021). At the national level, there is a need for strategic planning, budget allocation for improving communications, tax exemptions, and subsidies for IT-related costs (Bhandari, 2020).

In elaborating on the sub-theme of new strategies in teacher training, it can be said that the disadvantages and problems of online teaching experiences are primarily cited as the lack of teacher support, lack of information, and also the shortage of space or necessary equipment. Teachers have pointed out the difficulty in engaging students in learning and limitations in employing diverse teaching methods, choosing appropriate tools, and effective online teaching (Rasmitadila et al., 2020). Therefore, teachers should be given training to well-inform and prepare them for delivering online lectures. Furthermore, the use of innovative solutions in teaching, the willingness to learn from others, and experimenting with new tools are other necessities for teachers (Moorhouse, 2020). Pozo-Rico et al. (2020) examined whether a teacher training program as an intervention in primary education during COVID-19 has been beneficial for teachers. This study showed that teachers who underwent this program were better able to adapt to stress and information and communication technologies. It was also shown that intervention through teacher training could reduce their anxiety, doubt, fatigue, and adaptation to information and communication technologies (Pozo-Rico et al., 2020).

In elaborating on the sub-theme of new work procedures and goals, it can be said that these changes have also been reported in other countries. For example, Aristovnik et al. (2020), by examining 62 countries, showed that the pandemic period was associated with an increase in teachers' workload (Aristovnik et al., 2020). Moss et al. (2020), in the UK, showed that teachers' priorities during school closures shifted from teaching to supporting remote learning, health, and well-being of students. Teachers had concerns such as whether deprived families' students had enough food and could learn the materials without online access (Moss et al., 2020). The increase in teachers' workload and changes in the structure of educational courses (Carolan et al., 2020) and the use of diverse teaching methods and changes in student assessment (Putri et al., 2020) have also been reported.

In elaborating on the sub-theme of integrating technology in the workplace and life, it can be said that in this context, it has been shown that with the shift to online and remote education and learning, countries like Turkey have launched an educational TV channel to facilitate learning by offering free internet, live educational courses, review, and support (ÖZer, 2020). It appears that both in the workplace and in daily life, introducing digital technologies should be used to enhance learning and provide better education to students.

This study was conducted qualitatively on teachers in Zanjan County. The two main dimensions derived from the teachers' opinions emphasize the shift from in-person to virtual education and also the design and development of new educational policies. It can be concluded that in addition to the problems created by online and distance learning for

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schools, teachers, families, and students, the COVID-19 pandemic era opened a new window for the education system to adjust and change educational policies and develop the necessary infrastructure to improve the quality of education. Here, practical suggestions for educational systems post-COVID-19 based on experiences during the coronavirus era and the results of the present study are provided:

1. Reconceptualizing the participation of students and other stakeholders in education and training.
2. Developing flexible and adaptable educational systems that can respond to crises.
3. Building resilience should become a core part of planning and managing educational systems.
4. Providing training for teachers to use technology effectively.
5. Creating a blended model of education that combines online and in-person learning.
6. Focusing on the quality of work life and prioritizing the mental health and well-being of students, teachers, and families by the educational system.
7. Arranging support for students who have fallen behind in their education and learning due to the pandemic.
8. Increasing investment in education to familiarize with digital transformation, bridging the digital divide, and other inequalities.
9. Strengthening cooperation and partnerships between schools, families, communities, and industries.
10. Providing access to high-quality online resources and tools for all students.
11. Ensuring the inclusiveness and fairness of educational systems.
12. Creating professional development opportunities for teachers to improve their online teaching effectiveness.
13. Implementing virtual education full-time or part-time for practical experience.
14. Arranging online resources for education such as textbooks, videos, and interactive media to familiarize students with these types of resources.
15. Designing stronger online learning management systems.
16. Offering more opportunities for students to learn from their homes.
17. Ensuring that teachers are equipped with sufficient educational tools.
18. Creating ways for collaboration in virtual and distance education.
19. Resetting assessment standards to reflect new learning styles.
20. Providing more individualized learning opportunities for students.
21. Redesigning physical spaces such as classrooms to meet new learning needs including social distancing.
22. Designing new teaching methods that offer more opportunities for discussion and online exchange.
23. Developing literacy programs that explicitly teach digital literacy.
24. Engaging government, local authorities, and policymakers to support more funding for online resources and strengthening information technology infrastructure for education.
25. Striving to cultivate a culture of resilience, adaptability, and flexibility in students and teachers.
26. Investing in technologies and e-learning infrastructures to support remote learning.
27. Encouraging and developing student autonomy and self-regulated learning.
28. Enhancing digital literacy among teachers and students.
29. Designing and implementing student-centered learning approaches.
30. Emphasizing the use of gamification and game-based learning.
31. Designing and implementing asynchronous educational programs and courses that allow students to learn at their own pace.
32. Offering a wider range of online courses and programs.
33. Implementing strategies that enhance equality and access to distance learning.
34. Creating and supporting peer-to-peer social learning networks.

Authors' Contributions

This research was collaboratively conducted with the significant cooperation of all authors.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

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Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

In this study, there is no conflict of interest among the authors of the present research.

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Ethical Considerations

In this study, the authors endeavored to observe all ethical principles in research.

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