

Teacher Education During COVID-19 Pandemic: A Review of Literature During School Closures

Masooma Ali Al-Mutawah (Corresponding author)

Math, Science and ICT Department, Bahrain Teachers College

University of Bahrain, P.O. Box 33011, Sanad, Kingdom of Bahrain

Tel: 973-1743-8970 E-mail: malmutawah@uob.edu.bh

Received: August 12, 2024 Accepted: September 8, 2024

Published: September 28, 2024

doi:10.5296/jei.v10i2.22153

URL: <https://doi.org/10.5296/jei.v10i2.22153>

Abstract

The closure of schools as a response to the COVID-19 pandemic led to an urgent shift towards remote and online learning. This sudden shift necessitated significant adjustments in teacher education. Educators had to swiftly adapt their instructional methods to cater to the requirements of distance education. Understanding the experiences and strategies employed by teacher education institutions, educators, and pre-service teachers during this period is crucial for shaping future practices and policies. This study seeks to analyze a variety of research articles conducted both during and post the COVID-19 pandemic. The objective is to explore the main dimensions covered in these studies, focusing on the concerns or challenges faced by their teaching training programs. By examining the insights gleaned from these studies, we aim to gain a comprehensive understanding of the adjustments and innovations that emerged in response to the pandemic. This analysis will provide valuable insights into how teacher education programs can effectively navigate similar challenges in the future and continue to evolve in the face of changing educational landscapes.

Keywords: Teacher education, COVID-19 pandemic, School closure, Distance learning

1. Introduction

In March 2020, the World Health Organization declared the coronavirus disease 2019 (COVID-19) a pandemic (Johnson et al., 2024). The impact of the COVID-19 pandemic on various societal aspects, including education, has been profound. To mitigate the pandemic's adverse effects, governments worldwide implemented national movement restrictions, leading to the temporary closure of all educational institutions (Reshi, Khanrafiq, & Wanihaya, 2023). The closures of schools, universities, and other learning spaces have

disrupted traditional educational practices for over 94% of the global student population, necessitating a shift to online pedagogy that does not have a one-size-fits-all approach (Pokhrel & Chhetri, 2021). This transition to distance learning posed unprecedented challenges for teacher education, requiring significant adjustments in programs as educators rapidly adapted their instructional methods to meet the demands of remote education (Guo & Zakaria, 2022).

Additionally, schools were tasked with independently finding effective ways to support students at home by establishing digital networks that fostered school-family partnerships. These networks played a vital role in providing support to alleviate the effects of trauma, enhance digital learning, and address various instructional scenarios within students' homes (Hodges, Kerch, & Fowler, 2020). The closure of schools also affected pre-service teachers, as they missed essential aspects of the school environment such as its culture, expectations, and opportunities for reflection. This lack of in-person experiences could hinder their ability to learn from failures and build meaningful relationships within the educational setting (Hill, 2021).

Moreover, the provision of digitally mediated feedback by teacher educators during school closures emerged as a critical consideration. Feedback is essential for learning, but its usual occurrence in face-to-face interactions requires effective communication. The closure of schools disrupted this dynamic, presenting challenges in delivering feedback in a digitally mediated environment (Pereira, Fernandes, & Flores, 2021). This literature review aims to explore various facets of teacher education during COVID-19 school closures, examining the predominant themes in research conducted during and immediately after the pandemic. By analyzing these aspects, it will highlight the challenges faced by teacher education institutions in delivering effective and meaningful training in an online setting. Additionally, the review will delve into the innovative approaches and strategies adopted in teacher education during the pandemic, such as technology integration, virtual classrooms, and professional development opportunities designed to support educators in adapting their teaching practices to the context of distance learning. Understanding the efficacy and impact of these interventions is crucial for identifying best practices and informing future teacher education initiatives (Carrillo & Flores, 2020).

Through a comprehensive analysis of existing literature on teacher education during COVID-19 school closures, this study aims to provide insights into the strategies, experiences, and implications associated with this transformative period. The findings will contribute to the knowledge base on teacher education during crisis periods, guiding future policies and practices to enhance the resilience and adaptability of teacher education systems.

2. The Study's Questions

This article seeks to answer the following research questions:

- (1) What were the frequently discussed topics in research centered on online teaching and learning during the COVID-19 pandemic within teacher education?
- (2) What areas should be the focus of future research investigations?

In order to respond to these questions, a selection of literature reviews on teacher education and distance learning has been reviewed and analyzed. The results are presented in this paper from a descriptive perspective as an analytical tool.

3. Methodology

This research adopts a descriptive design utilizing a literature review approach to explore the topic of teacher education during COVID-19 school closures. The literature review methodology allows for a comprehensive examination and analysis of existing research studies, scholarly articles, reports, and other relevant sources to gain insights into the strategies, experiences, and implications of teacher education during the pandemic.

3.1 Data Collection

The data collection process for this study involved searching and accessing scholarly databases, academic journals, and reputable online platforms to identify relevant literature. The search terms used included variations of “teacher education, COVID-19; school closures; distance learning” and related keywords. The inclusion criteria for selecting the literature included relevance to the topic, publication date within the specified time frame of COVID-19 school closures, and availability of full-text access.

3.2 Data Analysis

The collected literature was analyzed using a systematic approach. Initially, a thorough reading and examination of each selected source was conducted to gain a comprehensive understanding of its content. Key topics, concepts, and findings related to teacher education during COVID-19 school closures were identified and summarized from the literature. These topics may have included challenges faced by teacher education institutions, experiences of educators and pre-service teachers, innovative strategies used in distance teaching, and the impact on long-term professional development and well-being of teachers.

3.3 Data Synthesis

The identified topics and findings were synthesized to provide a coherent and comprehensive overview of the literature related to teacher education during COVID-19 school closures. Connections, patterns, and discrepancies among the sources were identified and analyzed to develop a holistic understanding of the topic. The synthesized information was organized in a logical manner to present a clear narrative and address the research objectives.

3.4 Verification Strategy

A ‘verification’ strategy was implemented to confirm the accuracy of the research process. Peer reviews were conducted through regular exchanges between the researcher and two external reviewers to check the data collection and analysis, providing an external check of the research process. They reviewed the material generated and contributed with comments on both the methodological process as well as on the assessment of how the findings, interpretations, and conclusions of this study are supported by the data (product), allowing for the refinement of the research process and the product.

3.5 Ethical Considerations

As this research solely relies on published literature, ethical considerations such as informed consent and confidentiality of participants are not applicable. However, proper acknowledgment and citation of the original authors and sources will be ensured to maintain academic integrity and intellectual property rights.

Overall, the descriptive design of this research, utilizing a literature review methodology, provided a comprehensive synthesis and analysis of existing knowledge on teacher education during COVID-19 school closures. By examining the available literature, this research aimed to contribute to the understanding of the strategies, experiences, and implications of teacher education during this challenging period.

4. Results and Discussion

This section describes an overview of the findings of the literature review. The selected papers were subjects to five types of determination: (1) The randomly chosen research title, author names and dates (2) the geographic location or origin of the papers reported (3) The literature review main topics/themes based on the examining of the papers (4) the classification of each research under main topics/themes (5) The summary of each of these article's characteristics of the sample, the methods and their main findings.

Although a comprehensive review of the targeted literature is required for a descriptive analysis, in this research we focused primarily on the research purpose of the literature, rather than on the research methodology employed in the study.

4.1 The Randomly Chosen Research

There were no restrictions on the nature of articles in this study, which means that both review articles, empirical research and other types were chosen randomly on their being relevant to the research purpose. As presented in Table 1, a total of 50 articles were reviewed.

Table 1. The 50 reviewed articles

No.	Authors	Research Title
1	Al-Hajri, 2023	The Reality of Using E-Learning During The COVID-19 Pandemic from The Perspective of Faculty Members and Trainers in Kuwait
2	Al-Harbi, 2023	The challenges faced by kindergarten teachers with distance education under the Corona pandemic
3	Al-Houli et al., 2021	Attitudes of School Teachers in the State of Kuwait Towards the Experience of Distance Education During the Coronavirus Pandemic
4	Al-Jarah, 2020	The reality of e-learning in the distance learning program in light of the emerging Corona pandemic "COVID-19" from the viewpoint of students in Jordan between theory and practice

5	Al-Shaye & Al-Wadey, 2023	Reality of remote Training in light of the Corona pandemic from the male and female teacher's point of view at Riyadh and Dammam
6	An & Zakaria, 2022	A Scoping Review of Teacher Training During COVID-19 Pandemic
7	Basilaia & Kvavadze, 2020	Transition to Online Education in Schools during a SARS-CoV-2 Coronavirus (COVID-19) Pandemic in Georgia
8	Boyko et al., 2021	The Quality of Training Future Teachers during the COVID-19 Pandemic: A Case from TNPU
9	Bozkurt et al., 2022	The Impact of COVID-19 on Education: A Meta-Narrative Review
10	Cengizhan, 2021	The Effects of COVID-19 Process on Time Management of Foreign Language Teacher Candidates
11	De La Garza López, 2023	Teacher training before and during the COVID19 pandemic in higher education
12	Fauzi et al., 2020	Exploring COVID-19 Literacy Level among Biology Teacher Candidates
13	Halitoglu, 2021	Attitudes of student teachers towards distance education within the context of COVID-19 pandemic
14	Hasan, 2023	Education transformations in post-Corona pandemic time: An analytical study
15	Henriques et al., 2021	Portuguese Primary and Secondary Education in Times of COVID-19 Pandemic: An Exploratory Study on Teacher Training and Challenges
16	Holt, 2021	Preservice Teacher Perceptions of Virtual Reading Fieldwork During the COVID-19 Pandemic
17	Huang et al., 2022	Teachers' adaptations to COVID-19: perceived preparedness for distance education, frequency of teacher-student contact, and resources in ICT
18	Ismail et al., 2024	Teaching in the Pandemic COVID-19: Transition to Online Learning after Spending Years in Class
19	Julie et al., 2022	Indonesian mathematics teachers' views on distance learning barriers during the early COVID-19 pandemic
20	Keleşoğlu & Yetkiner, 2022	Teaching Practices Under the Shadow of COVID-19
21	Kier & Johnson, 2022	Exploring How Secondary STEM Teachers and Undergraduate Mentors Adapt Digital Technologies to Promote Culturally Relevant Education during COVID-19
22	Kutlay et al., 2022	Google Trends during COVID-19: Raising awareness among physical education teachers

23	Lampropoulos & Admiraal, 2023	The impact of COVID-19 pandemic on primary, secondary, and K-12 education: A systematic review
24	LaTronica-Herb & Noel, 2023	Understanding the effects of COVID-19 on P-12 teachers: a review of scholarly research and media coverage
25	Lee et al., 2022	Implementing Synchronous Online Flipped Learning for Pre-service Teachers During COVID-19
26	Mabalane, 2021	Work Integrated Learning Online Enrichment Intervention Programme for Student Teachers
27	Mavuru et al., 2021	Pre-Service Teachers' Levels of Adaptations to Remote Teaching and Learning at A University in A Developing Country in the Context of COVID-19
28	Mikhailov & Burlakova, 2022	Post-COVID-19 Teacher Training: The Trends That Are to Stay
29	Moliner & Alegre, 2022	COVID-19 Restrictions and Its Influence on Students' Mathematics Achievement in Spain
30	Nikolopoulou, 2022	Online Education in Early Primary Years: Teachers' Practices and Experiences during the COVID-19 Pandemic
31	Orhan-Karsak & Yurtçu, 2021	The Effects of Pre-service Teachers' Extracurricular Study Habits and Emotion Regulation on Lifelong Learning Tendencies in COVID-19 Process
32	Ortaş & Demir, 2022	Opinions of teacher candidates on the effects of emergency distance education implementations during the COVID-19 pandemic period on learning-teaching process, metacognition and social skills: A case study
33	Ozdemir, 2021	Views of Science teachers about online STEM practices during the COVID-19 period
34	Pareek & Soni, 2020	A Comprehensive Study on COVID-19 Pandemic: An Impact on School Education in India
35	Pathiranage & Karunaratne, 2023	Teachers' Agency in Technology for Education in Pre- and Post-COVID-19 Periods: A Systematic Literature Review
36	Pereira et al., 2021	Teacher Education during the COVID-19 Lockdown: Insights from a Formative Intervention Approach Involving Online Feedback
37	Pokhrel & Chhetri, 2021	A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning
38	Rodrigo & Ladrido, 2022	Promoting Equity and Assuring Teaching and Learning Quality: Magisterial Lectures in a Philippine University during the COVID-19 Pandemic

39	Rodríguez-Muñiz et al., 2021	Secondary Mathematics Teachers' Perception of Their Readiness for Emergency Remote Teaching during the COVID-19 Pandemic: A Case Study
40	Saleh et al., 2023	The sudden transition to remote learning in response to COVID-19: lessons from Malaysia
41	Sari & Saralar-Aras, 2022	A Case Study on Online Teaching during the COVID-19 Pandemic Perceived by Primary School Teachers
42	Suksawas & Yiemkuntitavorn, 2021	Investigation of Teacher Support and Teacher Training During the COVID-19 Pandemic: Tools and Skills Moving the Classroom Forward
43	Sultana & Palaroan, 2023	COVID-19 and Transition to Online Learning: Evidence from a Sino-Foreign University in China
44	Süt, 2022	Experience of transition to distance education in secondary education from the eyes of Syrian students during the pandemic
45	Sutiah et al., 2020	Implementation of distance learning during the COVID-19 in Faculty of Education and Teacher Training
46	Tiernan et al., 2021	Engaging Student Teachers in An Online Teaching Pedagogies Module during COVID-19
47	Tosto et al., 2023	Online learning in the wake of the COVID-19 pandemic: Mixed methods analysis of student views by demographic group
48	Ugalingan et al., 2021	Online Internship Experiences Among Pre-service ESL Teachers in the Philippines: Challenges and Opportunities
49	Valkenburgh & Gierhart, 2022	Fostering and Maintaining Relationships: Teacher Education During COVID-19
50	Yurtçu & Orhan-Karsak, 2021	The effect of COVID-19 on pre-service teachers' lifelong learning tendencies

4.2 The Geographic Location or Origin of the Papers Reported

The research articles were meticulously selected in a random fashion from a wide geographical spectrum and a diverse array of origins, encompassing various countries, regions, and cultural backgrounds. This inclusive approach aimed to capture a comprehensive perspective on the subject matter by drawing insights from a rich tapestry of global experiences, beliefs, and practices. By incorporating research from such a diverse range of sources, the study sought to ensure a well-rounded understanding of the topic, accounting for different contexts, viewpoints, and methodologies. The following Table 2 shows the geographic location or origin of the papers reported:

Table 2. The geographic location or origin of the research articles

Country	Research Article Number
Bhutan	37
China	43
Georgia	7
German-speaking countries	17
Greece and Norway	30, 23
India	34
Indonesia	12, 18, 19, 45
Jordan	4
Kuwait	1, 3, 14
Malaysia	6, 40
Mexico	11
Philippines	38, 48
Portugal	15, 36
Russia	28
South Africa	26, 27
South Korea	25
Spain	29, 39
Sri Lanka	35
Saudi Arabia	2, 5
Syria	44
Thailand	42
Turkey	10, 13, 20, 33, 31, 32, 41, 50, 22
Ukraine	8
United Kingdom	46
United States	16, 21, 47, 24, 49

4.3 The Main Topics/Themes of the Research

In our analysis, we examined the 50 distinct articles to gain insights into their primary focus areas. Our findings revealed that these articles can be categorized into five main thematic groups, as detailed in Table 3 below. This categorization allows for a structured overview of the diverse topics covered in the research landscape, providing a clear framework for understanding the breadth and depth of the scholarly contributions in the field.

Table 3. The 5 main topics/themes of the research

	Themes	f	%
1	Attitude, readiness and perceptions towards distance learning	17	34%
2	Challenges and opportunities of the online learning	13	26%
3	Effective online pedagogies	8	16%
4	Teachers' professional development needs	6	12%
5	Others	6	12%

4.4 The Classification of Each Research

In our analysis, we endeavored to categorize the 50 diverse articles into the five specified categories outlined in the preceding table. This classification system allows us to illuminate the predominant themes and emerging trends evident in the literature, providing valuable insights into the present research landscape and the primary areas of focus within the academic domain. By structuring the articles into these defined categories, we aim to offer a comprehensive overview of the scholarly contributions, emphasizing the key themes that shape the discourse and reflect the interests of the academic community.

Table 4. The classification of research under the 5 main topics/themes

	Themes	Research Article Number
1	Attitude, readiness and perceptions towards distance learning	3, 10, 11, 13, 16, 18, 20, 23, 27, 32, 35, 34, 36, 38, 43, 44, 45
2	Challenges and opportunities of the online learning	2, 4, 5, 8, 14, 19, 24, 29, 33, 37, 41, 47, 48
3	Effective online pedagogies	21, 22, 25, 26, 30, 39, 46, 49
4	Teachers' professional development needs	6, 15, 17, 40, 42, 50
5	Others	1, 7, 9, 12, 28, 31

4.5 The Summary of the Research

In this section, we provide concise summaries of the 50 research articles utilized in our study, offering readers valuable insights into the scope and findings of the research. These summaries serve as a guide, offering a glimpse into the diverse topics covered and the key points discussed in each article. By encapsulating the essence of each research piece, we aim to provide readers with a comprehensive understanding of the breadth and depth of the literature reviewed, facilitating a clearer grasp of the research landscape and the contributions made by each study. Additionally, these summaries are intended to spark interest and curiosity, encouraging readers to delve deeper into the details of the individual articles and explore the nuances of the research presented.

4.5.1 Al-Hajri, 2023

Using a descriptive approach based on a questionnaire, this study explores e-learning during the COVID-19 pandemic according to faculty members and trainers in Kuwait. The study's questions are: 1) What is the reality of e-learning during the COVID-19 pandemic according to faculty members and trainers in the General Organization for Education and Training in Kuwait?); 2) Are there differences between the averages of faculty members and trainers in the General Organization for Education and Training in Kuwait due to the gender variable? and 3) Are there differences between the averages of faculty members and trainers in the General Organization for Education and Training in Kuwait due to the qualifications variable?). The context of the study is limited to faculty members and trainers in the General Organization for Education and Training in Kuwait during the Academic Year (2022-2023). A random sample of 114 individuals (out of 2881 teachers and trainers) working in the General Organization for Education and Training in Kuwait was selected to represent the study, according to gender and qualifications. From the study's findings, the researchers concluded that e-learning was an important alternative to ensure the continuity of students' learning during crises. It was also effective in promoting students' performance and understanding for lessons and enhancing relationships between teachers and students. The faculty members expressed different positive and negative opinions regarding e-learning, especially when it comes to infrastructure. Therefore, the study recommended the enhancement of infrastructure

with stronger internet, developed curricula and more training by workshops and programs. It also called for diminishing all obstacles to the application of e-learning and conducting more studies regarding the issue.

4.5.2 Al-Harbi, 2023

The study identifies the challenges encountered by kindergarten teachers with distance education under the Corona pandemic. The study's questions are: 1) What were the educational and technological challenges faced by kindergarten teachers with distance education under the Corona pandemic? and 2) What were the psychological and social challenges faced by kindergarten teachers with distance education under the Corona pandemic? Using the analytical descriptive approach, a questionnaire of 40 paragraphs, of which the researcher verified the validity and reliability, and a study sample consisting of 161 female teachers (all received the questionnaire in the City of Hafer Al-Batin in March 2022). The study concluded that such challenges were massive. Distraction among female teachers may be caused by speaking and listening during distance education. Moreover, the lack of training for children and appropriate training on distance education strategies for female teachers during the service were psychological and social challenges. Moreover, there were no statically significant differences in the responses due to the variables of kindergarten type, which meant that the challenges were similar. The researcher recommended providing teachers and students with adequate training on dealing with modern technology tools and solving technical problems like weak internet signals. The researchers also called for informing officials in the Ministry of Education regarding the results of this study in order to lead kindergarten teachers, and to develop training programs and workshops in order to develop students' knowledge about what is distance education and the mechanism of applying distance education and overcoming challenges in the educational and technological educational process to meet the psychological and social challenges of teachers.

4.5.3 Al-Houli et al., 2021

This study aimed at examining schoolteachers' attitudes in Kuwait towards the experience of distance learning during the COVID-19 pandemic. The study's questions are: 1) What are public school teachers' attitudes in the State of Kuwait towards the distance education experience during the coronavirus pandemic? and 2) Are there statistically significant differences among the attitudes of school teachers in the State of Kuwait due to the study variables: gender, educational stage, educational district, and years of experience? It used the descriptive method through a questionnaire consisting of four dimensions to measure teachers' attitudes towards distance education. A sample of 1028 teachers of various disciplines at all levels of education in public schools in the State of Kuwait has received the questionnaire. The results showed that public school teachers in the State of Kuwait had a high degree of positivity towards the distance education experience during the coronavirus pandemic. The results also indicated that they had positive attitudes towards the experience of distance education during the coronavirus pandemic. This can be attributed to the fact that the need for continuity of education, regardless of the means, has fostered acceptance of distance education instead of traditional education. With schools closed for several months, teachers

feared for students' future and the future of education in general in the State of Kuwait. The researchers recommend the development teachers' performance during the service, especially with regard to the use of electronic means in education, training of school principals and agents on how to evaluate the performance of teachers providing distance education electronically, in addition to continuous follow-up and evaluation to achieve comprehensive distance education quality.

4.5.4 Al-Jarah, 2020

This study identifies the reality of e-learning in the distance learning program considering the Corona pandemic "COVID-19" according to students in Jordan, between theory and practice. The study's main question is: What is the reality of e-learning in the distance learning program in light of the emerging Corona pandemic "COVID 19" between theory and practice? From this question, the sub-question is (What is the importance of e-learning in the distance learning program in light of the emerging Corona pandemic "COVID 19" between theory and practice?). The context of the study is the interpretation of the reality of e-learning in the distance learning program in light of the emerging Corona pandemic "COVID 19" between theory and practice in the Directorate of Education, Al-Mazar As-Shamaliyah, Jordan during the 2nd Semester of the Academic Year (2022-2023). The researcher adopted the descriptive approach as it is most compatible with the objectives and procedures of the research. An electronic questionnaire including 20 items was given to a random sample of (1,200) male and female students, based on a descriptive analytical method. The study concluded the following results: The importance of using e-learning in distance learning programs, the extent of using e-learning in distance learning programs. There are difficulties preventing the use of e-learning in distance learning programs. There were no statistically significant differences at ($05.0 \leq \alpha$) between the responses of the sample members of students about the reality of e-learning in distance learning programs due to gender. The researcher suggested encouraging and educating students to benefit from e-learning technology to facilitate and improve teaching-learning practice under the pandemic's circumstances.

4.5.5 Al-Shaye & Al-Wadey, 2023

This study uses descriptive methodology to discuss the reality of remote training under the Corona pandemic according to the teachers in Riyadh and Dammam, KSA, during the first semester, 2021. The study's questions are: 1) What is the reality of distance training in light of the Corona pandemic according to the teachers in Riyadh and Dammam, KSA? 2) What are the obstacles to distance learning according to the teachers in Riyadh and Dammam, KSA? and 3) To what extent do statistically significant differences at the level ($\alpha \leq 0.05$) exist among the opinions of the study's respondents towards its aspects, when it comes to gender, workplace, qualifications and years of experience? The study adopted the descriptive approach to study the theoretical frameworks for distance training and its obstacles. It used the questionnaire as a tool to achieve the objectives of the study and answer its questions. Out of 97615 male and female teachers in Riyadh and Dammam, KSA, a sample of 223 teachers is representing the study's community. The results were as follows: The remote training considering the Corona pandemic was believed to be highly practiced, despite some obstacles,

like excessive teaching burdens and repeated family-related works and responsibilities. There were no statistically significant differences between the study sample members regarding the following variables (gender, experience years, educational qualification and the place of work). The researchers recommended reducing the teaching burdens for the male and female teachers to enable them to join the remote training programs. The researchers also recommend attracting human trainers' competencies and providing maintenance and programming specialists for repairing malfunctions that may occur during remote training. In addition, providing the male and female teachers with financial and moral incentives to encourage them to join these remote training programs.

4.5.6 An & Zakaria, 2022

This study unravels the literature of effective strategies (a scope of thirty-four journal articles) adopted by teachers and teacher educators in Malaysia from 2020 to 2021 to vanquish the negative effects of school closure on student learning. It aimed at guiding relevant researchers in conducting more in-depth academic research and reminding educational institutions and individuals of the need to take the most recent social issues into consideration when designing teacher training programs. A scoping review strategy, comprised of five steps (cited from Arksey & O'Malley, 2005) was applied to select and review all relevant articles (1276 articles). The steps are: COVID-19 and teachers' training, Scopus and web of science (1276 articles), Studies ready to review titles and abstracts (806 articles), Teachers' training g during the pandemic (60 articles) and Articles included in the data analysis (34 articles). It was discovered that the studies reviewed in this research were conducted using a variety of research methods, and a wide range of sample sources. Despite the fact that the included studies were written in English, the researchers hoped that this review may serve as a resource for future related research. Taken as a whole, this study suggests that a personal interview with in- or pre-service teachers is essential for researchers and teacher training institutions in order to obtain a comprehensive picture of teachers' training needs during the COVID-19 pandemic period. The findings also reveal a clear shared understanding of how teachers may be assisted in effectively utilizing technology for teaching and assessment as a critical teacher training effort. It is important to note that teachers are highly educated and knowledgeable individuals, and not "empty vessels" that need to be filled with new knowledge, so teacher training developers and facilitators need to consider the existing knowledge system of teachers, and assist them in adapting their existing knowledge base to the new norm, so that they may indeed be supported in overcoming the challenges presented to their professional development caused by unpredictable and unanticipated external changes.

4.5.7 Basilaia & Kvavadze, 2020

This study reviews the capacities of Georgia and its population to continue the education process at the schools in the online form of distance learning. It studies the different available platforms and indicates the ones that were used by the support of the government, such as online portal, TV School and Microsoft teams for public schools and the alternatives like Zoom, Slack and Google Meet, EduPage platform that can be used for online education and

live communication and gives examples of their usage. It is a case study, where the Google Meet platform was implemented for online education in a private school with 950 students. Based on the first-week statistics of the online teaching process, the researchers conclude that the quick transition from the traditional to the online education systems at the school was successful and gained experience can be used in the future. The authors recommended the integration of google meet system to the google classroom platform, or the separate platform needs to be created for education purposes that might include the laboratory practice simulators for schools in STEM courses. The online education format can be useful in the post-pandemic period, especially in the case of students with special needs. The experience and studies can be beneficial for other countries that have not found the ways of transition yet. The lesson learned from the pandemic of 2020 will force a generation of new laws, regulations, platforms and solutions for future cases, when the countries, government and population will be more prepared than today.

4.5.8 Boyko et al., 2021

This study clarifies the experience of the communicative competence formation of future teachers in a blended form of education as a dominant one during the COVID-19 pandemic. A total of 160 students of the Faculty of Pedagogy and Psychology of Ternopil Volodymyr Hnatiuk National Pedagogical University (TNPU) took part in this experimental research. The experimental study was conducted during the 2020-2021 academic year. The experimental research comprised three stages. At the ascertaining stage, the researchers studied the peculiarities of forming the communicative competence of future teachers in pedagogical theory and practice, attended classes of their colleagues, talked to students, and conducted a SWOT-analysis. At the formative stage, in accordance with the organization of the learning process at the university, several students were studying via a distant mode, whereas others were learning offline. This training format was organized to comply with the anti-epidemic measures connected with the COVID-19 pandemic. Students constantly changed the mode of study from offline to online and vice versa at one-week intervals. At the final stage, control tests were conducted to verify the effectiveness of the teaching methods used in the offline and online modes. Therefore, the researchers conducted a qualitative and quantitative analysis of the results of the study and determined the effectiveness of the applied learning approaches in forming the communicative competence. The study concludes with advantages and disadvantages of online and offline learning and the efficacy of technical learning tools. The article also describes the educational platforms (Moodle and Google Classroom) and technical means most frequently used by teachers and students in their everyday life.

4.5.9 Bozkurt et al, 2022

In this study, the researchers from Turkey conducts a bibliometric analysis of the publications covering COVID-19 and education to analyze the impact of the pandemic by applying the data mining and analytics techniques of social network analysis and text-mining. The study's questions are: 1) What are the thematic patterns in the title, abstract, and keywords of the publications on COVID-19 and education? and 2) What are the citation trends in the

references of the sampled publications on COVID-19 and education? This study used data mining and analytic approaches to examine bibliometric patterns and trends. More specifically, social network analysis (SNA) was applied to examine the keywords and references, while text-mining was applied to examine the titles and abstracts of the research corpus. From the abstract, title, and keyword analysis of a total of 1150 publications, seven themes were identified: (1) the great reset, (2) shifting educational landscape and emerging educational roles (3) digital pedagogy, (4) emergency remote education, (5) pedagogy of care, (6) social equity, equality, and injustice, and (7) future of education. Moreover, from the citation analysis, two thematic clusters emerged: (1) educational response, emergency remote education affordances, and continuity of education, and (2) psychological impact of COVID-19. The results from this study indicate that quick adaptability and flexibility have been key to surviving the substantial challenges generated by COVID-19. However, extreme demands on flexibility have taken a toll on human well-being and have exacerbated systemic issues like inequity and inequality. From the results of the study, there is an urgent need to develop effective strategies to ensure the continuity of education in the future, and that it is critical to proactively respond to such crises through resilience and flexibility.

4.5.10 Cengizhan, 2021

This study determines the effects of the COVID-19 process on time management of foreign language teacher candidates in Turkey. The study's questions were the following: 1) What are these candidates' thoughts about the plans they made during their stay at home during the COVID-19 process? 2) How do they think the COVID-19 process affects their time management? 3) How do they think the COVID-19 process affects their perception of time? 4) What kind of problems did they have about motivation during the COVID-19 process? and 5) Which time trap(s) do they think they fall into during the COVID-19 process? The qualitative design was used. The study group was formed by criterion sampling, which is one of the purposeful sampling methods. The criteria determined were for the participants to work, to have pedagogical formation training online, and to have previously had face-to-face training. Accordingly, 35 foreign language teacher candidates participated in the study. A semi-structured interview form consisting of five questions was used to collect the data. Content analysis technique was used in the analysis of the data and themes were reached from the codes. The study concluded that the educational plans made could not be followed due to the inability to perceive time. Simultaneously, it showed that the COVID-19 process had positive effects on preventing wasting time due to factors like providing a more flexible studying environment. Therefore, teacher candidates should receive training on stress coping, distance education and time management. The researchers recommended that teacher candidates, who assume a great responsibility in the field of education, without limitation of field, should receive training on stress coping, distance education and time management in order to be able to get away from the stress situations caused by negative effects such as pandemic or to be affected less at least.

4.5.11 De La Garza López, 2023

This cross-sectional study identifies the teacher-training provided before and after the Corona

pandemic in Mexico. The sample consisted of 80 teachers from two higher education institutions and 104 students through probabilistic, homogeneous, expert, systematic random sampling. By quota, the study's sample (teachers and students) showed that 80% were not prepared for virtual classes. The remaining 20% were prepared because they were already teaching online classes, among other relevant data declared in this study during 2019 and 2020. The researcher recommended that all teachers and students should be always trained on digital educational platforms, even when the subjects are face-to-face, and be updated to provide quality education and show that a teacher should always provide students with up-to-date information. Teacher training must be a permanent and dynamic practice that allows teachers to develop the necessary skills to face the challenges of today's world.

4.5.12 Fauzi et al., 2020

This study aimed to explore the level of COVID-19 literacy among biology teacher candidates in Indonesia. The selected location for this research was Malang, East Java, Indonesia. Malang is one of education city in Indonesia and was announced as the red zone for COVID-19 spread in Indonesia. The research sample were all students of Faculty of Teacher Training and Education in one of private university in Malang. The total sample were 290 students which comprised of 76 students of year 2016, 85 students of year 2017, 80 students of year 2018, and 49 students of year 2019. The data collection of COVID-19 literacy employed the questionnaire which was designed by the researchers. The questionnaire contained of three parts *i.e.* information of respondent's identity, profile of information resource, attaining time profile of COVID-19 related information, and COVID-19 literacy level. The literacy level part comprised of four aspects asked, *i.e.* (1) disease spread and transmission; (2) causes and disease symptoms; (3) prevention of spread and disease transmission; and (4) treatment and death rate. The total of item asked in this part were 21 items. By considering Malang condition during the research held, the questionnaire was transformed into online questionnaire by utilizing Google Form platform. The online questionnaire link was spread to the respondents in term of Biology Education students. It showed that students' years do not have a significant effect on their COVID-19 literacy regarding vaccines and symptoms. Most students had heard of COVID-19 before the disease was reported to enter Indonesia, but only few students were categorized as high-level, which requires an immediate response to these results, since students function as agents of information for those around them.

4.5.13 Halitoglu, 2021

This study aimed to determine the distance education-oriented attitudes of student teachers during the COVID-19 Pandemic. The main research question of the study was formulated as "How would student teachers score their attitude in regards to the distance education courses they attended?" Based on this main research question, the sub-research question was identified as in the following: Do student teachers' attitude towards distance education differ significantly in terms of their gender, previous training on computers "web-animation-graphic design, etc.", possession of such devices as smart phones, tablet computers or laptop, region of residence, place of residence, department? This descriptive study was based on the survey

method, one of the quantitative research designs. The participants of the study were selected randomly on voluntary basis, and they consisted of a total of 236 student teachers (140 females and 96 males) in five different departments of the Faculty of Education in a state university in the south of Turkey in the 2019-2020 academic year. Students reported that the most advantageous part of distance education consisted of its attribute of being independent of time and space, as well as the time savings that it provided, in addition to the opportunity to revising the classes. It was also observed that the attitude scores did not create any significant differences based on the gender of the students, whether they had previously been trained on computers, whether they possessed equipment, such as smart phones, tablets, computers, etc., or the area of residence. Considering the distance education-oriented attitude scores by departments, however, significant differences were determined in favor of the departments of Turkish Language Teaching, and Psychological Counseling and Guidance.

4.5.14 Hasan, 2023

In this study, the researcher from Kuwait discusses the changes in Post-Corona Education. It sheds light on e-learning experience and challenges during the pandemic, and how they are related to the reality of education in the future. The study's questions are: 1) What was the learning experience like during the Corona pandemic? 2) What are the obstacles and challenges of distance education? 3) What transformations have affected education after the Corona pandemic? 4) What is the future of education after the Corona pandemic? and 5) What are the requirements for the continuity of education after the Corona pandemic? Based on inductive approach, the study found out that most countries applied integration between traditional education and e-learning, which had many positive results. This requires setting educational plans based on learning technology.

4.5.15 Henriques et al., 2021

This study aimed to understand how the transition from face-to-face education to digital education was accomplished in Portuguese primary and secondary education, namely regarding teacher training and the difficulties experienced during the emergency remote education period. The Portuguese Ministry of Education, through the Directorate General of Education, took on the preparation of a set of guidelines and training actions aimed at teachers. Such initiatives were designed to support teachers in the transition from a face-to-face education model to a completely virtual one, seeking, in parallel, to support students who did not have access to technological devices or Internet connectivity. In this context, the Portuguese Council of Ministers approved the Action Plan for Digital Transition, which is assumed to be “the country's transformation engine”, and which aims to put into practice a diverse set of measures to provide the country's digitalization. These measures are organized into three main pillars, the first one being dedicated to training and digital inclusion that includes digital education and requalification. The data used in this study set up an exploratory study and are the results of an online questionnaire, comprising 15 questions. The questionnaire was disseminated through online social networks and answered between April and August 2020. Respondents were 136 Portuguese primary and secondary education teachers, from both public and private schools geographically dispersed across mainland

Portugal and its islands. The results showed how teachers have been forced to modify their pedagogical work, the importance of training, and the inherent challenges and critical reflections associated with the process, as well as the opportunities presented in a post-pandemic educational reality. The study recommends further invest in the development of digital skills for all citizens. Clearly, more professional development opportunities focused on digital technologies and requires setting educational plans based on learning technology.

4.5.16 Holt, 2021

This study aimed at examining the perceptions of teachers regarding virtual reading fieldwork during the COVID-19 pandemic in USA. The study's questions are: 1) How are preservice teacher preparation programs meeting reading fieldwork needs during the COVID-19 pandemic, when only limited in-person contact is permitted? 2) How do preservice teachers perceive the stages used, the impact on their work, and the stressors and overall effectiveness of the virtual reading fieldwork completed during the COVID-19 pandemic? and 3) In what ways do preservice teachers feel that improvements can be made to virtual reading fieldwork used in times of emergency such as the COVID-19 pandemic? The study was conducted during the 2020 fall semester, during which a total of 21 participants responded. The primary data source was a researcher-created survey. The developed survey was checked for validity and reliability by using member checking. The survey was designed using the SurveyMonkey software, and consisted of 44 questions including a combination of both open and closed items. The survey items focused upon the participants' fieldwork experiences during COVID-19, their perceptions of the project's impact on the students served, any stressors, and their suggestions for potential improvements. The study revealed challenges faced by teachers during virtual reading fieldwork unique to teacher preparation during a pandemic. A more streamlined process addressing technology pedagogy is needed to prepare preservice teachers during times when face-to-face, in-person K-12 classroom meetings are restricted or unavailable. Based on the study's findings, it is recommended that more research is conducted in the area of preservice teacher preparation and the possibilities of implementing virtual reading fieldwork to avoid gaps in teaching and learning instruction.

4.5.17 Huang et al., 2022

The study investigated teachers' psychological (perceived preparedness for distance education) and behavioral (frequency of teacher-student contact) adaptations to distance education in relation to job (training, collaboration, and equipment) and personal (self-efficacy) resources in the area of ICT during the first wave of school closings due to COVID 19 Pandemic in 2020. The study examines the following hypotheses: 1) Teachers' frequency of contact with students and perceived prepared-ness for distance education are positively associated with the number of professional training courses (ICT training), collaboration with colleagues (ICT collaboration), and access to equipment in schools (ICT equipment) in the area of ICT; and 2) Teachers' frequency of contact with students and perceived prepared-ness for distance education are positively associated with the amount of ICT training, collaboration, and equipment through their ICT self-efficacy. The present study draws on data from an online survey carried out in German-speaking countries from May to

June 2020 during the school closing related to the COVID-19 pandemic. The online survey was composed in German and circulated via teacher training website's newsletters and X. Results from the recursive path model showed that all job resources were positively associated with teachers' perceived preparedness, but the actual frequency of contact was only significantly related to ICT collaboration. Lastly, ICT self-efficacy mediated the associations between job resources and teachers' adaptations. The findings highlighted policymaking and school administration applications in which focus should be placed on fostering ICT resources, particularly collaboration. As teachers get more experience with online education post-COVID, the relationships between ICT resources and their adaptations may change over time. Therefore, longitudinal expansions of the present research, grounded in experiences of teachers and students, might render developing patterns obvious.

4.5.18 Ismail et al., 2024

This study aims to gain an understanding of the online learning among students at private universities and to prove the readiness and willingness to change from classroom learning modes to online learning modes during the COVID-19 pandemic. The authors discussed the case of a private university that recently changed in February 2020 to a university that has struggled to change the traditional learning process into online learning in one month through various training. The focus of online learning tools developed in this research was the Moodle Application. To investigate the results of online learning, the authors surveyed with a questionnaire created specifically to assess the development of learning models as a step to support government policy in preventing the COVID-19 outbreak. The data obtained was used for quantitative and qualitative analysis. Respondents in this study were recruited online using the Google Classroom platform. Data from 577 students of the Universitas Muhammadiyah Enrekang were recorded as respondents. However, 349 respondents gave and completed the questionnaire, so the final sample consisted of 349 respondents (completion rate: 60.49%) representing 5 different Study Programs. Participation is done voluntarily. The findings of this study show that most students have ample knowledge of using the Internet which has a positive benefit in online learning, although in general, they are not familiar with online learning. Students generally feel safe about online learning during the spread of COVID-19 and have a positive view of the flexibility of online learning, but they do not want face-to-face learning to be eliminated. In terms of content, features, comfort, communication, and pedagogical aspects, some students want it to be more interactive, complete, and creative. Most students agreed that the cost factor was the main obstacle in making the transition to online learning mode during the deployment of COVID-19. However, they hope to learn more about online learning. Institutions need to invest in online education and learning with more resources allocated to support students, lecturers, and instructors in online learning.

4.5.19 Julie et al., 2022

This study describes the views of Mathematics teachers in Indonesia on the distance learning barriers during the COVID-19 pandemic. The study's questions are: 1) What are the barriers that Indonesian mathematics teachers perceive as significant in distance learning during the

early COVID-19 pandemic? and 2) What are the efforts taken by Indonesian mathematics teachers to overcome distance learning barriers during the early COVID 19 pandemic? This study uses the descriptive research design, within which the researchers are able to describe a phenomenon and its features. In order to obtain a large number of responses in the online survey, snowball sampling was used to involve 415 participants (142 males and 272 females). An online questionnaire was employed because it can be readily distributed to a large number of people via a variety of online platforms. It shows that barriers related to pedagogical dimensions were perceived as significant in distance learning during the COVID-19 pandemic. Moreover, it reveals that most teachers made efforts that can be done by the teachers themselves to overcome the barriers. The findings are in line with the findings which revealed that one of the efforts that must be made by teachers in managing online learning is that teachers need to learn independently about how to design online learning and teach online. Through the independent learning process, teachers can look for learning resources that match their needs in managing online learning. The findings of this study suggest that more training is needed to support teachers' pedagogical competencies to conduct distance learning in order to deal with the current pandemic or any future crises that may potentially disrupt face-to-face learning.

4.5.20 Keleşoğlu & Yetkiner, 2022

This study aimed to evaluate the action plan designed to minimize the adverse effects of teaching practices during the COVID-19 pandemic in Turkey, which is an essential pillar of the teacher training system. For this purpose, the study seeks answers for these questions: 1) What are the student teachers' opinions about the teaching practices that have been attempted to be conducted through distance education? and 2) What are the mentor teachers' opinions about the teaching practices that have been attempted to be conducted through distance education?. The classical action research design was preferred, followed by a pragmatist approach to find a solution to the problem of carrying out the practices through distance education within the framework of pandemic measures and enable student teachers to have the best experience under the conditions. The study group of the research consists of the mentor teachers working in the practice schools affiliated with the Ministry of National Education and the student teachers participating in the practices. The criterion sampling was preferred from the purposive sampling method. Within the scope of the study, research data were collected from four mentor teachers working in four different schools and sixteen student teachers conducting their practices under the mentorship of teachers among fifty-four student teachers and thirteen mentor teachers who carried out teaching practices in the 2020-2021 academic year. It concluded that teaching practices should be supported with tasks suitable for distance education. Moreover, innovative technological material development should be considered, and student teachers should go through the teaching processes, in which they can prepare these materials.

4.5.21 Kier & Johnson, 2022

This qualitative research study explores how middle and high school teachers in an urban school district and undergraduate STEM mentors of color used digital tools and collaborative

pedagogies to teach science, technology, and engineering during the COVID-19 pandemic. It explores the question: How do middle and high school teachers leverage virtual collaborations with STEM undergraduate mentors and use digital technologies to promote equitable learning experiences for students during a global pandemic? This study took place within a large urban school district in the mid-Atlantic region of the United States. Thirteen middle and high school STEM teacher leaders agreed to participate in professional development, classroom implementation, and research as part of their STEM leader responsibilities. It is a qualitative multiple case study, where two primary sources of data were collected and analyzed: semi-structured pre-post interviews and the engineering design notebooks (document analysis). The researchers conducted interviews with teachers prior to beginning implementation to learn about their approach to STEM teaching and learning and their experiences teaching with engineering design challenges and digital tools. It showed that partnership and technologies led to rigorous and connected learning for students. Teachers and undergraduates carefully stroke a balance between technology use and giving feedback for students to reflect on their learning. The digital tools provided opportunities for students to collaborate and experience social connections and culturally relevant educational experiences despite being physically distanced from their peers, teachers, and mentors. There are opportunities to enrich and expand these virtually mentoring experiences not only within the United States but also internationally.

4.5.22 Kutlay et al., 2022

In this study, the researchers from Turkey aimed at raising awareness among physical education teachers by analyzing the trends in exercise programs on the Google platform during the COVID-19 pandemic. The study was realized using the quantitative research method. First, the relevant data was generated through Google Trends data source depending on search criteria associated with the content “Trends for Exercises Searched”. Then, the findings were demonstrated both in the context of Turkey and the world. The collected data were downloaded on Microsoft Excel and transferred to SPSS Statistics. Via these programs, the averages of trends in sport types sought on Google worldwide and in Turkey, the distribution of sought-after sport types by countries and provinces, and the frequency of popularity rates during the COVID-19 period were presented. In the popularity ratings offered on the Google Trends platform, a value of (100) indicates the highest popularity. Finally, the worth of “0” demonstrates that there was no sufficient data. It was observed that the most searched types of exercise on Google were strength training and fitness exercise. It might contribute to the development of physical education teachers in institutions that provide education for children and youths, to create the content of online or face-to-face exercise programs. In this respect, it is recommended that children and youths who did not exercise at all and developed a sedentary lifestyle before the COVID-19 pandemic should carry out, together with the state’s physical education teachers, some exercise programs that fundamentally initiate dynamic lifestyle activities. Thus, it is extremely important to determine the right exercise content for children and youths with the guidance of physical education teachers, not by these individuals themselves with random/arbitrary searches.

4.5.23 Lampropoulos & Admiraal, 2023

In this study, the researchers Lampropoulos from Greece and Admiraal from Norway aims to provide a cohesive overview and summary of the COVID-19 pandemic impact on primary education, secondary education, and K-12 education through an extensive literature review. The review focused on global educational stakeholders' perspectives, attitudes, sentiments, opinions, and experiences. This study has 15 questions distributed among the educational stages. They can be summarized in five questions: 1) What are (Primary/Secondary/K-12) education teachers' perspectives, experiences, and attitudes regarding the impact of COVID-19 pandemic on education? 2) What are (Primary/Secondary/K-12) education students' perspectives, experiences, and attitudes regarding the impact of COVID-19 pandemic on education? 3) What are (Primary/Secondary/K-12) education parents' perspectives, experiences, and attitudes regarding the impact of COVID-19 pandemic on education? 4) What are (Primary/Secondary/K-12) education administrators' perspectives, experiences, and attitudes regarding the impact of COVID-19 pandemic on education? and 5) What are (Primary/Secondary/K-12) education stakeholders' perspectives, experiences, and attitudes regarding the impact of COVID-19 pandemic on education? This study includes and analyzes 205 articles published from January 2020 to December 2022. The scientific databases SCOPUS and Web of Science were used. An in-depth synthesis of the related studies was provided based on the educational level and educational stakeholders' type. The results showed that the cultivation of educational stakeholders' digital skills, their familiarization with ICT, and their increased self-confidence and self-efficacy to use them in educational contexts were some of the main benefits. The new approaches, methods, practices, and tools created and adopted as well as the overall experiences led to the educational stakeholders' having different perspectives regarding the school and education of the future. It is expected that the integration of online learning aspects and methods will be used to enrich existing face-to-face teaching and learning activities and that the integration of new technologies and multimedia in education and the creation of blended learning environments will become a must in the near future.

4.5.24 LaTronica-Herb & Noel, 2023

In this analytical study, the researchers from USA identify the multi-dimensional challenges (diminished self-efficacy, work-life balance issues, health and safety concerns, and secondary trauma) encountered by P-12 teachers during the COVID-19 pandemic in USA. To gain a comprehensive understanding of the pandemic's impact on teachers' lives and their future professional plans, the researchers employed a qualitative content analysis approach to analyze 49 academic literature and news reports from 2020 to 2022. The information was gathered through an extensive review of academic literature and news reports focused on the United States. The researchers navigated through several established academic scholarship databases including ERIC, Education Source, and The Chronicle of Higher Education and focused primarily on articles published between 2020 and 2022. This targeted search approach, specifically centered on P-12 teachers within the United States, enabled the researchers to gain comprehensive insights into this group's experiences during the pandemic. The data sources for the study were selected based on well-defined inclusion and exclusion

criteria. These criteria were integral in ensuring that the sources were relevant to the study's aim: to examine the impacts of the COVID-19 pandemic on P-12 teachers in the United States. The content analysis has highlighted the impact of the COVID-19 pandemic on the teaching profession, emphasizing the significant personal and professional challenges teachers have had to contend with. The study recommends renewing societal respect for the teaching profession and ongoing research into the evolving needs and challenges of teachers. The study states that the future of education depends on our collective ability to listen, learn, and adapt in the face of adversity, ensuring that teachers are supported and valued for the critical role they play in shaping our world.

4.5.25 Lee et al., 2022

This study explores the possibility of how online synchronous flipped learning influences pre-service teachers (PSTs) in teacher education programs during the COVID-19 pandemic in South Korea. Three study's questions are: 1) How does online flipped learning affect pre-service teachers' learner engagement? 2) How does online flipped learning affect pre-service teachers' self-directed learning? and 3) How does online flipped learning affect pre-service teachers' satisfaction with the technology integration course? The current study was conducted in a teacher education program at a private university located in the southwest region of South Korea. There was a total of 140 Korean undergraduate PSTs during the 2020 academic year (2020 spring and 2020 fall). The course was open to all teacher education majors. Hence, the course included several different majors, such as special education, early childhood education, Korean language teaching, English language teaching, math education, and physical education. A total of 4 participants voluntarily agreed to in-depth interviews after completing flipped learning experiences. This study used three data sources: 1) PSTs' course evaluations after each semester, 2) PSTs' reflections after each semester, and 3) PSTs' individual interviews after 2020 fall semester. It reveals that PSTs preferred synchronous online flipped learning due to its various collaborative activities through Zoom breakout sessions. Also, pre-class materials from online flipped learning can positively enhance the PSTs' self-directed learning process. It is suggested that future researchers focus on comparing PSTs' synchronous and asynchronous FL learning experiences to gain a better understanding of the various benefits each design has PSTs' academic success and satisfaction. Moreover, it is necessary for future studies to explore the relationship between the faculty's PD and students' academic success. Furthermore, it is recommended that future researchers design research that considers PSTs' prior online learning experience.

4.5.26 Mabalane, 2021

The study explores the effectiveness of the of the online enrichment intervention program for work-integrated learning (WIL) for final-year student teachers at a tertiary institution in Johannesburg, South Africa to enhance and improve the History methodology student teachers' Pedagogic Knowledge and Pedagogic Content Knowledge (PCK), during the COVID-19 pandemic using different online tools. The study's question is: To what extent can the enrichment intervention programs for student teachers improve and enhance teaching practice before and during WIL in the context of COVID-19? The study employed a

qualitative research paradigm in order to explore the effectiveness of the online enrichment intervention program, to understand and gain insight into student teachers' opinions, their personal experiences and how they interpreted the impact of the enrichment program. Ethnography situated in the constructivist-interpretive paradigm was used as the research design for this study. Three categories of people were invited to participate: educational psychologist, former History student teachers and learners from different schools. 90 respondents participated in the study out of 148 PGCE and BEd student teachers. Twenty seven out of 38 PGCE and 63 BEd student teachers made up of 42 males and 58 females ranging in ages from 21 to 32 constituted the sample. Data was collected through 62 observations of recorded video lessons, role plays, online micro lessons, 46 Zoom semi-structured, individual interviews; and two focus-group interviews conducted for one and a half hours per session. In addition, documents such as lesson plans and student teachers' WIL reports were analyzed. The methods were triangulated to afford student teachers an opportunity to express their personal accounts of experiences and feelings about the online enrichment program using a predesigned interview schedule with open-ended questions. The program improved student-teachers' confidence, emotional readiness before and during WIL and the unfavorable circumstances in their classrooms. The study recommends that student teachers who are faced with uncertain circumstances and challenging contexts be provided with a support system ranging from academic and psychological support to technological skills development.

4.5.27 Mavuru et al., 2021

This study examines the levels of adaptation to remote teaching and learning by university students in South Africa. The study's questions are: 1) What are pre-service teachers' perceptions and experiences regarding remote teaching and learning? 2) How do pre-service teachers' perceptions and experiences of remote teaching and learning relate to their level of adaptation to the sudden transition from face-to-face to remote teaching and learning? 3) What are the pre-service teachers' conceptions about their preparedness to teach their own learners remotely? and 4) How do the pre-service teachers' adaptations compare across their different learning environments? Quantitative survey design was adopted to collect measurable data, which refers to the teachers' levels of adaptations to remote teaching and learning. Moreover, a five-point Likert scale questionnaire was designed. All pre-service teachers enrolled for Life Sciences Methodology and Practicum course in a South African university were selected in the census survey. The sample comprised of 84 fourth year and 63 third year Bachelor of Education students, and 10 postgraduate students with certificates in education to make a total of 157 pre-service teachers. Data collection involved administering the questionnaire to all the 157 pre-service teachers via online as a google questionnaire. The results revealed that differences and inequalities in different South African contexts dictated students' levels of adaptation to remote teaching and learning. The poor were less adapted due to the absence of electronic gadgets and connectivity of remote learning, compared to the rich. This calls for the importance of knowledge of students' socioeconomic backgrounds particularly when it comes to expectations regarding deadlines for completion and submission of activities and assessments.

4.5.28 Mikhailov & Burlakova, 2022

This study presents an overview of a few “new-normal” academic trends that emerged after the pandemic outbreak and prevailed in the provincial Russian university in the city of Shuya. The trends are related to education, learning and university management. As for education and learning, the transition to e-learning forced students to submit their homework online. The embracement of the academic innovations that were introduced and are likely to become part of the university routine in the future has become a significant trend. The first innovation is the three modes of digital learning. The first is the distant mode, which enables students to study at their own convenient time within the time frame set by the professor. The second mode is synchronic mode, where students attend a lecture or a seminar by the means of a videoconference. The third mode is the combined form of both the distant and the synchronic modes. The students can choose the mode that suits them best. As for university management, the trends are the important timely and accurate communication with the university community and the change in people’s lifestyle, and significant numbers of students now working part-time at home, thanks to the convenience of the internet. However, the same internet has made a negative trend, where students escape into it, which has created the absence of face-to-face communication with peers and professors. There is for some the feeling that it is nice to be in the digital world, especially for those for whom social interactions are often disturbing.

4.5.29 Moliner & Alegre, 2022

This study examines the mathematics achievement of high-school students in terms of quantitative differences in their academic achievement and the difficulties they are experiencing prior to/and during the COVID-19 pandemic. Given these two objectives, the study’s questions are: 1) Are there any significant differences in students’ mathematics achievement before and during the pandemic? 2) Do gender (male vs. female) or repeating conditions (repeaters vs. non-repeaters) act as significant moderators of students’ mathematics achievement before and during the pandemic? and 3) What are students’ opinions on the current situation regarding their helping strategies? A total of 368 students, all of which were 9th grade students; that is, 14 to 15 years old, participated in the study. The high school in which this research took place is located in a population of approximately 60,000 people in the Valencian Community, Spain. As quantitative and qualitative methods were used in this research, different instruments were used for different purposes in each case. Regarding the study’s first question, current restrictions due to COVID-19 could produce an important decrease in students’ Mathematics achievements. As for the study’s second question, no statistically significant differences were reported when considering scores by gender within each group. When analyzing the differences between the repeating and non-repeating students between groups, no statistically significant differences were reported. Students experiencing these restrictions may be affected regardless of their gender or repeating condition. Regarding the study’s third question, according to the students, not being able to interact easily with other peers was affecting their achievement in the class.

4.5.30 Nikolopoulou, 2022

This study investigates teachers' practices and experiences in executing online teaching for primary schools during the COVID-19 pandemic in Greece. The study's questions are: 1) What were teachers' practices during the pandemic? 2) What learning activities were implemented during the pandemic? 3) What were teachers' feelings and experiences (positive and negative) in implementing online education? and 4) What was the role of the parents and children's experiences, as experienced by teachers? The sample of the study consisted of 14 teachers working in public settings, in North and South Greece; teachers were teaching children aged 4-8 years. The data were collected via interviews with 14 teachers, between October and November 2021, *i.e.*, immediately after educational institutions returned back to face-to-face education. Content-thematic analysis was used, and the codes for the data analysis were descriptive. It indicates that most teachers used teaching practices, approaches and learning activities involving online implementation. Teachers' feelings were initially negative, due to the lack of earlier experiences (online education was a new situation for all teachers) and the lack of support (mainly, at the beginning of the pandemic). However, afterwards they experienced more positive feelings, mainly regarding children's familiarization with the technology and maintenance of contact with the school environment. Digital natives are familiarized (or get easily familiarized) with the digital technology/tools, and this has implications for the cultivation and enhancement of a digital culture in formal educational settings. Technical problems, followed by limited resources/support for children at home, and limited training in online methodology were witnessed as drawbacks, while children's familiarization with the technology and maintenance of contact with the school environment was positive.

4.5.31 Orhan-Karsak & Yurtçu, 2021

This study examines the effect of pre-service teachers' extracurricular study habits and the emotion regulation strategies on lifelong learning tendencies, which will lead them to become useful teachers by developing themselves during the COVID-19 pandemic. The relational survey model is used for research utilized quantitative research methods. The study group for Quantitative and Qualitative dimensions is composed of 343 students from the faculty of education while the population of the study is composed of university students studying at X University in the 2019-2020 academic year spring semester. Data was collected through Lifelong Learning Tendency Scale, which consists of 4 sub-dimensions. These sub dimensions are called motivation, persistence, lack of curiosity and regulation of learning. Data was also collected by the Emotion Regulation Scale, which was developed by Gross and John (2003), and was first translated into Turkish by Yurtsever (2004)'s study. The data obtained from the scales were recorded on the computer with the EXCEL format and analyzed using the SPSS 25 program. It was found that emotion regulation and extracurricular study habits predicted lifelong learning tendency. The increase in emotion regulation strategies and extracurricular study habits decreases the scores of lifelong learning tendency and thus positively affects lifelong learning tendencies. It is a necessity for the individual, who is the building block of social development, to develop his/her constructive, investigative and directing skills and to reach the power of the society to play a role in its

development efforts. In this context, it is very important that an individual consciously realizes herself/himself, continuously improves herself/himself in cognitive, affective and psychomotor characteristics, to reach a level that distinguishes the important from the insignificant ones and the beneficiary from the ineffective ones and that can establish a balance.

4.5.32 Ortaş & Demir, 2022

This study explores the effects of emergency distance education implementations conducted during the COVID-19 pandemic on metacognition, social skills, active participation, as well as learning and teaching processes. For this purpose, answers to the following questions were sought: 1) What are the views of prospective teachers on the impact of the emergency distance education applications employed during the COVID-19 epidemic on the development of metacognition skills? 2) What are the views of prospective teachers on the impact of the emergency distance education applications employed during the COVID-19 epidemic on the development of their social skills? 3) What are the opinions of teacher candidates on the impact of the emergency distance education applications, which were employed during the COVID-19 epidemic, on active participation? 4) What are the views of prospective teachers on effective communication with faculty members of the emergency distance education applications employed during the COVID-19 epidemic? and 5) What are the views of teacher candidates on the impact of the emergency distance education applications, which were implemented during COVID-19, on the learning- teaching process? This study, in which emergency distance education applications were collected using a data source in its own context, was designed as a case study from qualitative research methods. The study population of the research consists of primary school teachers, and pre-school teachers in the second and third grades of the Education Faculties of the Caucasus and Trakya University, which are located on the western and eastern borders of Turkey. The participants showed that emergency distance education applications increased the effectiveness of the learning-teaching process, regardless of homework load and insufficient explanation of educational tasks. Some of the suggestions recommended by the study are: (1. Creation of instructional design modules for teacher candidates that can be used in emergency distance education by field experts), (2. Providing supportive services for the psychological and social dimensions of teacher candidates by relevant experts) and (3. Include additional arrangements as much as possible, which will ensure active participation of teacher candidates in the lesson).

4.5.33 Ozdemir, 2021

The study examines the opinions of Science teachers who practiced online STEM activities in the Science course during the COVID-19 pandemic in Turkey. The study's question sought in the research is: "What are the viewpoints of Science teachers who conduct STEM online activities in the Science course?" Based on this main research question, the sub-research questions of the research are as follows: 1) What are online STEM practices like? 2) Are there any advantages of online STEM implementation? If so, what are they? 3) Are there any disadvantages of online STEM implementation? If so, what are they? 4) What are the

similarities between online and face to face STEM implementations? and 5) What are the differences between online and face to face STEM implementations? The descriptive scanning model, which is a quantitative research model, was used in the data collection, analysis and interpretation. The Spring Semester of the 2019-2020 Academic Year was carried out with volunteer 7th grade Science teachers, 66.6% of which are female, in 6 different public schools in Ankara. Semi-structured interview forms were developed using the relevant literature in order to make interviews with teachers. Teachers had difficulty in conducting and coordinating online STEM activities through minimal correcting feedback. Obviously, they needed family support in most cases, and student participation was too low. However, online access to resources, and online STEM implementation developed students' 21st century skills, such as problem solving, accessing and analyzing data, and critical thinking. Some of the suggestions recommended by the study are: 1) Online courses should be supported by multiple learning environments where students and practitioners can improve their STEM skills and appeal to more skills; 2) STEM implementations should ensure that the subject is taught for each course; and 3) Creating different learning environments at various grade levels, with different units, considering that it will contribute to the literature on online STEM implementations).

4.5.34 Pareek & Soni, 2020

This study discusses and analyzes COVID-19 and its impact on school education in the Indian context from a gender perspective. It is an empirical paper where a literature review was done to understand the concept of Indian schools in the context of online education, the importance of education and COVID 19 impacts on education from the perspective of parents, teachers, and students. The study's hypothesis is: There is/isn't significant difference between the perception of male and female respondents about the impact of online teaching during COVID-19 pandemic. For this purpose, a total of 100 respondents were selected from public and private sector schools of the Udaipur region of Rajasthan, by the convenience sampling procedure. Data collection was done using structured questionnaires using a Likert scale and analysis was performed with the help of group statistics and independent sample test, using IBM SPSS software 20. For statistical analysis factor analysis, group statistics and independent sample test was used for this study. Results of the study revealed that online classes were the best viable solution in situations like a pandemic and the tool was embraced by both the gender stakeholders equally. However, a few critical aspects that need a solution in this context are identified as trained and skilled teachers. School administrations are required to train their teacher to the level that enables the smooth online learning system. From the future point of view, virtual classes will contribute to our nation's educational growth. We should support our government to adopt online classes and help our students to give them the best future.

4.5.35 Pathiranage & Karunaratne, 2023

In this study, the researchers from Sri Lanka examine the way literature benefits the knowledge of teachers' perceptions of digital literacy in education. It systematically investigates 59 research articles in EBSCO discovery services. The study's questions are: 1)

How do teachers use digital tools and technology? 2) What challenges do teachers encounter in the process of competence development? and 3) What are teachers' expectations for the agency in technology enhancements in teaching? This paper systematically reviews 59 research articles searched in EBSCO discovery services, covering commonly included 80 different databases in the default search before and after the COVID pandemic to understand the teachers' involvement in technology-enhanced teaching. The search process is based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework, encompassing four main steps of identifying records, screening, assessing eligibility, and inclusion. Results revealed a contradiction between expectations for technology integration into education before the pandemic and the experience after the lockdown. Even though teachers are confident using basic technology, many have observed a disconnect between technology and pedagogy that emphasizes digital literacy's need. Teachers struggle with technology integration due to lack of knowledge, accessibility, cost, disconnection, infrastructure, time, workload, and technology anxiety. Therefore, teachers expect institutions to play a significant role in integrating technology by assisting them in mitigating challenges that require defining the institutional role of a technology-integrated learning environment. The comparison of the research work performed related to teachers' agency in technology during pre- and post-COVID context highlighted noticeable differences. Technology, being an optional addition during the pre-COVID period, led teachers to freely use technology without significant governance imposed on teachers' actions. However, the sudden change due to COVID has become an eye-opener for all the education stakeholders, specifically making teachers realize their actual competency and role in technological integration.

4.5.36 Pereira et al., 2021

This paper examines pre-service teachers' perspectives on assessment feedback developed in a teacher education course during the COVID-19 pandemic. When the first lockdown was formally declared in Portugal, the formative context in which the study was situated had just begun its second year of experimentation. The study's questions are as follows: 1) How did student teachers perceive the learning they developed in this context? 2) How did student teachers perceive the formative approach? and 3) How did student teachers perceive their teacher's feedback?). The study's approach was designed with close reference to four key assumptions about preservice teachers' professional learning, namely Pedagogical Content Knowledge (PCK), rehearsed practice as well as epistemology of reflective practice and assessment, involving both teacher's feedback (assessment for learning) and student teachers' self-inspection (assessment as learning). Following a scaffolding approach, the students were to apply theoretical knowledge (learned in their first degree) to designing a practical portfolio focusing on literacy education in pre- and elementary school. Data was collected through an online questionnaire. The participants were a complete group of 24 preservice student teachers enrolled in a master's in preschool and elementary education at a Portuguese public university (first-year students, second semester). They were all full-time female students, aged between 21 and 35 years old, six of whom had undertaken their first degree/minor at another university and had no prior experience in online teaching. It reveals both positive and

critical aspects regarding the feedback provided by teachers. The study concluded that online feedback involves the design and organization of strong learning contexts that are underpinned by acknowledged learning principles.

4.5.37 Pokhrel & Chhetri, 2021

In this study, the researchers from Bhutan aim at providing a comprehensive report on the effect of the COVID-19 pandemic on online teaching and learning of various papers, as well as indicating the way forward. Although there have been serious challenges for teachers and schools, when it comes to distance learning, there are many opportunities made by the pandemic for the ill-equipped and the distant plans of executing the e-learning system. The relationship between teachers and parents has become stronger than ever. According to the researchers, distance learning calls for parental support for their children's learning academically and economically. Students with disabilities need special care during the pandemic. Using online platforms, like Google Classroom, Zoom, virtual learning environment and social media and various group forums like Telegram, Messenger, WhatsApp and WeChat has been tested for teaching and learning for the first time ever to continue education. It can even continue after the return of school attendance, where these platforms can provide additional resources and coaching to students. Teachers must take creative initiatives to overcome the limitations of virtual teaching. Teachers are cooperating with each other to enhance online teaching methods. In addition, creative solutions and willingness to learn from others and trying new tools will be available, since teachers, parents and students all work together to support teaching and learning in a more interactive and engaging environment. Distance learning has facilitated teaching and learning in new ways unlike the case with traditional education involving mere school attendance. Such a fact can state a lesson from the pandemic, which is the importance for teachers and students to be knowledgeable at using online learning methods.

4.5.38 Rodrigo & Ladrado, 2022

The study describes how the production of video lectures in Ateneo de Manila University under the Open Educational Resource (OER) was guided by the principles of quality and equity; to discuss using lectures based on YouTube analytics and a survey of Ateneo students and teachers; and to measure the impact of the lectures on students' learning experience. This paper discusses the production design decisions and process to illustrate the emphasis on quality and equity, the use and reach of the Magisterial Lectures as captured by YouTube analytics, the use of Magisterial Lectures by Ateneo teachers and students and the impact of the Magisterial Lectures on Ateneo students' learning experiences. The OER discussed in this paper was created by the Ateneo de Manila University, a university in the Philippines, during the COVID-19 pandemic. The primary beneficiaries of these materials were Ateneo students and teachers, most of whom were in the Philippines, working or studying from home. The data was collected from three sources: access statistics from YouTube, a student survey, and a teacher survey. The researchers employed a purposive sampling method in recruiting student and faculty respondents. The authors found that the videos reached over 350,000 viewers in thirty-seven countries. The videos quality was ensured through both content and form.

Content referred to contextualization and curricular alignment. Quality of form referred to the high production value of the videos, something that students and teachers alike appreciated. The study suggested the increase of the accessibility of these materials by following through with the initial plans to produce lecture transcripts and audio-only versions. Since Areté produces its own educational podcasts, the audio-only Magisterial Lectures may be included in these channels. Furthermore, Areté should regularly monitor the use of these materials to gauge their impact and reach, and to determine whether continued production of these lectures would benefit a post-pandemic audience.

4.5.39 Rodríguez-Muñiz et al., 2021

This study explores the perception of secondary Mathematics teachers' readiness to emergency remote teaching (ERT) during the COVID-19 pandemic in Spain, based on their technological pedagogical content knowledge, their previous training in digital teaching tools, their level of digital competence for teaching Mathematics and their adaptation to ERT. The study's questions are as follows: 1) How can the TPCK of secondary mathematics teachers be described considering their teaching practices adopted during the COVID-19 pandemic? 2) To what extent had secondary mathematics teachers been trained in digital teaching tools when the COVID-19 pandemic struck? 3) What is the secondary mathematics teachers' perception of their level of digital teaching competence? and 4) What factors influence secondary mathematics teachers' perception of their adaptation to the ERT situation? The target population consisted of in-service Spanish secondary mathematics teachers. A non-random sampling was carried out. A sample of 244 secondary mathematics teachers was considered to analyze their perception. The target individuals were asked to participate in the research study by means of different forms of communication, in particular e-mail and social networks. The research instrument consisted of a 28-item questionnaire designed and administered in Spanish using Google Forms. Teaching practices during the accidental COVID-19 pandemic forced secondary mathematics teachers to expand their TPCK. Added to that, significant differences were clearly observed based on gender and age with respect to teachers' perception of their adaptation to ERT. The demand for preparation for video editing and online quiz composition can be considered for the design of future training programs.

4.5.40 Saleh et al, 2023

This study examined how lecturers' professionalism, course impression, and facilitating conditions at Universiti Teknologi MARA Malaysia (UiTM) affected undergraduate and graduate students' remote learning before and in the middle of COVID-19 pandemic. The model in this quantitative study was converted into academic policy for lecturer teaching evaluation and has been applied since September 2010. The higher prediction accuracy of the model demonstrated that students' remote learning activities were highly related to lecturers' professionalism, course impression, and facilitating conditions. The structural model demonstrated that the t-statistics of all measurement variables were significant at 1%. The strongest predictor of students' enjoyment of remote learning pre- and mid-pandemic was lecturers' professionalism. In the importance-performance matrix, lecturers' professionalism was in the quadrant for 'keep up the good work'. Facilitating conditions and course

impression did not require further improvement even during the pandemic. The influence of remote learning was demonstrated in the students' graduation rates and grades. The results also presented theoretical and practical implications for the UiTM hybrid learning plan post pandemic. Based on the findings, the authors recommended that the University policymakers revise the existing teaching and learning policy to empower LP through 360° teaching evaluation by students, peers or colleagues, and self-reflection. The revised policy should acknowledge students' remote learning accessibility. Accessibility does not merely involve internet or computer access, as family conditions can influence levels of concentration and learning material access. Furthermore, online classes must emphasize tolerance, adaptability, and communication.

4.5.41 Sari & Saralar-Aras, 2022

This study uncovers the experiences of primary school teachers in online teaching during the COVID-19 pandemic in Turkey, regarding obstacles to teaching different subjects, such as Mathematics and Science. The study was conducted in a case study design, as it was aimed to reveal the contextual experiences of primary school teachers in online education during the COVID-19 pandemic process. Particularly, in this multiple case study the study's sample comprised 12 primary school teachers with various professional experiences in years (such as 1-10 years and 11-20 years). The researchers collected the data through semi-structured interviews. The teachers found the lessons they teach in similar difficulty; that is to say, they did not find *e.g.*, teaching mathematics more difficult than teaching social sciences. Instead, they reported more general issues. These findings were collected under 4 main themes: guidance and support, planning and instruction, technical issues, and the use of technological tools. It suggested that schools should provide some school-based training to support teachers (especially pre-service teachers) and parents, whose interference played a major problem during the pandemic. Young children completely lack the skills required for online learning and are less capable of using technology and following teachers' instructions; they do not always have the self-discipline to stay away from distractions. For this reason, it was emphasized that a structured environment is necessary especially for young children not to be easily distracted. It may be suggested to update related teacher training courses at the universities to prepare pre-service teachers to teach with technology when they graduate. Moreover, particular short courses for parents could be planned.

4.5.42 Suksawas & Yiemkuntitavorn, 2021

This study investigates the type of technological support and training teachers need for teaching online during and after the COVID-19 pandemic. It also evaluates teachers' satisfaction with their training in relation to their needs. The study's questions underpinning this study are: 1) What types of "fundamental technologies" do teachers need to teach online during and after the COVID-19 pandemic? 2) What topics do teachers need training or professional development on to help them to overcome their challenges? and 3) To what extent were the teachers satisfied with the training provided in relation to their needs? This study included a sample of 59 in-service teachers from different parts of Thailand. The sample was 59 participants. Their responses were recorded on a Likert Scale, and also taken

as answers to open-ended questions. The research findings showed that there was a need for computers or other computing devices, a reliable and stable internet connection, a microphone, a headset and a camera. It also showed that implementing engaging lessons online and supporting students to use ICTs for projects or class work demanded specific training. There is a need to create a teacher training course that responds to language teachers' needs in more detail, over longer hours, and with more workshops. Government sectors and school administrators need to consider how to support teachers during the COVID-19 pandemic so as to help them to successfully achieve the set learning goals and objectives. If the teachers are confident in their online teaching practice, this may mitigate the effects of the pandemic on students' learning outcomes.

4.5.43 Sultana & Palaroan, 2023

This study examines how the COVID-19 pandemic and the first-time transition to online mode of instruction influenced Sino-Foreign University student perceptions of online learning in terms of (1) academic dishonesty, (2) privacy and confidentiality, (3) impact of social media on online learning (4) hybrid method and (5) institutional training. In order to judge students' perception of the transition to online learning, this study employed a cross-sectional survey-based design to gauge student perceptions of online learning before, during, and after the transition to remote instruction. It combines the elements of quantitative research and qualitative research. It used a mixed-method to increase the generalizability of the findings. The questionnaire was allocated on November 15th, 2021, using formerly manufactured students' WeChat groups that the university embraced for imparting to their students. Survey questions have been prepared in two styles, some are multiple-choice, and some are Likert scale, which was rated from one to five points. The authors obtained data from senior students who have experience with offline and online learning modes during the COVID-19 Pandemic. This study finds that (1). Sino-foreign University students are more conscious of academic integrity, including plagiarism of online assignments (2). Students didn't submit the same assignments in several courses and didn't submit others to individual projects (3). Students do not think that privacy and confidentiality are critical challenges of the transition to online education (4). Social media has a vital role in improving their academic performance (5). A blended learning model might be the best option for a post COVID-19 environment for higher institutions (6). Both instructors and students must have the proper training to overcome the barrier of a thriving online environment. In the context of the recent trend of globalization, it is crucial to investigate how the COVID-19 pandemic influenced student perceptions of online learning in a Sino-foreign university in China.

4.5.44 Süt, 2022

This study investigates the educational experiences of Syrian students, who switched to distance education due to the COVID-19 pandemic, and the factors affecting success in academic courses during this period. Answers to the following problems were sought: 1) What are the views of Syrian students on the practice of distance education? 2) What are the views of Syrian students on the factors affecting their motivation during distance education practices? 3) What are the views of Syrian students about the support they have received

since they started distance education? and 4) What are the views of Syrian students on the use of technology since they started distance education? The descriptive survey model' was applied. The study group consists of 200 students, 63% of which are girls selected by random sampling from students of secondary education institutions in Kahramanmaraş in the 2020-2021 academic year, who received distance education. During the distance education, 33.5% of the students received education using a computer while 18.5% with a TV and 33.5% with a smartphone. Grade levels were determined as 58% for 9th grade, 25.5% for 10th grade, 15.5% for 11th grade and 4% for 12th grade. The collection of the data obtained in the research was carried out by using the questionnaire technique. The findings obtained at the end of the research were discussed under students' views on distance education, factors affecting academic motivation, changes in studying habits and academic psychological support of families and teachers during distance education. The researcher suggested that more effective courses be made to increase student interaction in distance education and to eliminate the problem of social isolation. As for disadvantaged groups who have difficulty in accessing distance education, these courses can be recorded and students can be followed later. Moreover, creative, interactive, student-centered and group-based lessons can be planned, more effective instructions and feedback can be given to the student's attention and attention can be drawn to the lesson.

4.5.45 Sutiah et al., 2020

The study reveals the implementation of distance learning that was conducted suddenly because of the COVID-19 pandemic and assessed by the learning process, learning facilities and infrastructure, as well as the psychological aspects of students towards distance learning. This research design has a quantitative paradigm with a survey approach conducted at the State Islamic Higher Education in Indonesia. Catering data was carried out in June 2020 after the end of the even semester of the 2019/2020 academic year. Primary was collected through a survey with an instrument in the form of a questionnaire. There were 39 close-ended statements and 6 open-ended questions. The questionnaire design used Google Form and its distribution was through the WhatsApp application groups. A total of 750 active students of Faculty of Education and Teacher Training, Maulana Malik Ibrahim State Islamic University, Malang, Indonesia during 2020 academic years were enrolled in this study. Distance learning cannot replace the need for onsite and face-to-face learning, but may complement existing traditional classroom-based learning model. Therefore, the study showed that students preferred face-to-face learning rather than distance learning. Students encountered many difficulties during distance learning and were concerned about achieving learning outcomes. The learning process, learning facilities, infrastructures, and students' psychological aspects towards distance learning should be assessed, or their feeling of difficulty during distance learning and worrying about learning outcomes achievement will be increased. There is a need to develop learner capacity and capability with the goal of producing learners who are well-prepared for the complexities of today's workplace.

4.5.46 Tiernan et al., 2021

This study aimed at developing and evaluating an online teaching module within learning

environments for post-primary teachers in Initial Teacher Education (ITE). The study's objectives were: (1) To develop an effective online teaching pedagogies module which prepares student teachers for online placement in schools, (2) To evaluate the benefits of the module to student teachers for teaching online during placement, and their future teaching practice and (3) To improve online teaching modules that can respond to student teacher learning needs on placement and in their professional practice as teachers. This study was conducted in the Institute of Education at Dublin City University. Participants were 244 student teachers studying for a Professional Masters in Education (PME). All participants on the module were invited to complete the questionnaire. Thus, convenience sampling was used as a selection mechanism, as it provided researchers with ease of access to the participants. The module was designed in response to the COVID-19 pandemic and aimed to equip student teachers to continue their online teaching, including professional placement, during the school closures in Ireland in late 2020 - early 2021. Data were collected from students at the end of the academic year using an anonymous online questionnaire. The questionnaire contained 20 questions spread across four main themes: perceptions of module content; perceptions of assessment approaches; application of learning; and looking to the future. The study suggested that implementing the developed module was successful in preparing student teachers to teach online, providing them with the tools and confidence necessary for success. Improvements suggested the development of differentiated pathways for student teachers who are more experienced with online teaching. Future studies could examine the experiences of post-primary students. Future work could focus also on examining online and blended solutions specifically tailored for post-primary subjects and investigate their effectiveness from the perspective of teachers and students.

4.5.47 Tosto et al, 2023

This mixed-methods study comprehensively explores students' perspectives on online learning across different demographic groups, including gender, race-ethnicity, and domestic versus international student status. The study's questions are: 1) What mode of course delivery (Zoom, async, or on-campus) do students prefer and why? 2) What do students see as the main advantages and disadvantages of online learning compared to traditional, on-campus learning? and 3) What are the main reasons for students to keep their camera off during Zoom classes? It answers such questions using data from an anonymous survey conducted among a large and diverse sample of students (about 6000) at a mid-size university in the Northeastern United States. The findings reveal important insights: (1) Females are nearly twice as likely as males to prefer online asynchronous classes and feel self-conscious about keeping their cameras on during online synchronous (*e.g.*, Zoom) classes. However, gendered views and preferences align in other aspects of online learning. (2) Black students show a stronger preference for Zoom classes compared to online asynchronous classes and emphasize the importance of recording Zoom meetings. Hispanic students are twice as likely to prefer asynchronous online classes, which offer greater flexibility to manage multiple responsibilities. (3) International students value the ability to learn at their own pace provided by online learning but express dissatisfaction with the lack of peer interaction. On the other hand, domestic students are more concerned about reduced interaction with teachers in online

education. Domestic students also exhibit a higher tendency to turn their cameras off during Zoom classes, citing reasons such as self-consciousness or privacy. These findings carry significant implications for future research and educational practice, highlighting the need for tailored approaches that consider diverse student perspectives.

4.5.48 Ugalingan et al., 2021

This study describes the experiences of pre-service teachers who have undertaken an online teaching internship program in the Philippines during the COVID-19 pandemic. The study seeks to address the following research questions: 1) What challenges do pre-service teachers encounter during online tutorials? and 2) In what ways can the online internship experience be helpful to pre-service teachers in coping with the challenges brought about by the pandemic? Given the goals of the investigation, a case study approach employing qualitative methods was deemed appropriate for the method. Pre-service teachers (PSTs) were designated to conduct tutorial sessions. Under the guidance of supervising teachers, the PSTs were required to observe online classes, assist in the design of learning materials, and facilitate tutorials in different reading and writing skills. In total, PSTs completed 54 hours to fulfill the online internship program. For this investigation, 10 pre-service teachers enrolled in the internship course were invited to join as participants. The study's investigation showed that technical difficulties, adjustments in online communication, and lack of content knowledge and pedagogical skills appear to be relevant challenges for PSTs in implementing lessons in an online environment. However, opportunities for collaboration with experienced teachers, developing learner autonomy, and modeling teaching strategies appear to help PSTs cope with these new teaching conditions. Online teaching internship afforded opportunities to develop learner autonomy, collaborate with supervisors and model teaching strategies in online learning. Identifying different ways on how institutions implement the internship program for PSTs during the pandemic can provide better insights on refining the core competencies needed for supervision in these times.

4.5.49 Valkenburgh & Gierhart, 2022

In this study, the researchers from USA reveal how teachers' pedagogical practices have changed during the COVID-19 pandemic. Additionally, it offers pedagogical strategies found useful by the researchers to create and maintain supportive relationships with teachers and students during such a difficult time. It suggests using digitally mediated teaching and learning strategies, staying connected with students and using badge-based assessment and feedback approaches to build and strengthen bonds with students. The researchers concluded that the relationship between students and teachers must be intensified, regardless of learning under the circumstances of COVID-19 Pandemic, or any other pandemic that might occur in the future, and no matter what level or age students are. According to the researchers, the support that teachers get in training program should cover the minds and moods of their students, especially during middle school. No students can make great strides in learning without being supported, heard and listened to. Teachers should decide what essential knowledge, skills and attitudes students can show in order the vanquish the obstacles to their learning and achieve their goals and plan to continue their great performance in the current

time and for the future.

4.5.50 Yurtçu & Orhan-Karsak, 2021

This study investigates the effects of the COVID-19 pandemic on lifelong learning tendencies. The study's questions are: 1) What are the views of Turkish teacher candidates about lifelong learning tendencies? and 2) What kind of a process do they follow for lifelong learning tendencies during the pandemic? The research is designed based on qualitative research methods, such as observation, interview and document analysis. The participants were undergraduate students studying at the Faculty of Education in Turkey, Semi-structured interview forms were directed by researchers with ten students. It obtained in-depth information, using content analysis in the process of analyzing the responses received from the ten students. According to the findings obtained from the participants' views, lifelong learning is an inevitable part of life outside of school. However, it has a continuous and academic supportive feature. The researchers concluded that if the school wants to improve lifelong learning skills, teachers need to change their roles. They should be in a supporting role for students in discovering and acquiring knowledge, attitudes skills, abilities, and thus facilitating learning, not as real, theoretical or applied knowledge distributors. It is a need to stimulate students' critical attitudes and active learning styles in the lifelong learning process. As stated by the participants in this study, in the role of the school as a supporter of lifelong learning, teachers should have (1) originality-based self-efficacy, (2) establishing relationships that facilitate self-regulation, (3) seeing the connections between subject, discipline and life, (4) self-reflection, development and adaptation competencies related to lifelong learning.

5. Study Limitation

It is important to acknowledge certain limitations associated with this research methodology. Firstly, the reliance on existing literature may introduce selection bias, as certain studies or perspectives may be overrepresented or underrepresented. Secondly, the analysis is dependent on the quality and reliability of the selected sources, and the possibility of biases or limitations in the original studies cannot be completely ruled out. Lastly, the findings of this literature review may be influenced by the knowledge cutoff date of the used articles, which may exclude more recent developments and studies published after that time.

6. Further Studies

Future study evaluating the existing relevant literature could yield further valuable information. More specifically, the reviewed findings provide guidance for them to design and implement curricula that are more responsive to teacher training in extraordinary times, as well as to improve existing curricula based on them. Furthermore, in response to our research question 2, future research should concentrate on various crucial areas to enhance comprehension and refine methodologies. These areas could be:

- Investigate the integration of educational technology in online teaching, emphasizing best practices for selecting and utilizing digital tools to enrich learning experiences.

- Explore the influence of online teaching on teacher training programs and identify effective methods for preparing educators to deliver high-quality online instruction. This exploration could involve investigating the development of robust policies and guidelines for implementing online teaching practices in teacher education programs, taking into account regulatory frameworks and institutional support.
- Evaluate student learning outcomes in online environments, comparing them with traditional classroom settings to assess effectiveness and areas for enhancement. This analysis could include examining strategies to foster a sense of community and collaboration among students and educators in online learning environments to amplify social interaction and support.
- Examine how online teaching practices can tackle equity issues, ensuring all students have equitable access to resources and learning opportunities. This examination could also involve investigating the impact of online learning on the well-being and mental health of students and educators, exploring strategies to bolster well-being in virtual settings.
- Explore innovative assessment techniques and feedback mechanisms suitable for online teaching to ensure precise evaluation of student progress and engagement.
- Research effective pedagogical strategies customized for online teaching to boost student engagement, interaction, and learning outcomes, addressing constraints related to supervision and mentoring quality.

7. Conclusion

When the COVID-19 pandemic initially struck Yuhuan City in China in 2020, no one foresaw its global impact or the lasting changes it would bring to communication modes. The long-term effects of the pandemic on education and educators remain uncertain. However, what is evident is that the landscape of education has become markedly more challenging. School closures have underscored the urgent need to swiftly adjust to new teaching and learning environments. Teacher education institutions and educators have realized the importance of being prepared for unforeseen circumstances at any given moment (Flores & Swennen, 2020).

The COVID-19 pandemic has significantly impacted education systems worldwide, and teacher education has not been immune to these effects. As schools shifted to distance and hybrid learning models, teacher preparation programs faced unprecedented challenges. However, amidst these difficulties, new opportunities for innovation and growth have also emerged. Many researchers started to study the shift that happened to the teacher education programs during this period, trying to discover different teacher preparation aspects which was affected during this period.

The articles assessed in this study varied in focus but collectively mirrored the concerns and interests of educators during the period of school closures prompted by the COVID-19 pandemic. These articles illuminate how the pandemic's global repercussions have both

surprised and motivated teachers across all levels to confront unparalleled challenges. They offer insights into the substantial responsibilities that student teachers, educators, and teacher educators have shouldered since the pandemic's inception and will continue to face in the future. Through a diverse range of topics and research methodologies, these studies provide valuable perspectives on examining the 'new normal' in education, encompassing teaching and teacher education. They also underscore how such research can drive innovation and improvements in traditional and online teaching methods. It is clear that collaborative research endeavors are essential to develop a comprehensive body of theoretical and practical knowledge that can steer teacher education in adapting to the changing educational environment.

References

- Al-Hajri, S. J. (2023). The Reality of Using E-Learning during the COVID-19 Pandemic from The Perspective of Faculty Members and Trainers in Kuwait. *International Journal of Curriculum & Technological Education*, 13(23).
- Al-Harbi, F. A. (2023). The challenges faced by kindergarten teachers with distance education under the Corona pandemic. *Journal of Educational and Psychological Sciences*, 7(18), 82-103. <https://doi.org/10.26389/AJSRP.B161222>
- Al-Houli, A. I., & Al-Mesad, T. I. (2022). Attitudes of School Teachers in the State of Kuwait Towards the Experience of Distance Education During the Coronavirus Pandemic. *International Journal of Higher Education*, 11(2), 82-99. <https://doi.org/10.5430/ijhe.v11n2p82>
- Al-Jarah, F. S. F. (2020). The reality of e-learning in the distance learning program in light of the emerging Corona pandemic "COVID-19" from the viewpoint of students in Jordan between theory and practice. *Journal of Educational and Psychological Science*, 4. <https://doi.org/10.26389/AJSRP.C310520>. <https://doi.org/10.26389/AJSRP.C310520>
- Al-Shaye, A. M., & Al-Wadey, A. A. (2023). Reality of remote Training in light of the Corona pandemic from the male and female teacher's point of view at Riyadh and Dammam. *Journal of Educational and Psychological Sciences*, 7(47), 14-29. <https://doi.org/10.26389/AJSRP.E021023>
- An, B. G. & Zakaria, A. R. (2022). A Scoping Review of Teacher Training During COVID-19 Pandemic. *International Education Studies*, 15(2), 102-112. <https://doi.org/10.5539/ies.v15n2p102>
- Basilaia, G., & Kvavadze, D. (2020). Transition to Online Education in Schools during a SARS-CoV-2 Coronavirus (COVID-19) Pandemic in Georgia. *Pedagogical Research*, 5(4). <https://doi.org/10.29333/pr/7937>
- Boyko, M., Turko, O., Dluhopolskyi, O., & Henseruk, H. (2021). The Quality of Training Future Teachers during the COVID-19 Pandemic: A Case from TNPU. *Education Sciences*, 11(660), 1-13. <https://doi.org/10.3390/educsci11110660>

- Bozkurt, A., Karakaya, K., Turk, M., Karakaya, Ö. & Castellanos-Reyes, D. (2022). The Impact of COVID-19 on Education: A Meta-Narrative Review. *TechTrends*, 66(5), 883-896. <https://doi.org/10.1007/s11528-022-00759-0>
- Carrillo, C., & Flores, M. A. (2020). COVID-19 and teacher education: a literature review of online teaching and learning practices. *European Journal of Teacher Education*, 43(4), 466-487. <https://doi.org/10.1080/02619768.2020.1821184>
- Cengizhan, S. (2021). The Effects of COVID-19 Process on Time Management of Foreign Language Teacher Candidates. *Educational Policy Analysis and Strategic Research*, 16(2), 295-312. <https://doi.org/10.29329/epasr.2020.345.13>
- De La Garza López, I. L. (2023). Teacher training before and during the COVID19 pandemic in higher education. *South Florida Journal of Development*, 4(2), 1021-1030. <https://doi.org/10.46932/sfjdv4n2-030>
- Fauzi, A., Husamah, H., Miharja, F. J., Fatmawati, D., Permana, T. I., & Hudha, A. M. (2020). Exploring COVID-19 Literacy Level among Biology Teacher Candidates. *EURASIA Journal of Mathematics, Science and Technology Education*, 16(7), 1-12. <https://doi.org/10.29333/ejmste/8270>
- Flores, M. A., & Swennen, A. (2020). The COVID-19 pandemic and its effects on teacher education. *European Journal of Teacher Education*, 43(4), 453-456. <https://doi.org/10.1080/02619768.2020.1824253>
- Halitoglu, V. (2021). Attitudes of student teachers towards distance education within the context of COVID-19 pandemic. *International Journal of Curriculum and Instruction*, 13(1), 816-838.
- Hasan, A. H. S. (2023). Education transformations in post-Corona pandemic time: an analytical study. *Arab Journal for Scientific Publishing*, 6(26).
- Henriques, S., Correia, J. D., & Dias-Trindade, S. (2021). Portuguese Primary and Secondary Education in Times of COVID-19 Pandemic: An Exploratory Study on Teacher Training and Challenges. *Education Sciences*, 11(542), 1-11. <https://doi.org/10.3390/educsci11090542>
- Hill, J. B. (2021). Pre-Service Teacher Experiences during COVID-19: Exploring the Uncertainties between Clinical Practice and Distance Learning. *Journal of Practical Studies in Education*, 2(2), 1-13. <https://doi.org/10.46809/jpse.v2i2.18>
- Hodges, T. S., Kerch, C., & Fowler, M. (2020). Teacher Education in the Time of COVID-19: Creating Digital Networks as University-School-Family Partnerships. *Middle Grades Review*, 6(2), 1-9. Retrieved from <https://scholarworks.uvm.edu/mgreview/vol6/iss2/4>
- Holt, L. (2021). Preservice Teacher Perceptions of Virtual Reading Fieldwork During the COVID-19 Pandemic. *Educational Process International Journal*, 10(4), 7-19. <https://doi.org/10.22521/edupij.2021.104.1>
- Huang, Y., Lazarides, R., & Richter, D. (2023). Teachers' adaptations to COVID-19:

Perceived preparedness for distance education, frequency of teacher-student contact, and resources in ICT. *European Journal of Teacher Education*, 1-26. <https://doi.org/10.1080/02619768.2023.2288554>

Ismail, N., Samad, I. S., Mulyadi, N., Rahmat, N., & Tini, N. (2021). Teaching in the Pandemic COVID-19: Transition to Online Learning after Spending Years in Class. *Advances in Social Science, Education and Humanities Research*. <https://doi.org/10.2991/assehr.k.210615.080>

Johnson, R. M., Little, C. W., Shero, J. A., van Dijk, W., Holden, L. R., Daucourt, M. C., ... Hart, S. A. (2024). Educational experiences of U.S. children during the 2020-2021 school year in the context of the COVID-19 pandemic. *Developmental Psychology*, 60(7), 1298-1312. <https://doi.org/10.1037/dev0001488>

Julie, H., Veronika, V. R., & Apriani, M. S. (2022). Indonesian mathematics teachers' views on distance learning barriers during the early COVID-19 pandemic. *Journal of Research and Advances in Mathematics Education*, 7(1), 27-35. <https://doi.org/10.23917/jramathedu.v7i1.15616>

Keleşoğlu, S., & Yetkiner, A. (2022). Teaching Practices Under the Shadow of COVID-19. *Participatory Educational Research*, 9(4), 92-110. <https://doi.org/10.17275/per.22.81.9.4>

Kier, M. W., & Johnson, L. L. (2022). Exploring How Secondary STEM Teachers and Undergraduate Mentors Adapt Digital Technologies to Promote Culturally Relevant Education during COVID-19. *Education Sciences*, 12(48), 1-25. <https://doi.org/10.3390/educsci12010048>

Kutlay, E., Gönkek, P., & Köksal, A. (2022). Google Trends during COVID-19: Raising awareness among physical education teachers. *Cypriot Journal of Educational Sciences*, 17(1), 217-227. <https://doi.org/10.18844/cjes.v17i1.6697>

Lampropoulos, G., & Admiraal, W. (2023). The impact of COVID-19 pandemic on primary, secondary, and K-12 education: A systematic review. *International Journal on Studies in Education*, 5(4), 348-440. <https://doi.org/10.46328/ijonse.161>

LaTronica-Herb, A., & Noel, T. K. (2023). Understanding the effects of COVID-19 on P-12 teachers: a review of scholarly research and media coverage. *Frontiers in Education*, 8. <https://doi.org/10.3389/feduc.2023.1185547>

Lee, Y. J., Davis, R., & Li, Y. (2022). Implementing Synchronous Online Flipped Learning for Pre-service Teachers during COVID-19. *European Journal of Educational Research*, 11(2), 653-661. <https://doi.org/10.12973/eu-jer.11.2.653>

Mabalane, V. T. (2021). Work Integrated Learning Online Enrichment Intervention Programme for Student Teachers. *International Journal of Higher Education*, 11(1), 59-70. <https://doi.org/10.5430/ijhe.v11n1p59>

Mavuru, L., Pila, O. K., & Kuhudzai, A. G. (2021). Pre-Service Teachers' Levels of Adaptations to Remote Teaching and Learning at a University in a Developing Country in the

Context of COVID-19. *International Journal of Higher Education*, 11(1), 12-30. <https://doi.org/10.5430/ijhe.v11n1p12>

Mikhailov, A., & Burlakova, M. (2022). Post-COVID-19 Teacher Training: The Trends That Are to Stay. *International Dialogues on Education*, 81(2), 124-130.

Moliner, L., & Alegre, F. (2022). COVID-19 Restrictions and Its Influence on Students' Mathematics Achievement in Spain. *Education Sciences*, 12(105), 1-10. <https://doi.org/10.3390/educsci12020105>

Nikolopoulou, K. (2022). Online Education in Early Primary Years: Teachers' Practices and Experiences during the COVID-19 Pandemic. *Education Sciences*, 12(76), 1-12. <https://doi.org/10.3390/educsci12020076>

Orhan-Karsak, H. G., & Yurtçu, M. (2021). The Effects of Pre-service Teachers' Extracurricular Study Habits and Emotion Regulation on Lifelong Learning Tendencies in COVID-19 Process. *International Journal of Curriculum and Instruction*, 13(1), 334-342.

Ortaş, B. Y., & Demir, O. (2022). Opinions of teacher candidates on the effects of emergency distance education implementations during the COVID-19 pandemic period on learning-teaching process, metacognition and social skills: A case study. *International Journal of Curriculum and Instruction*, 14(1), 155-182.

Ozdemir, E. B. (2021). Views of Science teachers about online STEM practices during the COVID-19 period. *International Journal of Curriculum and Instruction*, 13(1), 854-869.

Pareek, T., & Soni, K. (2020). A Comprehensive Study on COVID-19 Pandemic: An Impact on School Education in India. *Amity Journal of Management*, VIII, 2581-5261. <https://doi.org/10.4236/jss.2020.89004>

Pathiranage, A., & Karunaratne, T. (2023). Teachers' Agency in Technology for Education in Pre- and Post-COVID-19 Periods: A Systematic Literature Review. *Educ. Sci.*, 13(9), 1-25. <https://doi.org/10.3390/educsci13090917>

Pereira, I. S. P., Fernandes, E. L., & Flores, M. A. (2021). Teacher Education during the COVID-19 Lockdown: Insights from a Formative Intervention Approach Involving Online Feedback. *Education Sciences*, 11(400), 1-17. <https://doi.org/10.3390/educsci11080400>

Pokhrel, S., & Chhetri, R. (2021). A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, 8(1), 133-141. <https://doi.org/10.1177/2347631120983481>

Reshi, A. R., Khanrafiq & Wanihaya (2023). COVID-19 Pandemic and Teaching and Learning: A Literature Review. *Morfai Journal*, 2(4), 820-826. <https://doi.org/10.54443/morfai.v2i4.693>

Rodrigo, M. M. T., & Ladrido, E. M. M. (2022). Promoting Equity and Assuring Teaching and Learning Quality: Magisterial Lectures in a Philippine University during the COVID-19 Pandemic. *Education Sciences*, 12(2), 146. <https://doi.org/10.3390/educsci12020146>

- Rodríguez-Muñiz, L. J., Burón, D., Aguilar-González, A., & Muñoz-Rodríguez, L. (2021). Secondary Mathematics Teachers' Perception of Their Readiness for Emergency Remote Teaching during the COVID-19 Pandemic: A Case Study. *Education Sciences, 11*(238), 1-18. <https://doi.org/10.3390/educsci11050228>
- Saleh, M. I. M., Alias, N. A., Ariffin, S., Ibrahim, Z., Ramli, A. R., & Aliman, S. (2023). The sudden transition to remote learning in response to COVID-19: lessons from Malaysia. *Humanities & Social Sciences Communications, 10*(1). <https://doi.org/10.1057/s41599-023-01751-6>
- Sari, M. H., & Saralar-Aras, İ. (2022). A Case Study on Online Teaching during the COVID-19 Pandemic Perceived by Primary School Teachers. *International Journal of Psychology and Educational Studies, 9*(2), 440-449. <https://doi.org/10.52380/ijpes.2022.9.2.705>
- Suksawas, W., & Yiemkuntitavorn, S. (2021). Investigation of Teacher Support and Teacher Training During the COVID-19 Pandemic: Tools and Skills Moving the Classroom Forward. *English Language Teaching, 15*(1), 118-129. <https://doi.org/10.5539/elt.v15n1p118>
- Sultana, R., & Palaroan, R. (2023). COVID-19 and Transition to Online Learning: Evidence from a Sino-Foreign University in China. *Journal of Instructional Pedagogies, 28*.
- Süt, H. M. (2022). Experience of transition to distance education in secondary education from the eyes of Syrian students during the pandemic. *International Journal of Curriculum and Instruction, 14*(1), 786-802.
- Sutiah, S., Slamet, S., Shafqat, A., & Supriyono, S. (2020). Implementation of distance learning during the COVID-19 in Faculty of Education and Teacher Training. *Cypriot Journal of Educational Sciences, 15*(1), 1204-1214. <https://doi.org/10.18844/cjes.v15i5.5151>
- Tiernan, P., O'Kelly, J., & Rami, J. (2021). Engaging Student Teachers in An Online Teaching Pedagogies Module during COVID-19. *International Journal of Higher Education, 10*(7), 62-73. <https://doi.org/10.5430/ijhe.v10n7p62>
- Tosto, S. A., Alyahya, J., Espinoza, V., McCarthy, K., & Tcherni-Buzzeo, M. (2023). Online learning in the wake of the COVID-19 pandemic: Mixed methods analysis of student views by demographic group. *Social Sciences & Humanities Open, 8*(1), 100598. <https://doi.org/10.1016/j.ssaho.2023.100598>
- Ugalingan, G., Edjan, D., & Valdez, P. N. (2021). Online Internship Experiences Among Pre-service ESL Teachers in the Philippines: Challenges and Opportunities. *The Electronic Journal for English as a Second Language, 25*(3), 1-13. <https://doi.org/10.59588/2961-3094.1020>
- Valkenburgh, V. J., & Gierhart, A. R. (2022). Fostering and Maintaining Relationships: Teacher Education during COVID-19. *Current Issues in Middle Level Education, 26*(2), 1-12. <https://doi.org/10.20429/cimle.2022.260203>
- Yurtçu, M., & Orhan-Karsak, H. G. (2021). The effect of COVID-19 on pre-service teachers'

lifelong learning tendencies. *International Journal of Curriculum and Instruction*, 13(1), 893-909.

Acknowledgments

Not applicable.

Authors Contributions

Not applicable.

Funding

Not applicable.

Competing Interests

Not applicable.

Informed Consent

Obtained.

Ethics Approval

The Publication Ethics Committee of the Macrothink Institute.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and Peer Review

Not commissioned; externally double-blind peer reviewed.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data Sharing Statement

No additional data are available.

Open Access

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.