

Teacher Technostress and Coping Mechanisms During COVID-19 Pandemic : A Systematic Review

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ABSTRACT

The COVID-19 pandemic has struck many countries around the world. Most countries declared a health emergency to halt the spread of COVID-19 cases, putting all citizens on lockdown. This has caused schools to implement distance learning strategies with little or no prior experience. The COVID-19 pandemic has pushed the world's education system into an unstructured, emergency remote education mode. New issues arise as a result of the change from offline to online instruction, as well as achieving work-life balance. Hence this systematic review was guided by Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) in order to identify the current research on teacher technostress. The factors that contribute to the said factor and ways of overcoming teachers' technostress during online learning would be investigated. A number of 52 related studies were accessed from Jun 2021 until September 2021 for this study. Articles published between 2019 and 2021 were sought from two leading databases which are Web of Science (WOS) and Scopus. Thus, this review systematically identifies teacher technostress and coping mechanisms during COVID-19 pandemic. It was found that several effects were caused by the technology use. In light of the result, stakeholders need to prepare a proactive way to make sure teachers are less stressed with this new norm of teaching and learning.

Keywords: Coping mechanism, Educator, Technostress, Teacher.

INTRODUCTION

In early 2020, coronavirus 2019 (COVID-19) struck many countries globally. As a result of COVID-19, many people, especially educators, have experienced major disruptive societal changes and emotional issues (Auger & Formentin, 2021; Dogra & Kaushal, 2021). When COVID-19 was officially declared a pandemic by the World Health Organization (WHO), schools and universities were closed, and classes were shifted to online education. Previously, online education was only used to support face-to-face education, which was not done on a big scale. However now, this change was intended to reduce the transmission of COVID-19. This situation encouraged teachers to prepare themselves and their students for the VUCA (volatile, uncertain, complex, ambiguous) world, as defined by UNESCO (Hadar et al., 2020).

Consequently, teachers had to plan and adjust their teaching practices to ensure that no children are left behind. Due to limited online learning readiness, educators felt stressed and anxious when they were forced to rapidly move their teaching online due to the COVID-19 physical distancing measures (Pozo-Rico et al., 2020). Educators and students alike were forced to switch from using traditional textbooks to electronic devices like tablets and smartphones. This shift did not affect students who come from wealthy or well-off families because their parents could afford to create a better learning environment for them. The duration of confinement caused by the spread of COVID-19 has had detrimental consequences for the world population's psychological status, such as mental health (Amri et al., 2020), stress, anxiety, and overall discomfort among teachers (Palma-Vasquez et al., 2021) anxiety, and general discomfort in teachers. This study

aimed to explore the mental health of teachers who were forced to telework because of COVID-19, and to analyze the association with sociodemographic, teacher-related, and working conditions. The sample was 278 classroom teachers in Chile who teleworked more than 50% during the 2020 academic year. The participants were mostly women (82%).

This situation has shown it is not easy to establish a distance learning and teaching strategies under protective measures for COVID-19 (Akour et al., 2020) one of which was the closure of universities and shifting to remote teaching. The impact of this pandemic could extend beyond the risk of physical harm to substantial psychological consequences. Our study aimed at assessing 1. Replacing traditional, in-person teaching with online teaching (Gobbi et al., 2020). Indeed, according to a study conducted in China, more than 25% of the general population reported moderate to severe stress or anxiety symptoms as a result of COVID-19 (Amri et al., 2020).

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Meanwhile, research conducted by Ozamiz-Etxebarria et al. (2021) reported 50.6 percent of teachers said they were stressed, with 4.5 percent saying they were highly stressed and 14.1 percent saying they were stressed. 49.5 percent of the teachers reported anxiety, with 8.1 percent reporting extremely severe symptoms and 7.6 percent reporting severe symptoms. Finally, the research showed, 32.2% of the teachers reported suffering from depression, of which 3.2% reported extremely severe symptoms and 4.3% severe symptoms.

Gadgets and electronic devices are not the only source of stress for teachers; even the internet connection and use of technology has also made teachers stressed about online learning. Recent studies have shown that stress levels are higher among teachers than in many other occupational groups (Auger & Formentin, 2021; Petrakova et al., 2021; Pozo-Rico et al., 2020). Since the change, teachers have also been facing technostress (Hasan, 2020). Technostress is the stress and negative psychological impact of introducing new technologies at work. Many factors contribute to technostress, including techno-invasion, techno-overload, techno-complexity, techno-insecurity, and techno-uncertainty (Ragu-Nathan et al., 2008). Other contributing factors include: lack of support during testing and frequent interruption of assigned tasks due to the ongoing stream of communication (Ragu-Nathan et al., 2008; Mark et al., 2008). Finally, we must remember that the education obtained by young people during this period of crisis will have a significant impact on how our society will develop in the future. These pressures, along with a lack of personal coping methods, can have a negative impact on the primary goal of educational attainment.

Teachers who find themselves in this scenario must develop coping mechanisms to maintain a sense of balance in their lives. There is a plethora of coping mechanisms that we might employ to alleviate stress. When dealing with stress, collaboration among peer communities' learners (PCL) is the best course of action, as documented by Zaalouk et al. (2021) during this crisis. As a result, this systematic review serves as a reference point for future research into teacher technostress and coping mechanisms associated with the use of technology in the classroom, with three research questions as follow:

RQ 1: What is the current research on teacher technostress?

RQ 2: What factors contribute to teacher experiencing technostress?

RQ 3: How can a teacher deal with technostress during online learning?

METHOD

This section provides an overview of the research methods used in the current study, and is divided into five main sub-sections, namely PRISMA, resources, inclusion and exclusion criteria, systematic review process, and data abstraction and analysis.

PRISMA

This systematic review was adapted by the PRISMA statement guidelines (Joanna Briggs Institute, 2014). PRISMA or Preferred Items for Systematic Reviews and Meta-Analysis is a published standard intended to help conduct a systematic literature review. According to Liberati et al. (2009), using PRISMA can reduce the risk of flawed reporting and improve the clarity and transparency in how reviews are conducted. Besides, Sierra-Correa and Cantera Kintz (2015), PRISMA suits systematic literature reviews in social sciences as it helps with 1) defining clear research questions that permits systematic research, 2) identifying inclusion and exclusion criteria and 3) attempting to examine a large database of scientific literature in a defined time. This improves results in a rigorous search of terms related to teacher stress and technology adaptation.

Resources

Two leading indexed databases were used for this review, the Web of Science (WOS) database and Scopus; the Web of Science being most selective and being the most exhaustive. About 99.11% and 96.61% of the journals indexed in Web of Science are also indexed in Scopus, respectively (Singh et al., 2021). Other than that, these databases (DBs) still remain the two major and most comprehensive sources of publication metadata and impact indicators. Therefore, they serve as the major tools for a variety of tasks: from journal and literature selection or personal career tracking to large-scale bibliometric analyses and research evaluation practices at all possible levels (Pranckute, 2021).

The Systematic Review process for selecting the articles

Identification

This systematic review process for selecting a number of relevant articles for the present study consisted of three main stages. The first stage involved the identification of keywords, followed by the process of searching for related and similar terms based on the thesaurus, dictionaries, encyclopedia and past research. Accordingly, in August 2021, search strings on Scopus and WOS were developed. Table 1 below shows the search terms in each database. In this review, an advanced search was used to allow complex search queries using field codes, Boolean and proximity operators to narrow the scope of the search. Boolean AND and OR were used to further expand the search (Grewal et al., 2016). Boolean OR is used to accommodate alternative spellings and synonyms words, while Boolean AND is a word separator for a wider range of discoveries and expands the search into specialized studies. This process yielded 330 documents from Scopus and 242 documents from Web of Science (WOS).

Screening (Inclusion and Exclusion Criteria)

The purpose of this early stage was to remove duplicate articles. In this process, reviewers identified several eligibility, inclusion and exclusion criteria to find suitable documents for this systematic review. We limited our search using three criteria, which were: the year of publication, document type, and language. Regarding the year of publication, we limited it to a period of 3 years (between 2019 -2021) (Krauss, 2020), an acceptable period of time to examine the growth of research and related publications. Second, to avoid the difficulties of translating, the search excluded all non-English publications and only extracted articles which were published in English. Lastly, there are various types of documents that have been indexed in both Scopus and WOS. So, only journal articles with empirical data were selected. This means this review excluded journal articles, book series, chapters in books and reference papers. Overall, a total of 136 article were excluded based on the criteria (Table 2).

Eligibility

After the initial screening, a total of 296 documents were prepared for the third stage known as eligibility. Eligibility is a process that includes or excludes articles manually, according to the authors specific criteria. At this stage, the title, abstracts, and the main contents of all the articles were examined thoroughly to ensure that they fulfilled the inclusion criteria and fit research objective. Before the process, 140 articles were removed as similar articles appeared in both Scopus and WOS. A total of 244 articles were excluded after cautious screening

because they didn't meet the research objective. This stage ended up with 52 articles that were utilized for the subjective examination. (Figure 1).

Data Abstraction and analysis

The remaining articles were evaluated, reviewed, and analyzed; the results are explained in depth in this report. The studies included are displayed in Table 3, where all the information contained in the inclusion criteria and thus relevant to the review are shown.

FINDINGS

This section, divided into two subsections, presents the findings of this study in detail. First, we describe the findings of the document analysis, and then we present the findings in a visual format to illustrate the findings. Following four phases of selecting eligible articles, a total of 52 articles were selected for inclusion in this systematic review. All the selected articles were exported to data organization and management software, NVivo 12 Plus.

Only English-language articles were used for this analysis. Since the outbreak, researchers have continued to publish

Table 1: Keywords used for the process of finding relevant literature

Databases	Keywords used
Scopus	TITLE-ABS-KEY ((“teacher*” OR “educator*” OR “lecture*”) AND (“mental health” OR “technostress” OR “stress” OR “anxiety” OR “burnout”) AND (“education” OR “educational technology” OR “technology knowledge”) AND (“pandemic” OR “covid-19” OR “corona”))
Web of science	TS= ((“teacher*” OR “educator*” OR “lecture*”) AND (“mental health” OR “technostress” OR “stress” OR “anxiety” OR “burnout”) AND (“education” OR “educational technology” OR “technology knowledge”) AND (“pandemic” OR “covid-19” OR “corona”))

Table 2. The inclusion and exclusion criteria

Criterion	Inclusion	Exclusion
Timeline	Between 2019 to 2021	< 2019
Language	English	Non-English
Document type	Journals (research articles) with empirical data	Journal article without empirical data, book series, chapters in books and reference papers

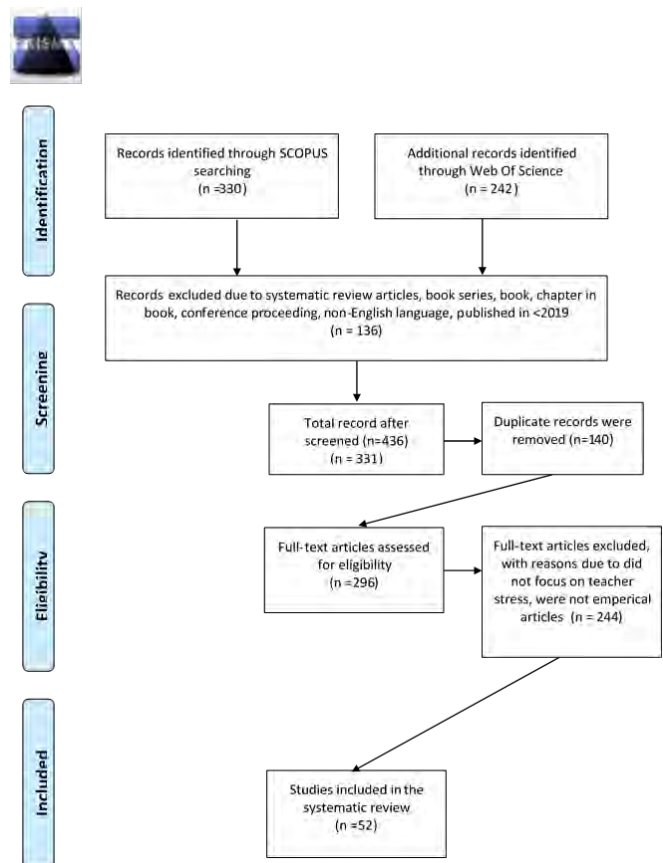


Figure 1. The flow diagram of the study. (Adapted from shaffril et. Al., 2020.)

Table : Summary of the selected articles.

<i>Study</i>	<i>Year</i>	<i>Aim</i>
(Amri et al., 2020)	2020	To assess the magnitude results of burnout and associated factors among primary school teachers in Kenitra in Morocco during this confinement period.
(Abid et al., 2021)	2021	To explore the lived experiences of university teachers who participated in online teaching for the first time during the COVID-19 pandemic.
(Akour et al., 2020)	2020	To assess 1) psychological status, 2) challenges of distance teaching, and 3) coping activities and pandemic-related concerns among university teachers in Jordan in the midst of COVID-19–related quarantine and control measures.
(Petrankova et al., 2021)	2021	To investigate the characteristics of psychological stress and coping strategies in the context of the abrupt transition to distance learning imposed by the COVID-19 pandemic.
(Müller et al., 2021)	2021	To explore experiences, perceptions, practices, and future adoption intentions related to eLearning of educators from a large public university in Singapore.
(Vatier et al., 2021)	2021	To assess the impact of COVID19 on French undergraduate students and teachers, to identify practice changes, and to evaluate successes and areas for improvement of this remote learning experience.
(Palma-Vasquez et al., 2021)	2021	To explore the mental health of teachers who were forced to telework because of COVID-19, and to analyze the association with sociodemographic, teacher-related, and working conditions.
(González-Calvo et al., 2021)	2021	The aim of this study is, under the theory of teaching identity and professional reconstruction, to contrast how three groups of teachers from different educational stages teach PE with COVID 19.
(Rawal, 2021)	2021	To understand challenges during COVID which are being faced by school teachers in Noida delivering content to students from home and their survival strategies.
(Dogra & Kaushal, 2021)	2021	To explore the challenges faced by women educationists in making themselves comfortable with the work-life balance with emerging challenges, such as new technology-based innovative teaching methods and various learning software, apps, platforms, etc.
(Uzun et al., 2021)	2021	To determine the difficulties that first-grade elementary school teachers have faced during the pandemic.
(Kayabinar et al., 2021)	2021	To evaluate the changes in musculoskeletal problems and psychosocial status of teachers during the COVID-19 pandemic due to online education and to investigate the effects of preventive telerehabilitation applications for musculoskeletal problems.
(Ballová Mikušková & Verešová, 2020)	2020	To explore the connection between teaching experience, personality traits, and emotions of teachers and their perception and management of distance education during the coronavirus pandemic.
(Oliveira et al., 2021)	2021	To understand how learning was mediated by technology during the early stages of the pandemic and how students and teachers experienced this sudden change.
(Auger & Formentin, 2021)	2021	To explore challenges faced by instructors in adapting their courses as well as personal challenges experienced by instructors and their students.
(Toto & Limone, 2021)	2021	To investigate the impact of digital technology on teachers' school practices in the context of COVID-19.
(González-Calvo et al., 2021)	2021	To analyze the factors that affect pedagogical practice and the consideration of the subject of physical education (PE) for a group of students in initial training to become teachers, with the intention of (a) discovering what feelings the COVID-19 pandemic arouses in the future teachers when having to teach physical education virtually; (b) investigating the advantages and disadvantages of the virtual teaching of PE during the pandemic; and (c) finding out how the pandemic has changed their perception towards the teaching of PE and their passion for teaching.

<i>Study</i>	<i>Year</i>	<i>Aim</i>
(Panisoara et al., 2020)	2020	To discover new predictors that may encourage teachers to continue intention to use online instruction, even in an uncertain working environment, as well as their impediments to accepting it.
(Weidlich & Kalz, 2021)	2021	To understand the challenges and difficulties higher education teachers faced during Emergency Remote Teaching (ERT).
(Košir et al., 2020)	2020	To investigate the predictors of work stress in elementary and upper-secondary school teachers and school counsellors in the initial period of online education in schools during the COVID-19 pandemic.
(Attieha & Zouhairi, 2021)	2021	To investigate charismatic leadership during the COVID-19 crisis from the perspective of educators who work in virtual teams
(Kim & Asbury, 2020)	2020	To explore teachers' experiences of this abrupt change to their working practices, and during the 5–6 weeks that followed.
(Liu et al., 2021)	2021	To measure the influences of resilience and job burnout on turnover intention and explore the mechanisms at play with regard to high school teachers who had the heaviest teaching tasks during the height of the COVID-19 epidemic
(Ma et al., 2021)	2021	To examine online teaching self-efficacy (TSE) during COVID-19, its associated factors and moderators.
(Jelińska & Paradowski, 2021)	2021	To evaluate how the epidemic reality and remote teaching conditions affect instructors' wellbeing.
(Casacchia et al., 2021)	2021	To 1) evaluate the impact of DE by teachers in our department during the second semester of the 2019–20 academic year following the March– May 2020 Italian national lockdown and 2) evaluate the relationship between DE and the emotional well-being of teachers during the period of home confinement.
(Marek et al., 2021)	2021	To explore the experiences of higher education faculty who switched to distance learning during the COVID-19 pandemic.
(Pellerone, 2021)	2021	To measure the self-perceived instructional competence, self-efficacy, and burn-out in a group of Italian teachers, and curricular and specialist support, comparing these dimensions before and during the pandemic; to value the predictive role of the possible presence of burnout on the quality of teaching; and to analyze the mediating role of teachers' self-efficacy on the relationship between burnout and self-perceived instructional competence.
(Idoiaga Mondragon et al., 2021)	2021	To analyze how teachers perceived their quality of life when coping with the re-opening of schools after their closure due to the COVID-19 pandemic.
(Ozamiz-Etxebarria et al., 2021)	2021	To measure the symptomatology shown by teaching staff in the Basque Autonomous Community at the time when schools were reopened
(Wakui et al., 2021)	2021	To assess the factors contributing to infection-related anxiety and educational anxiety among teachers conducting face-to-face classes during the COVID-19 pandemic after schools reopened.
(Prieto-González et al., 2021)	2021	To evaluate the prevalence, intensity, and related risk factors for back pain in female teachers from Slovak regions in the context of remote learning during the COVID-19 pandemic.
(Eadie et al., 2021)	2021	To explore the impact of the pandemic on EC educators' wellbeing and educator-child relationships, as growing evidence shows the influence of these factors on children's developmental outcomes.
(Hidalgo-Andrade et al., 2021)	2021	To assess the psychological distress, life satisfaction, and perceived stress of Ecuadorian teachers who adopted online learning in response to the COVID-19 pandemic.

<i>Study</i>	<i>Year</i>	<i>Aim</i>
(Mehta, 2021)	2021	To investigate the readiness on the part of teachers to switch to/adopt online teaching as a part of their pedagogy. Also, this study analyzes the relationship between perceived stress (PS) and readiness to change (RTC).
(Li et al., 2020)	2020	To assess the prevalence of anxiety and explore its factors during the Coronavirus Disease 2019 (COVID-19) epidemic among teachers in China.
(Zapata-Garibay et al., 2021)	2021	To analyze faculty members' experiences about the change from face-to-face to an online modality in the health emergency context due to the COVID-19 outbreak.
(Oducado et al., 2020)	2020	To assess the COVID-19 perceived stress among employed Filipino teachers.
(Stachteas & Ch.Stachteas, 2020)	2020	To initially investigate the psychological effects of the new COVID-19 pandemic on secondary school teachers.
(Pozo-Rico et al., 2020)	2020	To explore an empirical learning package to support teachers, who perform front-line work in schools, in coping with stress, preventing burnout, improving their information and communications technology (ICT) competency, and introducing the principles of emotional intelligence (EI) in the classroom.
(Carreon et al., 2021)	2021	To compare fear of COVID-19 and remote teaching burnout across sample characteristics and relate fear of COVID-19 to the remote teaching burnout.
(Pressley, 2021)	2021	To gain insight into the impact of COVID-19 on teacher anxiety and burnout.
(Drašler et al., 2021)	2021	To uncover the attitude and perception of WFH and online education among students and employees of the University of Ljubljana.
(Prado-Gascó et al., 2020)	2020	To analyze the perception of COVID-19 and the psychosocial risks of non-university teachers comparing Spain and Mexico during the state of alarm caused by COVID-19.
(Hong et al., 2021)	2021	To investigate pre-school teachers' experience during the COVID19.
(Szromek & Wolniak, 2020)	2020	To assess the level of satisfaction with scientific work among researchers and to identify the factors that influence its level.
(Obrad, 2020)	2020	To update information on the complex relationship between stress and resilience in the case of employees from the area of education.
(de Klerk & Palmer, 2021)	2021	To understand how the COVID-19 challenge refocused the commitment of five principals from rural schools in two education districts of the Northern Cape province of South Africa to address resurfaced historic inequalities, including digital access and fluency to attain an equitable learning environment.
(Gobbi et al., 2020)	2020	To investigate the effects of lockdown on PE teachers' behaviors promoting their students' out-of-school PA and differences between three European countries.
(Wang et al., 2021)	2020	To evaluate the level of worry and its influencing factors during the COVID-19 epidemic among teachers in Henan Province in China.
(Zhao et al., 2020)	2020	To study the effects of and proper preparation for this educational approach.
(Zaalouk et al., 2021)	2021	To determine how communities created value from their social learning during the pandemic.

articles on the topic of teacher stress and coping mechanisms. As in the case of the rise of COVID-19, all countries continue to take steps to ensure that their education systems are not affected. The author found 17 publications published in 2019 and 38 articles published in 2021 from the selected articles. Figure 2 depicts the increasing number of articles published each year. This demonstrates that the topic of teacher stress and coping mechanisms has remained a major topic all year.

It has been predicted that the papers published on this topic will continue to increase.

Figure 3 shows the countries active in publishing documents on teacher stress and possible coping mechanisms. The total number of publications is represented by the different word sizes in the cloud figure. The European countries lead the list. Researchers from Spain published the most documents, followed by researchers from China (5), Italy (4), India (3),

Australia (2), Philippines (2), Poland (2), Romania (2), Slovenia (2), Turkey (2), USA (2), with one paper each from Chile, Ecuador, Egypt, United Arab Emirates, France, Germany, Japan, Jordan, Lebanon, Portugal, Russia, Singapore, Slovakia, and Greece. From the results, it's clear that affected countries have been proactive in research to prevent their education system from collapsing. Meanwhile, ASEAN countries still lack relevant research. The ICT growth in ASEAN countries is diverse. Singapore is ranked 16th internationally with an ICT Development Index (IDI) of 7.90, whereas Myanmar is placed 150th with an IDI of 1.82. Only three countries have an IDI above the global average of 4.77. The demographics, and educational system of each country vary greatly while many the population don't have access to the internet and electronic devices, which may affect IDI.

Regarding sample populations, most previous research focused on samples from secondary and higher education rather than primary school. On the other hand, a total of 11 articles used teachers from kindergarten education as their sample. Figure 4 shows us the pie chart describing

the distribution of samples across the sector. Focusing on secondary and higher education is predictable as, since the outbreak, schools and universities have been closed. This sudden change has raised concern among many teachers and professors.

Main Findings

This study attempted to analyze the existing studies published between 2019 and 2021 on teacher technostress in a systematic manner. These concerns have been addressed in previous studies that evaluated the technostress associated with online distance learning. According to the selected articles, there are several causes and effects of technostress, which have been experienced by teachers worldwide, since the implementation of movement order control (MCO). Due to the current MCO, most educational systems have been forced to adopt alternatives to face-to-face teaching and learning. The use of ICTs has become an obligation rather than an option for teachers. To reduce the risk of infection, these changes necessitate the use of technology-assisted teaching methods. Interestingly, most teachers had moderate to high motivation for distance teaching (Akour et al., 2020). However, some of the teachers reported they felt pressure and stress in this transition. This intense pressure leads to a modern adaptation disorder defined as technostress. According to the definition made by Brod (1984), technostress is a modern disease that arises from the self-inadequacy to adapt to computer technologies. Since the spread of COVID-19, teachers have expressed feeling exhausted and worrisome (Carreon et al., 2021), with deteriorating mental health (Akour et al., 2020), emotional health (Idoiaga Mondragon et al., 2021) and depression (Ozamiz-Etxebarria et al., 2021). These problems experienced by teachers during online learning, especially for those who are older (Idoiaga Mondragon et al., 2021). It also examined,

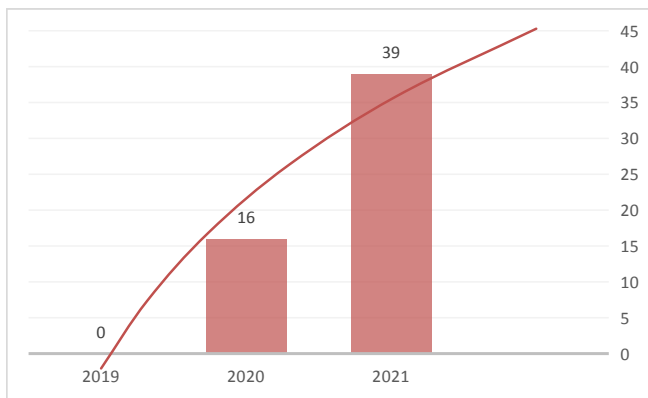


Fig. 2: Distributions and progress of publications trends by year.



Fig. 3: Distributions of publications by country.

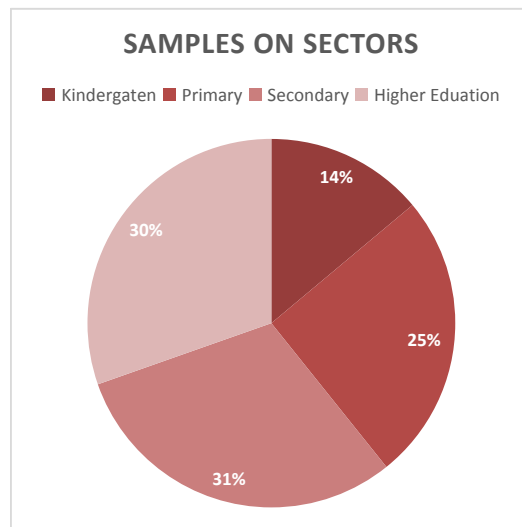


Fig. 4: Distribution of samples across sectors.

teaching is a tough job during the pandemic (Drašler et al., 2021; Palma-Vasquez et al., 2021).

Due to changes in education, teachers can use either asynchronous or synchronous teaching and learning sessions. Asynchronous learning allows teachers and students to connect before or after the online class through thread discussions and email, whereas synchronous learning allows teachers and students to interact during the session using methods such as video conferences or chat rooms. The change to online learning at such short notice (Müller et al., 2021) and the lack of training to cope with this new experience (González-Calvo et al., 2021) caused worry and anxiety among educators. Also, some teachers have felt irritated with the change without seen their capabilities to their strengthen (Mehta, 2021). Although hybrid or blended learning approaches were preferred, support enabling the implementation of technology-based and pedagogy-informed teaching is necessary (Müller et al., 2021). The biggest challenge faced by educators is to understand the needs of diverse students. As an example, lecturers were stressed in relation to their aims in order to adapt to this new situation (González-Calvo et al., 2021), while school teachers admitted to being very limited on the content to be taught (Petraikova et al., 2021). This situation required teachers to spend a lot of time finding formats that would allow them to deliver the material more effectively and support children's wellbeing. The root of this problem lies in the fact that teachers also felt uncomfortable with the curriculum being implemented online just as it was during normal (pre-pandemic) face-to-face education (Uzun et al., 2021). This situation taught us distance teaching/learning requires extensive planning (Marek et al., 2021). Teachers felt a lot of challenges to become adaptable to new methods of teaching which involves technological complexity, literacy, and competency (Dogra & Kaushal, 2021). For example, it was difficult for Physical education (PE) teachers to teach online since their class involves physical activity (Wakui et al., 2021). In fact, this problem also bothered teachers in terms of practicing new norms, such as daily health scan (Hong et al., 2021).

Teachers have experienced stress and anxiety due to the difficulty in transitioning from face-to-face teaching methods to online teaching methods (Akour et al., 2020) **one of which was the closure of universities and shifting to remote teaching. The impact of this pandemic could extend beyond the risk of physical harm to substantial psychological consequences. Our study aimed at assessing**

1. Stress and anxiety are not a new issue in the pandemic. Previously, parents and teachers could only interact during school hours. However, as the pandemic era has given way to virtual interaction, their interaction occasionally occurs outside of school hours. Some parents and students disregard their teachers' interaction time. Working parents prefer to

contact teachers at night to ask for assistance with their child's homework and discuss family issues (Petraikova et al., 2021). This situation burdens the primary job of the teacher, which is to teach, not act as a counselor.

Meanwhile, the global cyber threat is evolving at a rapid pace, as seen by the increasing number of data breaches that occur each year. According to a survey by Risk Based Security, data breaches exposed a staggering 7.9 billion records in the first nine months of 2019, which is the highest number ever recorded. This amount is more than double (112 percent) the number of records disclosed over the same time period in the previous year. With the scale of the cyber threat set to continue to rise, teachers also face problems like inappropriate content and glitches when using online platforms to teach. Other than that, using non-educational applications without knowing their privacy setting is mainly dangerous (Abid et al., 2021). This privacy issue has become more dangerous when teachers reported receiving calls from unknown numbers regularly.

Not only are teachers' privacy rights violated, the issue of working from home also causes female teachers to face more stress than male teachers. This is because, when working from home, female teachers are more bound by stereotypes of having to do homework like cooking, serving meals and cleaning (Dogra & Kaushal, 2021). In fact, a study in India found that female teachers are at a high level of stress when they have to divide their time to teach, take care of their children and mind children, while doing other tasks (Abid et al., 2021). Male teachers, on the other hand, are thought to be unimpressed by the move. Worse, the problem of technostress is forcing female instructors to work longer hours than before. Many respondents indicated difficulties balancing homeschooling children while also teaching remotely (Auger, & Formentin 2021; Hong et al. 2021; Kim, & Asbury 2020). In addition, educators who reported taking care of their own children reported higher levels of perceived stress (Košir et al., 2020). In some cases, teachers not only had to manage children at home, but also had to divide their time to take care of their older parents. This situation caused the teacher to be forced into double work while working at home. This did not leave them enough time to manage school matters, meaning this had to be completed during non-office hours, indirectly increasing the workload of teachers.

The natural life of a new technology is inevitably fraught with challenges. The same is true in the case of educational digitization. This circumstance irritates instructors, who are increasingly saddled with activities that are out of their daily ordinary tasks (Hong et al., 2021; Panisoara et al., 2020; Prado-Gascó et al., 2020) **as a significant stress factor for their workplace. Derived from the Self-Determination Theory (SDT.** As the Ministry of education change online learning, teachers' interactions with students are cut short due to the limited engagement procedure. In reality, teachers are under

pressure to finish the syllabus and provide evidence of the lessons report (Muhammad Faizal et al., 2018). Teachers' time management is also impacted when they must record the teaching and learning process. In this case, also, teachers were burdened with double the work, like marking student homework, preparing tasks and sometimes repeating a lesson for students who did not join their class (Akour et al., 2020) **one of which was the closure of universities and shifting to remote teaching. The impact of this pandemic could extend beyond the risk of physical harm to substantial psychological consequences. Our study aimed at assessing I.**

As the Ministry of Education and the Ministry of Health took immediate action by closing down schools for the time being until the situation is stable, one of the most immediate changes induced by COVID-19 was the broad cancelling of in-person classes (Vatier et al., 2021). This situation has made educators anxious as they need to cater to various students' needs, while making sure all students have their own study room (Auger & Formentin, 2021). As reported by Abid et al. (2021), students from underprivileged areas were adversely affected when emergency eLearning was implemented (Petraikova et al., 2021; Uzun et al., 2021). Students had a problem with online lessons because they were frequently sidetracked by other things, such as social media. Some had a computer in the living room with the TV on, or they had siblings or someone else in the house. When siblings' classes overlap, two or more children may be present at home, but only have one tablet computer (Uzun et al., 2021). According to Zapata-Garibay et al. (2021), 40.8% of students had to share their tablet with other siblings. As a result of this, they missed class with their teachers, and their grades fell. Furthermore, restricting student internet access put teachers under strain as online learning requires stable internet access (Marek et al., 2021). The findings of the study also found that students face problems when internet access is limited. Limited devices such as using their parent's smartphone also affect the teaching and learning process. Even teachers' concern is doubled when students need to access their online class from parking lots or coffee shops to get better Wi-Fi connections (Auger & Formentin, 2021).

Internet access is not a new concern in online teaching and learning. Good connectivity is a fundamental requirement in order to ensure successful online distance learning (Marek et al., 2021). Teachers also had a problem with the quality of the internet connections (Oliveira et al., 2021), an unpredictable situation which makes them frustrated, especially when they have an online class and the internet is down, causing a communication delay which disrupts their class. Sometimes, this technostress causes teachers to feel isolated. Due to lockdown, they didn't return home. Loneliness and lack of social support from their loved one have also been issues faced by teachers (Ozamiz-Etxebarria et al., 2021).

Since, teachers need to work 24/7 (Rawal, 2021), most of them spent their spare time by sitting in front of their laptop only. Research has shown using the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) ProFitMap-Neck questionnaire, the Oswestry Disability Index (ODI), and the Upper Extremity Functional Index (UEFI) many ended up with musculoskeletal problems (Kayabinar et al. 2021; Prieto-González et al. 2021). More specifically, the researchers stated 74% reported cervical pain, 67% lower back pain, and 60% pain in more than one vertebral region. This would make teachers stressed and uneasy. Since the pandemic began, the cost of living has become a global issue. Teachers were forced to increase their expenditure to buy data for their cellphone. Some of them also needed to buy new smartphone and laptop as they had problems with storage (Petraikova et al., 2021). So, by using electronic devices, the total of the electricity bill also had also increased (Zapata-Garibay et al., 2021). These teachers may face the risk of insufficient income by the retirement stage, due to excessive expenditure on treatment for their anxiety (Wang et al., 2021).

This change also needs educators to keep themselves updated with online learning platform and highlighted a lack of understanding of how ICT tools mediated learning during the early stages of the pandemic (Oliveira et al., 2021). Teachers reported they used the same pedagogical methods used in physical classroom teaching, which were simpler, in the online teaching environment. Even teachers received their online learning class or webinar (Dogra & Kaushal, 2021) but they still had a problem if government didn't provide them with fundamental necessities for lessons, such as Internet connectivity (Uzun et al., 2021). This could be due to the reliance on traditional teaching pedagogies because of the necessity to build up a positive teacher-student relationship and engage students in online discussion (Bailey and Card 2009).

This review also found most teachers use coping strategies. Coping strategies are unique behavioral strategies that help overcome threats causing psychological stress (Petraikova et al., 2021). The most used coping strategies included seeking social support, exercising, engaging in leisure activities (Hidalgo-Andrade et al., 2021), spiritual activities, reading books and novels, Listening to music (Akour et al., 2020) . Seeking social support has been teachers' most popular behavioral strategy in a stressful situation (Petraikova et al., 2021). Despite there no interaction since the physical distancing, using online social media platforms like WhatsApp, Telegram, Zoom and other communicating platforms through groups helped the teachers build strong social relationships (Zaalouk et al., 2021).

So, the findings through systematic review approach have resulted in a number of recommendations that may be useful in future research. The shift to online teaching and learning methods is a proactive move toward maintaining the teaching and learning process's continuance. All stakeholders must play

their part in ensuring that everything is according to plan. Teachers, on the other hand, are considered as the primary leaders in ensuring that it is implemented correctly. In order to understand online teaching and learning, every teacher must arm oneself with information technology knowledge (Abidah et al., 2020).

Based on the findings through the collection of information and materials of previous studies, it was found that teachers face difficulties in practising teaching and learning online. The findings of Deepika (2020) show that veteran teachers are more comfortable implementing traditional teaching and learning than novice teachers. This is due to teachers' understanding of using information and communication technology. Worse, a lack of knowledge has led to teachers being uninterested in online teaching and learning. This change in education is seen to be the biggest constraint when teachers are forced to carry out teaching and learning without getting help or courses first.

Additionally, online education necessitates that student limits their interaction with the teacher. As a result of this situation, teachers are unable to assess their students' level of comprehension of the teaching and learning process. Not only the issue of limited access, but teachers also expressed annoyance when some of their students were unable to access online learning due to the constraints of the limited number of devices at home. Pupils are also reported to have difficulty in providing a conducive learning environment. In line with the study of Abid et al., (2021), who reported that students felt embarrassed to share video recordings during class. The perfection of the learning space is the most significant factor, the limited and narrow learning space makes students uncomfortable sharing video recordings.

Therefore, to reduce the level of technostress among teachers, strategic planning involving implementers needs to be coordinated. Administrators need to be more aware of the problems faced by teachers in implementing online teaching and learning. This is because, administrators will be more proactive in providing facilities if they consider the difficulties faced by teachers. Through this approach, it can ensure that the implementation of virtual classes is more productive instead of just meeting the current demand in the field of education.

CONCLUSIONS

This systematic review study addresses teacher technostress and coping mechanism during the COVID-19 outbreak. Based on the conclusion and exclusion criteria described above, two databases, Web of Science (WOS) and Scopus were used, and 52 final papers were included in the review. A number of researchers were examined in this study. The researchers have carried out studies using a variety of methodologies to highlight the topic, which is teacher technostress and the coping mechanism. Although teachers confront various

challenges when it comes to using technology in their teaching and learning, it is not an obstacle. We can conclude from the findings that teachers require assistance to encourage them during this pandemic teaching session. To ensure the effectiveness of online learning and teaching, all stakeholders, including the school's management, are needed to ensure the effectiveness of online learning and teaching. Even though teaching is the primary responsibility of teachers, other stakeholders must offer enough facilities and training to guarantee that instructors' lack of technology understanding does not become an impediment.

In light of the increasing importance placed on integrating technology into the teaching and learning process, The use of various facilities available should be used by teachers to continue learning and teaching. With the recent wave of the covid-19 pandemic and school closures, many schools have been compelled to look for other ways to keep the curriculum running by utilising relevant and connected technology. This research also revealed that technology is becoming a more important tool in the classroom as the needs of *21st-century skills*. So, educators need to look at appropriate learning design and pedagogy. In order to ensure that teachers are under less pressure, schools can offer counselling sessions to them in addition to rewarding them for continued excellence in the classroom. Besides, the findings of this study are expected to help all parties concerned in improving the skills of the use of information and communication technology needed to implement the transformation of the education system. Future studies need to be conducted to curb this technostress problem in the endemic era. With the findings of this study, educator can learn how to set up facilities and technological infrastructure more effectively.

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