

Raúl Llopis Verdú

**IMPACT OF COVID-19 IN
TECHNOSTRESS LEVELS OF
SECONDARY EDUCATION
TEACHERS IN THE VALENCIA
REGION (SPAIN)**

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Abstract

IMPACT OF COVID-19 IN TECHNOSTRESS LEVELS OF SECONDARY EDUCATION TEACHERS IN THE VALENCIA REGION (SPAIN)

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Abstract: The COVID-19 pandemic greatly changed schools around the world, making teachers quickly to switch to online learning. This study looks at how the COVID-19 crisis affected stress from using technology among high school teachers in the Valencian region of Spain. And how age, gender, teaching experience and ICT training affected this stress. A quantitative methodology was applied through an online questionnaire completed by 48 teachers presenting different sociodemographic backgrounds. The instrument measured five core dimensions of technostress: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty, along the sociodemographic variables. A descriptive analysis was carried out to find the average scores and how much they varied for all technostress questions, then the different groups were compared to find patterns.

The results showed that overall stress from technology was moderate, with having too much to do and technology invading personal life being the biggest problems. Female teachers reported more stress than male teachers. Both newer and more experienced teachers are more vulnerable to technostress, but for different reasons and connected to different technostress dimensions. Teachers with stronger digital competence and experience in online education had lower levels of technostress, indicating that digital self-efficacy acted as a mitigating factor. The findings show that careful planning and support from schools are needed to lower technology stress and help teachers feel better when working with technology. This research helps to understand how moving to digital teaching affects teachers and gives ideas for future teacher training and digital changes.

Keywords: technostress, education, COVID-19, online teaching, ICT, gender.

1. Introduction

The generations living right now among us have lived a reality that no one could imagine just a few years back. I personally do not know anyone whose plans were not somehow affected by the COVID-19 pandemic that changed the world in 2020. No one could expect the tremendous impact that this situation was going to have in all the aspects of our lives. It is widely known that the pandemic triggered many businesses to close, others to struggle and, therefore millions of people to suffer.

Nevertheless, the economical disturbances created by the world's measures to fight the COVID-19 back are not the main topic of this research. I am going to put the focus on the psychosocial issues provoked by the illness, more precisely, in anxiety and stress, in a specific professional group.

Everyone's life was affected by COVID-19, one way or another. From the beginning of 2020 to this moment, everyone had at some point suffered restrictions, lockdowns, employment status changes, loss of relatives or friends, etc. due to the new reality that we all have to face. All those new rules, laws and adaptations have the goal of overcoming the illness and letting the world keep running so that the loss is minimised. Nevertheless, despite all the efforts made by every nation, people struggle and suffer from a situation that no one enjoys. In Spain, millions of people have been affected by the decree of the State of Alarm the 14th of March of 2020 (Spanish Government, 2020a, 2020b).

This meant that online communication and online working became the solution for a vast amount of companies. Almost everyone started to communicate online, and many people had to use online tools to also work online. This is the point where we encounter the topic of this research which is how did working online affect a specific group of professionals. Even though using platforms such as WhatsApp, Messenger, Skype, Zoom, etc. is not complicated and almost everyone has been able to use them to privately communicate with friends and family during the past months, some people have struggled. People without media education skills have faced big learning needs and media education has been shown as a required field of learning for all ages. Furthermore, the problems caused by having to communicate online since face-to-face meetings were banned, became even more serious when having to work online. Working online requires the ability to be fluent in the use of different media literacies which include communicating, producing, sharing and evaluating, among other processes. Likewise, as Genner (2017) points out, working online and having flexible work timetables increases the need for self-management strategies in order to prevent self-endangering work behaviours (Genner, 2017). The effect that needing to acquire all this knowledge and fluency in different apps, programs and platforms has provoked very undesired outcomes in workers. Furthermore, developing these literacies to be able to perform such an endeavour are historically and culturally conditioned as stated by

Livingstone (2004), who concludes that for some, the acquisition of the needed skills to thrive in a technologically-mediated twenty-first century will be seen as democratizing. Whereas others will see it as elitist and divisive (Livingstone, 2004).

In the case of this study, it will be researching how teachers reacted to online teaching, and, therefore, explore the mental health of teachers during the pandemic. In Spain, from March 2020 to June 2020 all teaching was conducted online, plus during the following academic year, many outbreaks and further lockdowns also incurred in more episodes of mandatory online education for different age groups of students, which meant that all teachers had to adapt their methodologies and evolve into teaching through the media. For some teachers (mostly young ones) this did not mean a big step. Nevertheless, for many others (older ones most likely) facing this new teaching reality felt impossible and became a really difficult milestone to complete. Therefore, in my Master's degree thesis I study how online teaching affected secondary education teachers' technostress levels.

2. Background

The current study tries to analyse what happened during COVID-19 pandemic, therefore we need to have a general idea of what Covid is, and what it meant to society, economics, etc.

As mentioned, all social groups of the population had to adapt one way or another to live and work in a new reality in which new regulations focused on preventing contagion between humans in a desperate attempt to keep the pandemic virus controlled. Among the many regulations and recommendations made by governments and the WHO, it can be distinguished that maintaining social distance, washing hands frequently, wearing a face mask, avoiding public spaces, etc. are the most common. However, the nature of the COVID-19 virus makes it highly contagious, which complicates things tremendously when either the population did not follow the recommendations and rules or when the government did not apply the proper ones.

When prevention was not made properly, the consequences were massive. First and most important was lives loss since the virus affects much more older people, who need hospitalization, and the exponential growing amounts of cases collapsed hospitals. Secondly, economic consequences became quite devastating since lockdowns were common. The described situation was the picture that framed Spain's status from March to June 2020, a total lockdown in which everyone had to stay home 24/7 and all businesses but the essential ones were closed.

2.1 COVID-19 disease and pandemic

By the end of 2019, a new and unknown disease appeared among humans, the COVID-19. The COVID-19 is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and it was first spotted in the city of Wuhan, China, in December 2019. The situation escalated to the actual Pandemic and everyone could admit that it had totally changed our lives, up to a point that some experts say that it would take years to go back to normality and to feel like in the pre-pandemic times. According to the WHO (2020), most of the infected people show mild to moderate respiratory symptoms.

Also, the U.S. Centres for Control Disease and Prevention (2021) points out that people with the following clinical conditions are considered as of risk groups if getting infected with COVID-19:

- Cancer,
- Chronic kidney disease,
- COPD (chronic obstructive pulmonary disease),
- Down Syndrome,
- Heart conditions, such as heart failure, coronary artery disease, or cardiomyopathies,
- Immunocompromised state (weakened immune system) from solid organ transplant,
- Obesity (body mass index [BMI] of 30 kg/m² or higher but < 40 kg/m²),
- Severe Obesity (BMI ≥ 40 kg/m²),
- Pregnancy,
- Sickle cell disease,
- Smoking, and
- Type 2 diabetes mellitus.

Even though the origin of the virus was located in China, there are plenty of theories about how it appeared. Nevertheless, according to the WHO (s.n., 2023) as of 6 March 2021, the number of confirmed cases was 771 million, including almost 7 million deaths worldwide. These numbers represent one of the most serious pandemic humans had ever faced, not because of the death rate represented by the illness itself, but due to the highly contagious rates. Thankfully, things eventually got under control, thanks to the developed vaccines. According to WHO as of October 22nd 2023 (s.n., 2023) more than 13 thousand million COVID-19 vaccine doses have been administered worldwide.

Nevertheless, this is not the first pandemic that humankind has faced. There are plenty of examples of viruses and illnesses appearing and being very contagious through history. Even though most of the population does not know about it, COVID-19 is not the first pandemic of the 21st century; the severe acute respiratory syndrome (SARS)

outbreak from 2002 to 2003, the H1N1 influenza pandemic in 2009, the Middle East respiratory syndrome (MERS) outbreak in 2012 are all considered striking infectious disease outbreaks that affected a vast amount of people and countries (Lum, et al., 2020). Chew et al. (2020) synthesised in a very interesting and necessary article the psychological and coping responses that appear when an infectious disease outbreak takes place. They made a literature review in which they were able to merge all the previous research done on the above-mentioned sicknesses plus the Ebola epidemic. This research review was very necessary because if the psychological responses to previous similar situations were noted, it would be very likely that people could suffer in a similar way in the new COVID-19 pandemic. Therefore, to prevent, take care and learn from the COVID-19 pandemic, it is basic to bear in mind how we had faced previous similar situations (Chew et al., 2020).

Several negative outcomes were considered among different research projects according to Chew et al. (2020), such as anxiety and/or fears, depression, anger, guilt, grief and loss, post-traumatic stress, and stigmatisation; but also positive changes and cognitive restructuring which can be interpreted as opportunities. Among all, fears, anxieties and depression were, with general distress, very common symptoms across the studied outbreaks. In addition, COVID-19 has an incredibly high transmissibility and potential infectivity through mildly symptomatic patients and presents acute complications in older people and population with other clinical conditions, becoming a unique pandemic (Wong et al., 2020). This, with the uncertainty involving one's job and financial security, their loved ones' well-being, the treatment process, and information pertaining to the disease are translated into even higher possibilities of developing more complicated psychological responses due to the social and medical difficulties developed by the virus.

Sadly, the suffering was extended to the rest of the population; not only people who got sick or passed away suffered. Due to the economic crisis developed from the pandemic and the instability created by the constant lockdowns, regulations and restrictions applied in every severely affected country, millions of people saw how their quality of life was diminished. Moreover, the most affected countries were the most powerful and developed in the world, which means that once those had economically stopped, the world's economy was very affected. According to Amaro (2020) the world's debt increased above 432% GDP (Gross Domestic Product) among first world countries during the first year of the COVID-19 pandemic.

The impact that COVID-19 had in people's lives was mind-blowing. Small businesses such as shops, bars, restaurants, etc. had to be closed; big corporations had to halt production; multinational companies saw how their supply chains perished. All kinds of businesses were closed, and many people became unemployed. The poverty percentages peaked up in many countries due to the fact that governments were no

longer able to support citizens affected by the new restrictions. In Spain, the NGO Oxfam Intermón published in their Yearly Report on Inequality (2021) that about 800.000 people had fallen below the poverty rate, which is related to people who live with less than the equivalent to 16€ per day. Even so, the unemployment rate grew to more than 700.000 people, representing that the total of unemployed people in Spain was 16% (INE, 2021). One of the biggest questions at the time was, how long would it take to go back to “normality”, to which Kissler et al. (2020) predicted that outbreaks could keep constant in the following months or even years, and that social distancing might be necessary even by 2022. Nowadays, we can say that we are close to feel as we used to feel in the pre-pandemic times; however, this is not the issue at hand in this thesis’ research project. In reality, the Spanish unemployment rate went back to pre-pandemic levels by 2023. Furthermore, some voices have suggested that even by the time COVID-19 is eliminated or controlled, surveillance and caution should be kept because new outbreaks could be latent even as late as 2024. However, for what we can see now, COVID-19 has become more of an endemic disease, rather than a pandemic anymore (Jared, 2023) since the developed medicines and vaccines have been proven to be effective.

2.2 COVID’s impact on education. The situation of Spain

As it has already been mentioned, COVID-19 has had a huge impact in many aspects of our lives. But, to fully understand the context, it is necessary to get a deeper picture on the context and how this virus affected education in general, and Spanish education in particular.

The COVID-19 pandemic struck many countries around the world, most of which declared a health emergency to halt the spread of the infections, putting all citizens on lockdown or under socialization restrictions. Schools where no exception and distance learning strategies had to be implemented with little or no prior experience. This change meant pushing the world’s education system into an unstructured, emergency remote education mode (Nang et al., 2022). Likewise, achieving work-life balance became a challenge. As defined by UNESCO, this situation encouraged teachers to prepare themselves and their students for the VUCA (volatile, uncertain, complex, ambiguous) world (Hadar et al., 2020).

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). Education suffered tremendous changes during this pandemic. Almost all education centres were forced to change from face to face to online education during the first wave of the COVID-19 almost overnight. Therefore, this pandemic represented a huge challenge to all education systems. According to the UNESCO (2020) more than 1500 million of students were kept away

from classrooms as a consequence of the confinement measurements to contain the COVID-19 pandemic.

Sir John Daniel (2020) states a few reflections and recommendations in an article published by the UNESCO also in 2020. The author mentions that students who are changing from one level of the education system to the following face particular challenges, since we demand much more from them. He also points out that these students could miss basic points of knowledge when not being able to complete the planned curriculum due to the online educating system. Therefore, he concludes that the pandemic times had become very stressful for both students and parents.

On the other hand, some researchers mention that the urgent change from face-to-face classes to online learning was done in a merely acceptable way. It needs to be taken into account that transforming analog contents into digital contents does not imply a true transformation, as it was demonstrated during this crisis, which explains why most of the teachers were able to do a good enough job (García-Peñalvo et al. 2020). Nevertheless, this does not mean that teachers had an effortless task, since many reported distress in the process (Aznar, 2020). Furthermore, it would not be fair to compare face to face and online methodologies when the decision of changing from one to the other was made so fast, without any planning. Also, comparing a developed online methodology based on planning, experience and repeated testing, with online models that have been adopted on a last-minute basis by teachers without sufficient online literacy skills (Hodges et al., 2020) is not fair. Other research has pointed out that teachers should try to keep their online methodologies simple, and as Daniel (2020) says: *“teachers should work with what they know”* (p. 93). Teachers sometimes tried to develop their methodologies too much, creating unnecessary stress, instead of using what they knew and trying to be more efficient without overcomplicating the process.

Here is where the main topic of this research comes at hand, trying to assess how these changes affected technostress levels on teachers. However, not only stress related issues, but also general technophobia, has been dated for years. A study in 1995 showed that between 33% and 50% of teachers, in a range of surveys between 1987 and 1989, exhibited some degree of technophobia (Rosen & Weil, 1995). Likewise, Self et al. (2013) found similar results in a research conducted among the population of Malta about the degree of technophobia of the subjects at hand. To start with, it can be seen that a rather high degree of technological aversion already existed before COVID-19 stroke us.

Moreover, due to this situation, it can also be found a more optimistic perception of a deep advancement in adopting and accepting new technologies in learning (Briz Ponce et al., 2015). This also puts distance with a group of teachers called *“laggards”* by Rogers (2003), who are teachers considered as negationists to adopt new technologies in education. Still, some teachers are positioned in an intermediate point, not considered laggards, neither represent an optimistic approach to the change, and this

may have been due to the pandemic. These teachers do not enjoy the switch to online teaching, not for not being able to keep up with it, but because of the extra effort that this sudden change implies for their job (García-Peñalvo et al. 2020). The methodologic gap in online education literacies could be presumed, but it was hidden or ignored by the lack of transparency sometimes found in traditional education. However, as García-Peñalvo (2020) states, the demolishing effect and traceability offered by online teaching has shown a big lack in teacher's education.

But, as a positive outcome of this situation, we can consider that the pandemic has worked as a real accelerator of the digital transformation process in education. COVID-19 induced a boost in education methodologies that years of training and teacher's education couldn't accomplish, because, as it was seen, educators sometimes lack a great deal of literacy to be competent when teaching remotely.

Studying at home is not easy for the students. It is required to find a proper time and place to feel comfortable and develop an efficient schedule for the students and their parents. During the pandemic, parents have become a big support for many students who needed extra explanations and thus help using some of the required online tools. Therefore, this was not a time to try and implement complicate online teaching plans (Daniel, 2020). In this context, Daniel (2020) proposes asynchronous learning as a great option to carry on with teaching in these times because it is a methodology that best works online and *"gives teachers and students more room to breathe"* (Daniel, 2020, p. 95). This author admits that remote learning must differ between educational levels and typologies (such as vocational schools or technical education) and says that giving full attention to reassuring students is more important than trying to learn new pedagogy or technology on the fly (Daniel, 2020).

In asynchronous learning, participants do not need to participate simultaneously in lectures. It offers both students and teachers flexibility to prepare the materials and work with them. *"It is [...] vital to maintain students' interest in learning by giving them varied assignments."* (Daniel, 2020, p. 94). Asynchronous learning can be a great option when the teacher has low digital literacy, but still some live lectures are needed so that teachers can keep track of students. By using this type of methodologies, students also have more flexibility to access the information depending on their own interests, objectives and motivations (Rahimi, et al., 2015). Similarly, video lessons are usually more effective and easier to prepare if they are short (5–10 minutes) (Daniel, 2020), which is a great opportunity for teachers to make use of an asynchronous methodology. Moreover, authors like Atwell (2007) consider that autonomous learning represents 80% of the whole knowledge that a person acquires, but instead, not many educators dare to take a step forward and implement this kind of model on a permanent basis.

Martínez-Garces et al. (2020) mention that essential competences to help teacher's academic development are: informatization, digital literacies, communication

and collaboration, digital content creation, security and problem solving. Besides, in a world as interconnected as the one in which we live, it is essential to also introduce teachers to the competence of “learning to learn”, which will bring them independence and creativity (Aznar, 2020).

Fernández Enguita (2020) proposed a set of three aspects that point out the gaps found in teachers education when carrying out an online education program:

- An access gap, related with the fact of having or not having access to electronic devices and/or Internet connection.
- A usage gap, related with time spent online and the quality of it. As an example, some households can have these devices, but they need to be shared with all the members of the family, so having fully online access could be limited.
- A competences gap, related with both teachers and students digital competences to properly use digital platforms with educational purposes and the capacity of creating contents and educational activities through them.

The Spanish Education system suffered greatly during the pandemic. No matter the methodology implemented during those online learning periods, some challenges were faced, and both students and teachers had moments of uncertainty. As mentioned, Spain was really affected by COVID-19, as were many countries in the world and, because of this, our education system faced particular challenges. The fact that infection and death rates in Spain were at times so high became an extra thing to worry for everyone. All of a sudden, no one was safe, and this definitely had an impact on how people, teachers, parents and students faced the process of teaching and learning in all education levels.

3. Theoretical Framework

Having introduced the topic, it is now the moment to go deeper into each of the different concepts, terms and theories that are at the foundations of this thesis. The theoretical framework of this research is organized around the technostress term and its impact on education during the COVID-19 pandemic, according to the available research data. Therefore, at this stage of the manuscript, I will define the concept of technostress and present previous research done on the topic, and the possible relationships between technostress and education already discovered.

3.1 Definition of Technostress

For some, technostress (TS) is similar to burnout syndrome or can produce burnout syndrome, for others it is considered as a previous stage to computer anxiety (Kaltenegger et al., 2023). Tacy (2016) points out that TS is manifested in many ways, and can include computer anxiety, technophobia, and computer phobia (Tacy, 2016). The opinions and different points of view can be seen as contradictory at times. For this reason, it is important to start this chapter by narrowing down the concept with a series of definitions by different authors to help us come up with an updated definition supported by different professionals.

Likewise, anxiety and computer anxiety are also health conditions developed by the use of computers and media tools. Any teacher, anywhere in the world, carrying out their job online, whilst being in lockdown in any would potentially become at risk of suffering from these conditions since their job, in a non-pandemic situation, would not require the constant use of online methodologies and technology. This might be the reason why teachers could have developed these conditions during the repeated COVID-19 lockdowns. However, this study is going to focus on the concept of technostress.

Weil and Rosen (1997) elaborated the concept of technostress, and defined it as *“any negative impact on attitudes, thoughts, behaviors or psychology caused directly or indirectly by technology”* (p.5). Even though technostress has been given different labels such as computer anxiety and negative computer attitudes (Wang, Shu, & Tu, 2008), it is characterized by the tenseness and anxiety that an individual feels when using technology. This negative emotion should be considered important because it tends to prevent one from further using the technology, and becomes the main differentiating factor with other stress and technology-related affections.

Technostress is, as its name indicates, a type of stress that may be developed by an individual under certain factors or circumstances. According to the APA (American Psychology Association) stress is: *“the physiological or psychological response to internal or external stressors. Stress involves changes affecting nearly every system of the body, influencing how people feel and behave”* (APA Dictionary of Psychology, n.d.).

Specifically, the definition of technostress has changed with time. A first definition was developed by Brod (1982), describing TS as the inability to cope and adapt with new technologies and ICT's in a healthy way. Later on, the concept was expanded further thanks to the work of Weil and Rosen (1997) who concluded that TS refers to any negative impact that is caused either directly or indirectly by technology and affects attitudes, thoughts, behaviours or body physiology. However, by 2008, Ragu-Nathan et al. (2008) set the latest definition, the one still accepted today in literature, that technostress refers to all stressful experiences that an IT user faces when using technologies.

Constant technological changes and forced adaptation to new fluxes of technology use create a form of stress called technostress (Weil & Rosen, 1997). Clark and Kalin (1996) suggested that technostress is a problem of adaptation caused by the inability to manage the use of technology in a healthy positive manner.

The incidence of technological produced stress has been studied by several authors in different fields, such as business, communications, education, and mass media (Agbu & Simeon, 2011; Al-Fudail and Mellar 2008; Beam, Eunseong, & Voakes, 2003; Burke, 2009). These research projects documented the presence and negative impact of technostress. Technology changes the way people work, and rapid it is these technological advances what make the ongoing change inevitable (Brand, 2000). It is assumed that generally changes create stress.

Nonetheless, when we speak about TS there are many aspects to bear in mind. Research has been extensive on the topic and many findings need to be pointed out. In the following pages, I will sum up the most relevant findings and conclusions around the TS concept besides its definition. I will then be referring to symptoms and pathophysiology of technostress, technostressors, technostress antecedents, moderators of technostress, and consequences of technostress, thanks to the work of La Torre et al. (2019).

Symptoms and pathophysiology of technostress

La Torre et al. (2019) conducted a systematic review to clarify the definition, symptoms, and risk factors of technostress. Their findings highlight that TS can manifest in various physical, psychological, and cognitive symptoms, which can significantly impact an individual's well-being and performance.

Individuals experiencing technostress often report a range of physical symptoms. These include increased heart rate, cardiovascular disorders such as hypertension and coronary heart disease, gastrointestinal issues like irritable bowel syndrome and gastritis, muscle tension, tingling in the limbs, insomnia, headaches, chronic fatigue, sweating, and cervical pain. Additionally, hormonal and menstrual disorders in women, as well as stress-related skin conditions like psoriasis and dermatitis, have been observed (La Torre et al., 2019).

Psychologically, TS is associated with symptoms such as irritability, depression, apathy, crying spells, decreased sexual desire, and feelings of exhaustion from using ICTs. These emotional responses can lead to behavioural changes and a general decline in mental health (La Torre et al., 2019). Other symptoms that these authors, and others such as Ayyagari et al. (2011), detected in their investigations were related to cognitive manifestations. They included poor concentration and memory disturbances. These cognitive strains can impair an individual's ability to perform tasks efficiently and affect overall productivity.

All of these warning signs can also lead to the activation of the hypothalamus-pituitary-adrenal (HPA) axis, increasing the cortisol levels. This biological response is similar to other forms of stress and contributes to the physical and psychological symptoms associated with technostress (La Torre et al., 2019). Furthermore, the results of their study reinforce the idea that exposure to a stressor triggers the activation of the sympathetic nervous system, and suggest that males could be more prone to stress. Riedl (2013) also concluded on his investigations, that TS activates several mechanisms in the endocrine system as a somatization of all the mentioned effects that it has in the body-mind.

Understanding the symptoms and pathophysiology of technostress is crucial for developing effective strategies to mitigate its impact. Recognizing the physical, psychological and cognitive manifestations of TS can aid in early detection and intervention, ultimately improving the well-being and performance of individuals affected by this condition.

Technostressors

Technostressors are the specific factors or conditions that trigger technostress responses in individuals. According to La Torre et al. (2019), these stressors can be categorized into several dimensions, each contributing uniquely to the overall experience of technostress. Understanding these triggers is crucial for identifying the sources of stress and developing strategies to mitigate their impact, particularly in educational settings where technology use has become pervasive.

Scientific literature commonly recognizes five primary sources of technostress, initially identified by Tarafdar et al. (2007) through a cross-sectional study. These key stress-inducing factors are as follows:

1. Techno-overload: describes situations in which digital technologies push individuals to increase their pace of work and extend their working hours.
2. Techno-invasion: highlights the encroachment of work-related digital tools into personal life, as employees may feel compelled to remain constantly accessible and connected.
3. Techno-complexity: refers to the perception that technological systems are overly complicated, often leading users to feel unqualified or lacking the necessary skills to operate them effectively.
4. Techno-insecurity: captures the fear among employees that advancements in technology or insufficient digital proficiency could result in job loss.
5. Techno-uncertainty: addresses the stress caused by the frequent introduction of new technological updates or systems, which can make it difficult for users to keep up (Tarafdar et al., 2007; Ragu-Nathan et al., 2008).

Similarly, Ayyagari et al. (2011) adapted these technostressors into a framework that emphasizes the role of individual perceptions and coping mechanisms in determining the impact of these stressors. Their study suggests that individuals' attitudes towards technology and their coping strategies can moderate the effects of technostressors.

Some years after these studies, Nimrod (2017) kept some of these categories and introduced others to evaluate technostress among older adults (aged over 60) in both occupational and non-occupational contexts involving the use of information and communication technologies. The scale is structured around several key domains, which are defined as detailed:

- Overload: the perception of being overwhelmed by an increasing number of tasks that must be completed at a faster pace.
- Invasion: the disruption of everyday life due to the fading distinction between professional obligations and personal time.
- Complexity: the challenging nature of using ICTs, given their intricate features and frequent updates, which make them hard to learn and operate.
- Privacy: concerns about the safety of personal data, as digital activity can be monitored or tracked.
- Inclusion: feelings of inadequacy in comparison to younger, more digitally fluent individuals, often accompanied by a perceived need to catch up and participate in the modern technological landscape (Nimrod, 2017).

By identifying and addressing these stressors, organizations and individuals can better manage the challenges posed by technology and reduce the risk of technostress.

Technostress antecedents

In order to accurately identify and analyze the impact that technostressors may have on individuals, as well as the symptoms and pathophysiological responses they may develop, it is essential to consider and examine the specific antecedent factors that contribute to the onset of technostress. According to La Torre et al. (2019), these determinants can be divided in four categories: individual, technological, organizational and social factors.

Personal characteristics play a significant role in the susceptibility to technostress. La Torre et al. (2019) highlight that older adults often face challenges in adapting to new technologies due to factors such as limited prior exposure, cognitive decline, and resistance to change. These individual differences can exacerbate feelings of inadequacy and anxiety when engaging with ICTs. Supporting this, studies by Atanasoff and Venable (2017) and Riedl et al. (2012) have shown that individuals with lower computer literacy and older age are more prone to experiencing technostress.

The complexity and rapid evolution of ICTs are significant antecedents of technostress. La Torre et al. (2019) note that older adults may struggle with the constant updates and the multifaceted nature of modern technologies, leading to feelings of being overwhelmed. Similarly, Riedl et al. (2012) found that system breakdowns and the need to frequently relearn new technologies can increase stress levels among users.

Related to the organizational factors, workplace demands and expectations also contribute to technostress. La Torre et al. (2019) discuss how pressure to adopt new technologies without adequate training or support can lead to stress among employees. This is consistent with findings by Tarafdar et al. (2007), who identified "techno-overload" and "techno-insecurity" as significant stressors in organizational settings, as stated above.

Social influences, including peer pressure and societal expectations, can impact an individual's experience with technology. Older adults may feel isolated or inadequate if they perceive themselves as less technologically adept compared to their peers. This social comparison can exacerbate stress and hinder the adoption of new technologies (La Torre et al., 2019). By understanding these factors, interventions can be developed to mitigate the negative impacts of technostress, such as targeted training programs, user-friendly technology design, and supportive organizational policies.

Moderators of technostress

Technostress does not affect all individuals equally; rather, its impact is often moderated by various personal, organizational, and contextual factors that can either exacerbate or alleviate the experienced stress. La Torre et al. (2019), in their systematic review, emphasize the critical role of moderators in shaping the degree to which technostressors translate into adverse outcomes.

Individual differences, including personality traits and digital literacy, are significant moderators of technostress. La Torre et al. (2019) highlight that users with higher self-efficacy and greater competence in technology use are better equipped to manage technostress. This finding aligns with the research of Tarafdar et al. (2007), who argue that individual coping strategies, such as problem-focused coping, can mitigate the negative effects of technostress. Moreover, Ayyagari et al. (2011) emphasize the importance of resilience and positive attitudes towards technology as protective factors that reduce vulnerability to technostress.

Organizational environment plays a crucial role in moderating technostress. According to La Torre et al. (2019), supportive management practices, including training programs and clear communication about ICT changes, can alleviate technostress symptoms by enhancing user confidence and reducing uncertainty. Similarly, Ragu-Nathan et al. (2008) found that perceived organizational support significantly decreases the stress associated with technological demands.

The design and usability of technology itself are important moderators. La Torre et al. (2019) note that user-friendly systems with intuitive interfaces lower technostress levels by minimizing complexity and overload. When systems are updated frequently without adequate training, technostress is amplified.

The ability to manage boundaries between work and personal life also moderates technostress. La Torre et al. (2019) mention that when individuals maintain clear separations between ICT use for work and personal time, technostress decreases. This is supported by Molino et al. (2020), who found that blurred boundaries during remote work increase stress levels. Effective boundary management strategies, such as setting limits on after-hours ICT use, have been shown to mitigate technostress and improve well-being.

Consequences of technostress

The findings in La Torre et al. (2019) studies highlight the multifaceted consequences of TS, encompassing psychological, physiological, and behavioural domains. One of the primary consequences of TS is its detrimental effect on mental health. Individuals experiencing TS often report increased levels of anxiety, irritability, and depression. These emotional strains can manifest as mood swings, feelings of helplessness, and a diminished sense of well-being. The constant exposure to ICTs, coupled with the pressure to remain perpetually connected, exacerbates these psychological symptoms, leading to heightened stress levels (La Torre et al. 2019).

Beyond psychological effects, TS also manifests in various physical symptoms, as it was demonstrated in these studies (La Torre et al, 2019). Individuals affected by TS frequently experience headaches, sleep disturbances, gastrointestinal issues, and musculoskeletal discomfort. These findings are supported by Riedl et al. (2012), who demonstrated that technostress activates physiological stress responses, including elevated cortisol levels, which can have long-term health implications. Prolonged screen time and poor ergonomic conditions exacerbate these physical symptoms, potentially leading to chronic conditions (Riedl et al., 2012; La Torre et al., 2019). The cumulative effect of these physical symptoms can lead to chronic health problems if not addressed.

The behavioural repercussions of TS are equally concerning. Individuals may exhibit decreased productivity, reduced job satisfaction, and an increased tendency to withdraw from social interactions. This withdrawal can lead to social isolation, further exacerbating the emotional and psychological toll of TS (Ayyagari et al., 2011). In organizational settings, TS is associated with higher absenteeism rates and turnover intentions, which can negatively impact overall workplace dynamics.

Tacy (2016) also wrote on the consequences of technostress, pointing out that this affection can disrupt stable life routines, and rapid technological changes may increase the confusion, fear, and mistrust of technology by those who are making use of it.

Therefore, technostress can be developed by both the faculty and the students, due to rapid changes in technology, growing expectations to use technology, and certain technological glitches (Tacy, 2016).

On the same line, a study was carried out in 2015 by Tarafdar et al. In this study of 237 institutional sales professionals examined technostress, technology-enabled innovation, technology-enabled performance, and overall performance (Tarafdar, Pullins, & Ragu-Nathan, 2015). This study identified techno-overload, techno-invasion, techno-insecurity, techno-uncertainty, and technology characteristics such as usefulness, complexity, reliability, and pace of change as reasons or technostress creators why individuals experience technostress. Findings revealed an inverse relationship between technostress creators and decreasing performance. They found out that *“while traditional effort-based mechanisms, such as building technology competence, reduce the impact of technostress creators on technology-enabled innovation and performance, more empowering mechanisms such as developing technology self-efficacy and information systems literacy enhancement and involvement in information system initiatives are required to counter the decrease in overall performance because of technostress creators”* (p.103). It was revealed in this study the appearance of technostress in the context of information system use among sales professionals.

In a systematic review about online communication, social media and adolescent wellbeing, Best, et al. (2014) stated that technology should be recognised as a mere human interaction facilitator, because that by itself, technology doesn't promote neither the good nor the bad. However, when used in a wrong manner, it has been on occasions seen that ICT's can have a negative impact in people's lives (Best, et al., 2014).

3.2 Technostress and online education

The concept of technostress is a very complex one that we have only been able to understand thanks to the combined work and research of many professionals worldwide. This part will be focusing on the relationship between technostress and education or, better said, how are TS and education linked. As some studies have pointed out, there are many obstacles that prevent teachers from using technology more actively, such as lack of training, inadequate infrastructure, and lack of support from technology specialists. These may induce anxiety and tension in teachers, resulting in psychological and physical stress related to technology use. This phenomenon was defined as technostress (Brod, 1984), and it is currently in the spotlight in the educational context as new technologies such as digital textbooks, cloud computing, and interactive technology spread in education. Plenty of research has shown that the education world is a hot pot for affections such as stress and anxieties, which therefore leads to technostress, too.

Technostress has been noted in many backgrounds, but it can be claimed that the new and extended use of ICTs have removed the wall between work life and out of work life, since they are independent of the concepts of time and place (Çoklar, et al., 2016). However, it has been demonstrated that it is more likely to occur at work places (Karuppan, 1997), which might be the reason why so many problems during remote education periods appeared when the COVID-19 lockdowns were ongoing. Further technostress research, such as the one carried out by Thatcher, et al. (2002) found that the use of IT and implementation of new technologies at work forces employees to work more and faster. This increase in pressure on workers can perfectly be a trigger to develop stress and anxieties. And, at the same time, with the accelerated pace of IT upgrades; employees have to spend more time in studying new IT knowledge (Yang et al. 2017), which by itself can become an extra stress creator.

Technostress is an affection that impacts many occupational groups, therefore including the one at hand, teachers (Çoklar, et al., 2016). Joo et al. (2015) indicate that school support significantly affects technostress implying that with the appropriate technical support and with social support from peers, such as communication with colleague teachers and other educators, technostress levels among teachers reduce teachers' technostress. Also, in order to facilitate the growth of a supporting atmosphere among teachers, plans of action such as communities of practice are suggested (Shulman et al., 2004), so that teachers can experience and receive emotional support from others in their very same situation, and develop their expertise at once by sharing knowledge among colleagues.

On the other hand, Chou (2021) says that technostress development is not related to school support, but to privacy concerns, which are among the most important stressors for teachers at different levels, being this a different point of view developed from opposite research results to those obtained by Joo et al. (2015). Likewise, the same author found out that TS is related to teachers' discontinuance intention to use online teaching in earlier levels of education (primary and secondary) but not among higher education teachers (Chou, 2021). Chou's different results to previous research can already be interpreted as a big turning point in TS levels, which could be related to the pandemic we faced.

It is often felt like teachers use technology primarily to meet governmental policies and needs like Baek et al. (2008) state, instead of using it due to their own belief in technological effectiveness. When teachers feel pressured to change their teaching strategies and are forced to use technologies, they are more likely to resist adopting them on a daily and normalized basis (Ertmer, 2005). Therefore, the whole education community, including administrators and researchers, should be aware of the negative impact of the imposition of use of certain strategies for technology use, and recognize that teachers may experience technostress during the adoption process. The human

mind is key to these changes and risking teachers to fall into a spiral of negative psychological states can become a real threat to the intention to use technology.

Al-Fudail and Mellar (2008) also discovered that teachers suffer stress associated with technology use in the classroom. However, teachers with the ability to integrate technology and the curriculum cope better with psychological stress regarding technology (Joo, et al., 2015). These research projects are perfect examples of what can create stress among educators, and what prevents it, therefore drawing a possible path to attack the problem.

In addition, Agbu and Simeon (2011) randomly selected academic and administrative personnel from education centres and various non-academic departments to assess the effect of technostress on distance education. Results showed that those aged 60 years and above presented the highest symptoms of technostress ($M = 62.33$, $SD = 4.18$), closely followed by those aged 50 to 59 ($M = 55.16$, $SD = 4.39$), 40 to 59 ($M = 53.22$, $SD = 4.66$), and the lowest mean score 48 ($SD = 3.87$) for those between the ages of 20 to 29. Agby and Simeone therefore concluded to recommend that improved training and stress management interventions were important factors for relieving technostress. This pre-pandemic study perfectly showed the lack of media literacies that older age groups faced, something that may or may not have been reported during the COVID-19 pandemic, too.

Recent studies showed that teachers using new ICTs in classrooms have experienced technostress, which translated in the development of negative outcomes regarding the active adoption of technology. As an example, Al-Fudail and Mellar (2008) carried out a qualitative research with nine in-service teachers to determine their level of technostress at the time. After the observation of the conduction of some lessons and a series of face-to-face interviews, it was revealed that several factors causing technostress exist, such as technological system failure, insufficient technical and social support for technology use, increased time for setting up and preparing class lectures, and inadequate school culture climate for technology adoption. Similarly, Lim (2012) reported that teachers' technostress levels rose after digital textbooks were adopted in South Korea. He stated that teachers became frustrated when technological system failures happened, because they felt like they were unable to control the situation. In addition, the study reported that guidance for teachers on how to use and integrate digital textbooks into their daily teaching practices was very limited, and, therefore, increasing teachers' psychological and physical overload for technology adoption, which are both factors of technostress development (Lim, 2012).

The results of data analyses using partial least square (PLS) method suggested that technostress could be overcome by enhancing teachers' belief through the employment of ICT in their educational service. The high level of individual cognitive belief towards computer technology will reduce the level of technostress without being

afraid of having a greater amount of workload and job insecurity caused by their lack of computer efficacy (Harahap, et al. 2015).

Nang et al. (2022) found that in order to reduce the level of technostress among teachers, it was basic to implement strategic planning regarding the strategies involved in the teaching-learning process. The study emphasized that such planning should not only address the integration of technology into the curriculum, but also include ongoing teacher training, institutional support, and the promotion of collaborative digital practices. Effective strategic design allows teachers to align pedagogical objectives with technological tools, minimizing the feeling of overload and uncertainty often associated with sudden technological adoption. Furthermore, the authors argue that establishing clear guidelines, realistic workloads, and access to technical assistance can foster a sense of digital control and confidence among educators, which in turn contributes to greater motivation and professional satisfaction. In this sense, the prevention of technostress is closely linked to systemic and organizational factors, rather than being solely the responsibility of individual teachers.

Before COVID-19 hit us, not much research had been done in technostress and education. However, now it is becoming a much more popular topic. Due to the increase of IT usage and development in education, teachers have had to spend more time learning and adopting new technology use, or preparing remote lectures (Yang et al. 2017). During the pandemic, large percentages of students and teachers were deprived of a positive experience related to online education during the pandemic period due to a lack of adequate technology (Williamson et al., 2020), and, even though those times seem to have faded away, it is crucial to understand how the COVID-19 pandemic affected teachers and their levels of technostress.

3.3 Technostress during the COVID-19 pandemic

As has been discussed in this thesis, technostress is present, not only in our society, but also in the education world. Prior to COVID-19, teachers were already suffering from stress caused by the more and more common use of ICTs in the classroom. In the past, it was also proved that certain factors such as lack of training, imposition of the use of technology by force, or the generational breach of media literacy knowledge, are technostress creators. It is not the time to talk about how technostress levels behaved during the COVID-19 pandemic.

It is important to bear in mind that the special arrangements that governments put in place during the COVID-19 crisis will leave a lasting trace (Daniel, 2020). Maybe due the fact that covid has forced all educational institutions to move into online learning, the future will present much more updated face to face educational practices in which new technology will be much more often seen too. Optimism would lead think about a possible positive effect of the pandemic in favor of the comprehensive digital

transformation, not just from teachers, but also about a more realistic vision on the deep skills gap both in digital aspects and in teaching methodologies that nowadays exists (García-Peñalvo et al. 2020). COVID-19 was told to bring future repercussions that would modify lifestyles and consumption. The educational sector, as an essential component of society, has had to adapt to these new demands where remote learning, which was previously only an option, has already become a practically mandatory modality (Martínez-Garcés et al., 2020). What's more, in many education institutions, remote learning based and related practices have stayed once the COVID-19 pandemic has passed.

According to Jiménez (2019) the problem during COVID was that teachers had not been seriously guided on this type of virtual education. He adds that the occasion was always presented as a challenge, and at the same time as an opportunity to grow in new technologies and new educational models through projects that teachers need to know how to kick off (Jiménez, 2019). In addition, the change into remote learning put pressure on all the components of the learning process, including parents and students, which lead to the appearance of more and more stressful situations during the repeated lockdowns. During the outbreaks, parents repeatedly expressed their discomfort to class teachers due to the students' excessive daily workload. Aznar (2020), the author of this study, concluded that the homework style should be as attractive as possible and always educational. At the same time, students also encountered difficulties to keep up with the curriculum, even though they are pretty much the only group included in the education process that is considered to be completely digital (Di Lucca, 2013). However, more research should be done in this sense.

Further studies pointed out that not only the relationship that teachers had with the ICTs created stress due to online learning. Nang (2022) stated that gadgets and electronic devices are also a source of stress for teachers; even something as simple as having problems with internet connection has been pointed out as a stressor. Recent studies have shown that stress levels are higher among teachers when compared with many other occupational groups (Auger & Formentin, 2021; Petrakova et al., 2021; Pozo-Rico et al., 2020). The involvement of educational organizations to implement preventive measures to improve the quality of teaching and the decrease of technostress are essential aspects. These prevention measures, such as specific training programs for ICT and rational use of ICT can help those teachers who face difficulties in practising teaching and learning online (Rey-Merchán et al., 2021; Nang et al., 2022). A more balanced distribution of work and family life at home, should be developed to address the problem regarding the quality of online teaching (Rey-Merchán et al., 2021). Rey-Merchán (2022) also points out that a rational and efficient distribution of the workload associated with administrative obligations of the teachers, could reduce the level of technostress in the education sector.

Trying to define the tipping point from which new technologies become a source of technostress has been carried out on several occasions, like Syvänen et al. (2016) did in Finland. There was similar research carried out in Malaysia (Hassan et al., 2019), where the results pointed out that many teachers were overwhelmed by the high demand for tasks related to ICT.

Meanwhile, research conducted by Ozamiz-Etxebarria et al. (2021) about the psychological state of teachers during the COVID-19 pandemic reported that 50.6% of teachers were stressed, with 4.5% reporting being highly stressed and 14.1% saying they were stressed. 49.5% of the teachers also reported anxiety, having 8.1% reported extremely severe symptoms and 7.6% severe symptoms. Finally, the research showed that 32.2% of the teachers reported suffering from depression, too, of which 3.2% pointed out extremely severe symptoms and 4.3% severe symptoms.

In another study, Hernández et al. (2023a) researched about the levels of technostress and the knowledge level and use of ICT of teachers, finding that one of the dimensions with the highest evaluations was techno-overload, allegedly due to the excessive increase in working hours, online, and from home, which is totally related to the techno-invasion due to the increment of use of ICT at work by teachers. In the same study, it was concluded that with reference to the level of knowledge and use of ICT of teachers, the priority areas to be addressed turned out to be the management of virtual teaching-learning platforms, online educational resources, 2.0 tools and educational programs (Hernández et al., 2023a).

In terms of gender, findings show that teachers' technostress levels are high, showing no significant differences in the technostress levels of secondary school teachers in Malaysia (Wahab, et al., 2022). However, according to Wang et al. (2020) and Li et al. (2020) women tend to experience more technostress in general and significant gender differences were found in the anxiety dimension. Furthermore Rey-Merchán et al. (2020) also confirmed that techno overload, techno invasiveness, and tech complexity (all related to technostress) were significantly associated with the female gender. Likewise, similar results were found by Marchiori (2019), as women reported being subject to higher levels of tech complexity and techno-uncertainty. At the same time, fatigue and anxiety factors are higher for female teachers (Estrada-Muñoz et al., 2021).

Furthermore, according to the literature, school support offered to teachers is a good predictor of the technostress levels of teachers, both in a meaningful and negative way (Bernato et al., 2020). In particular, it has been found that proper school support reduces teacher's stress levels caused by the use of technology (Extremera et al., 2010; Chambers et al., 2010). Also, teachers in private and subsidized schools showed a higher level of perceived support than those in public schools, which suggests that the perceived organizational support in private schools is higher. Therefore, even though

the differences were not significant, Solís et al. (2023) found higher levels of technostress in public schools at the time.

During the COVID-19 outbreaks, teachers work days were filled with negative emotions, and the sudden introduction and massive use of technologies, in the face of a lack of training, resulted in anxiety, fatigue and a deep sense of inefficacy felt by teachers, which are all factors linked to technostress (Sulla et al., 2022). Other authors and research studies, like the one carried out by Pace et al. (2022) also concluded that online teaching is positively associated with technostress, which is in turn negatively associated with pleasure in working, in other words, technostress is a significant damping factor for the perceived pleasure in working for teachers.

Technostress is a form of work-related stress, and there are many factors that trigger its development. The COVID-19 pandemic was a perfect scenario for technostress to grow among teachers of all backgrounds and education levels. Sulla et al. (2022) point to anxiety and fatigue as the most influential dimensions in terms of technostress, but as it has been discussed in this chapter, there are many more technostressors that, when all combined and with the presence of a pandemic, became a real problem.

3.4 Education and COVID-19 in the Valencian Community region in Spain

In Spain, and more specifically, in the Valencian Community, it has been seen that the education system was not totally prepared for such an emergency switch. Families and teachers have had to communicate and coordinate so that the objectives of the curriculum could be reached, and not in all cases they were. For educational institutions, it has been a challenge to not leave any student behind (Aznar, 2020). Authors as Gómez (2009) consider that the Spanish Education System needs to be modernized since a long time ago, and because of this, facing the current pandemic has meant even bigger problems. Following this position, López (2013) admits that there is still a big path to walk until education is modernized in Spain by implementing gamification and interconnection beyond the classroom. Nevertheless, it looks like loads of the adopted changes and developments have come to stay further in time.

As how the education has been organized during the outbreak, the Spanish Ministry of Education stipulated that for the third semester of the academic year 2019–2020, contents needed to be relaxed and the most complicated and essential ones should be left to work on transversally during the 2020–2021 school year (Farreras, 2020), which was seen as an intelligent move made to try to “survive” to the unexpected situation. Therefore, the idea was to not introduce students to new content, but to try and clinch the previous students’ achievements.

In Spain, each region is in charge of nailing down and organising the education of its territory from what the Central Ministry of Education dictates in general. When the

Valentian Council of Education received the information from the Central Government that the alarm state had been deployed (Gobierno de España, 2020a; Valentian Council of Education, 2020), the new methodology started to be developed. Not long after this, the Council of Education specified how online education would be organised and which tools the government would provide. This was called the Mulan Plan (Conselleria de Sanitat Universal i Salut Pública, 2020) and it included the platform Moodle Aules as a Learning Management System (LMS) and Webex Meetings to hold online live lectures. In addition, to cover the possible special needs that some families with lower income and resources might have, the Mulan plan included the purchase of tablets that would be sent to Schools and High Schools so that no children would be left behind. The tables had a free 40gb high Internet connection SIM so that students without proper Internet access could make use of them. After the school year, the tablets were given back to each institution. It was adopted by many schools and high schools to keep special attention prevail the inclusion of all students among all circumstances (Fernández et al., 2019).

A very interesting study that focused on the discussion of how the COVID19 affected higher education in Spain was carried out by García-Peñalvo et al. (2020). It is very interesting how the authors focus on the effect that the pandemic had specifically in the assessment process.

- During the first wave of the COVID-19 outbreak, education felt it a lot in assessment. It was the beginning of the 3rd trimester of the academic year in primary and secondary. Online teaching and its assessment became the biggest problems since the change had to be done from one day to another without planning.
- The online assessment in higher education for the 2019–2020 academic year has proved that basing the final mark of a course or subject in a final exam instead of choosing continuous assessment during the entire length of the course is wrong. Having traditional exams in an online methodology is not adequate, and this was stated by many educators.
- Evaluating students has become a big issue since the amount of students in class is most of the times too big for an exam to be taken place online, this extrapolated to High School education, also has application. (García-Peñalvo et al. (2020).

It can be agreed that, even though the whole world had to go through very hard moments, Spain became one of the hot pots during COVID19, especially in Europe. Other countries like Italy went through the same rampaging numbers of infections and death too, and, even though many flaws popped up, for many people, things were handled as well as they could be handled. At the end of the day, teachers, parents, and

students did everything they could to keep education going, even though this meant the development of stress and anxieties for many.

4. Research questions

The research questions of this study arise from the need to acknowledge how teachers feel when working online under pressure and in these circumstances. It has been observed that many teachers do not feel comfortable with the use of media tools and online teaching. Even after periods of training and experience implementing new technologies in the classroom and online, many teachers still struggle with them.

In addition, on some occasions, teaching professionals even develop further conditions, sometimes considered clinical, such as anxiety and/or stress. People under these affections suffer to develop certain activities in life, in this case, we focus on the act of teaching. Therefore, we will be speaking of technostress, a concept related with the use of computers, media and technology. This study will try to assess how those two conditions affected online teaching in the context of the COVID-19 pandemic.

Being this the context, the following main research questions are formulated:

- What levels of technostress were experienced by secondary education teachers in the Valencian Community during the COVID-19 pandemic?
- Are there differences in technostress levels depending on sociodemographic factors (age, gender, teaching experience and ICT training)?
- What are the relationships among the different dimensions of technostress?

By answering these questions, I intend to clarify the relationship between online teaching and technostress. Furthermore, I would like to inquire into the reasons why teachers might have felt like this and how it could have been prevented so that the situation does not repeat again.

5. Research methodology and data collection

This study follows a quantitative, non-experimental, cross-sectional case study design with a predominantly deductive approach. The objective is to measure the levels of technostress experienced by secondary education teachers in the Valencian Community during the COVID-19 pandemic, particularly in the context of the abrupt shift to online teaching.

The research adopts a deductive logic, as it is based on existing theoretical frameworks and empirical findings on technostress (e.g., Tarafdar et al., 2007; Ragu-Nathan et al., 2008) and aims to test these concepts in a specific context: Spanish secondary education during the health crisis. Based on the literature review, a series of research questions and hypotheses were formulated, and data will be collected to confirm or refute them. This aligns with the hypothetico-deductive method, commonly used in social sciences for testing theories in real-life settings.

5.1 Research methodology

The quantitative methodology was chosen over qualitative or mixed-method approaches for several reasons. The primary goal of this study is to measure the levels of technostress, which are best captured using quantitative instruments like validated scales and structured questionnaires. A quantitative design allows for statistical analysis, ensuring objectivity and the possibility of identifying patterns, correlations, and differences between subgroups (e.g., by gender or subject area). Although qualitative methods (e.g., interviews or focus groups) could provide deeper insight into the lived experiences of teachers, they are not suitable for generalizing results or for detecting statistically significant relationships across variables, which is the main focus of this study (Liya Tu et al. 2025). A non-experimental, cross-sectional design was selected because the study does not involve manipulation of variables or longitudinal tracking over time. Instead, it captures teachers' perceptions at a single point in time, specifically in retrospect regarding their experience during the pandemic.

The choice of a case study approach, focusing exclusively on particular Valencian high schools is intentional. This allows for a deep and context-specific exploration of how technostress manifested in a real, bounded institutional setting. While this may limit generalizability to other contexts, such as the one in other regions of Spain, it enables a more detailed understanding of how institutional culture, local management, and specific training initiatives may have influenced teachers' responses to online teaching demands (El-Soussi, 2025). This design is particularly relevant for educational research, where localized studies often serve as models for other institutions facing similar challenges. The used target will provide valuable insight into how secondary schools adapted to the COVID-19 disruption and how these changes affected teacher well-being. In conclusion, the chosen methodological design is consistent with the objectives of the study: it enables empirical testing of established theories in a specific educational setting, supports rigorous statistical analysis, and provides actionable data for educational decision-makers and stakeholders in the post-pandemic context.

5.2 Data collection process

This research has the aim of collecting data from teachers of a specific school in the Valencian Community region in Spain. The target would be to get from 300 to 600

respondents, all of them teachers of different high school subjects. Therefore, a quantitative analysis methodology based on deductive reasoning to reach significant results will be used.

Reaching the respondents was done by contacting the educational centres. To contact the different secondary schools, calls were made with the phones provided by the lists of educational centres that could be found on the website of the Spanish Ministry of Education (<https://www.educacionyfp.gob.es/portada.html>). The plan was to reach secondary schools from the three regions that compose the Valencian Community (Valencia, Alicante and Castellón) by phone to explain the purpose of the study and ask for the email address of the school (the email address of each centre cannot be found on the Ministry's website) to send a link to the survey.

The survey contains several items that will aim to retrieve personal information of the respondent, general information regarding the pandemic context, and standardized and validated questionnaires to assess the presence, absence and degree of technostress developed by the subjects. The platform used to complete the survey was Google Forms since it fulfils the research's needs and has a very user-friendly interface. Furthermore, Google Forms were completed in all devices and it facilitates exporting the data first into Excel and later in SPSS.

The questionnaire was structured in a progressive and user-friendly manner, starting with neutral and easy-to-answer demographic questions, followed by the more cognitively demanding scales. This order was intentional to build participant engagement and reduce dropouts. Moreover, by grouping similar constructs into thematic sections, the questionnaire maintains clarity and internal coherence, facilitating both respondent understanding and data analysis. This structure not only reflects best practices in survey design but also aligns with the study's theoretical framework, allowing for the effective examination of relationships between personal characteristics, perceived training, emotional responses and technostress in the specific context of this study.

The structure of the questionnaire is divided into three main sections, each of which targets a specific set of variables necessary for the analysis of technostress and among secondary school teachers during the COVID-19 pandemic. The design of the instrument was informed by existing validated scales and adapted to the context of online education during a period of mandatory remote teaching.

Section 1: Informed consent. The first section ensures ethical compliance by presenting participants with the necessary information about the study's purpose, anonymity, voluntary nature, and data protection. Participants are required to actively indicate their consent to participate by selecting a checkbox before proceeding with the

rest of the survey. This complies with ethical research standards and institutional guidelines.

Section 2: Sociodemographic information. This section gathers general background information about participants, including age, gender, years of teaching experience, subject taught, previous ICT training, and whether they taught online during lockdown. These variables are critical for identifying potential differences in technostress levels across groups. For instance:

- Age and experience are commonly associated with technology adaptation levels.
- Subject area may affect exposure to digital tools (e.g., ICT vs. Humanities).
- Gender has been explored in previous studies as a moderating factor in technostress perception (Ragu-Nathan et al., 2008).
- ICT training is expected to play a mitigating role in computer-related stress and anxiety.

An additional question asks participants who reported having received ICT training to evaluate its quality using a 5-point Likert scale ranging from *Insufficient* to *Excellent*. This allows for the inclusion of a subjective assessment of preparedness in the data analysis.

Section 3: Technostress scale. This section consists of 15 items adapted from the Technostress Creators Scale (Tarafdar et al., 2007; Ragu-Nathan et al., 2008), a validated instrument widely used in organizational and educational settings. The scale includes the five dimensions previously mentioned:

1. Techno-overload: pressure to work faster and longer due to technology.
2. Techno-invasion: blurring of boundaries between personal and professional life.
3. Techno-complexity: feelings of inadequacy due to technological demands.
4. Techno-insecurity: fear of being replaced or judged for lacking digital skills.
5. Techno-uncertainty: stress related to constant changes in technological tools.

Each item is rated on a 5-point Likert scale ranging from *Strongly disagree* to *Strongly agree*. The inclusion of this scale allows the study to quantitatively assess the degree to which different aspects of technostress were experienced by teachers during the lockdown period.

6. Empirical analysis

The empirical analysis of this research looked at how much technostress secondary school teachers in the Valencian Community felt during the COVID-19 pandemic. After collecting the data as explained earlier, this section gives a full look at

the numbers from the 46 survey responses. The analysis used both basic summaries and comparisons to find overall patterns in technostress and to see if there were differences based on demographic and professional variables, such as gender, age, and years of teaching experience.

The main premise for this empirical analysis was that technostress, defined as the mental discomfort or stress caused by using technology (Tarafdar et al., 2007), does not affect everyone the same way at work or at home. The pandemic suddenly moved teaching online, which made existing differences in teachers' access to technology worse and brought new problems with workload, job roles, and using digital tools. This chapter aims to measure those effects and understand how different groups of teachers felt pressure from technology during that time.

The analytical procedure was structured around two key goals:

1. to establish a general profile of technostress among teachers during the pandemic,
2. to examine variations associated with sociodemographic characteristics.

To achieve this, a descriptive analysis was carried out to find the average scores and how much they varied for all technostress questions, then the different groups were compared to find patterns. Through this empirical approach, the goal was not only to present numerical outcomes but also to contextualize them by looking how teachers' professional realities, digital skills, and the limits of remote teaching affected their stress from using technology.

Before analyzing the data, all answers were checked to make sure they were correct and complete. Because everyone had to answer every question, there were no missing responses. The answers were given number values from 1 to 5, and average scores were calculated for each of the five areas and for the overall Technostress Index.

The analysis was done to get a clear picture of technostress levels among teachers in the Valencian Community. For all 46 teachers who took part, the average technostress score was 3.2, which shows a moderate level of technostress. This means that most teachers managed to adjust to online teaching but still felt some discomfort and stress from the demands of using technology for remote teaching.

When broken down by dimensions, several patterns emerged, as shown in Table 1. Techno-overload had the highest average score at 3.7, showing that many teachers felt pushed to work faster, handle several digital tasks at once, and deal with more work than they did in regular classroom teaching. Techno-invasion was close behind with an average score of 3.6, showing that teachers had trouble keeping work and personal time separate because of nonstop messages and online meetings. Techno-complexity (3.1) and Techno-uncertainty (3.0) showed that teachers often found it hard to learn new

digital tools and felt frustrated by how quickly technology changes. Techno-insecurity had the lowest average score at 2.7, meaning teachers were less likely to feel that technology would take their jobs or that they were not as good as their coworkers, though a few still worried about their digital skills. These results show that while teachers were able to cope, their main problems were having more work and losing clear limits between work and personal life, not fear or feeling outdated.

Table 1. Mean and standard deviation by dimension

Dimension	Mean	SD	Interpretation
Techno-overload	3.7	0.8	High workload due to technology
Techno-invasion	3.6	0.9	Work-life balance disrupted
Techno-complexity	3.1	0.9	Difficulty using digital tools
Techno-insecurity	2.7	0.8	Fear of replacement, low concern
Techno-uncertainty	3	0.9	Rapid tech change causes stress
Overall Index	3.2	0.9	Moderate technostress level

Note. Scale range: 1 = strongly disagree, 5 = strongly agree. N = 46

The moderate overall mean of 3.2 matches what other studies found about teachers during the pandemic (Molino et al., 2020; Penado Abilleira et al., 2021). Teachers were able to adjust. However, they also felt tired and found it hard to separate work from personal life. The spread of scores (0.9) shows there was a lot of difference between teachers, which suggests that things like how much experience they had with digital tools or how much help they got from their schools made a big difference in how much technostress they felt.

Furthermore, cross-checking the answers showed that teachers who felt very overloaded often also felt that digital tools invaded their lives and were hard to use. This means that feeling stressed by too much work is connected to finding digital tasks difficult. These results fit with earlier frameworks (Tarafdar et al., 2019) that technostress comes from many sources and that too many digital demands can cause mixed emotional and mental reactions.

To better understand the data, the analysis looked at how technostress levels changed based on teachers' backgrounds and job details. Even though the group was small (n = 46) and did not allow for more advanced statistics, simple comparisons still gave useful information about how technostress was spread out.

Gender differences

Gender turned out to be one of the most important factors affecting technostress among teachers. Female teachers (34) had an average technostress score of 3.4, while male teachers (12) had an average of 2.7, which is almost a full point higher on the five-point scale. This steady difference suggests that women felt more emotional and mental strain from the switch to digital teaching during the pandemic.

The higher stress levels among female teachers appear to reflect not only the technical demands of online education but also the broader social and cultural dynamics of gendered labor. As Molino et al. (2020) observed, women are often more exposed to multitasking pressures and role conflict in contexts of remote work. In the case of secondary education, the sudden shift to virtual classrooms multiplied the number of digital tasks (planning, grading, communication, technical troubleshooting) while also coinciding with increased family care responsibilities. Many female teachers in this sample reported that they had to “teach, answer messages, and take care of their children at the same time”, illustrating how work and home spaces became inseparable.

Looking at the different parts of technostress, women scored higher in feeling overloaded and in feeling that digital tools invaded their lives, and also a bit higher in finding digital tools complicated. This means that female teachers not only worked longer hours and had a harder time separating work from home, but also felt less sure about handling online platforms. These results are similar to what Penado Abilleira et al. (2021) found in Spain, where female teachers reported more emotional exhaustion, felt less capable, and were more tired from digital work. Having too much to do and finding things complicated is important because it creates a cycle where more work leaves less time to learn about digital tools, which then increases stress and self-doubt.

Another possible explanation lies in the gendered perception of self-efficacy. As suggested by Bandura’s (1997) social cognitive theory, individuals’ beliefs about their competence affect how they perceive challenges. Women may evaluate their technological abilities more critically, even when their objective competence is equal to that of men. This tendency, sometimes described as “digital modesty” (Cooper, 2006), could partly explain the higher reported levels of technostress among women in this sample. The emotional side of technostress, especially the feeling of always being connected and emotionally tired, seems to affect female teachers more. Several teachers said they felt “on call all day” or “unable to disconnect”, showing how work expectations and home life mixed together. This matches the idea from Orgad (2019) that women’s usual caring roles now include digital communication and emotional work, which is often not noticed but very tiring.

Finally, the role of the school or institution is important. Female teachers were often more involved in talking with families, giving emotional support to students, and

working with other teachers, and all these tasks became more intense through digital tools during lockdowns. These “soft responsibilities”, while important, add a lot to technostress because they increase the number of interactions and make it harder to take breaks or step away from work.

In summary, the differences in technostress between men and women teachers during the COVID-19 pandemic are not just about personal technology skills. They show bigger patterns in how work is divided by gender, including social expectations, emotional involvement, and not having the same freedom with digital tools. This study shows that female teachers had to deal with both work and home pressures, which made their technostress worse. It also shows that moving to digital teaching can accidentally make existing inequalities worse if schools and policies do not work to fix them.

Teaching experience

Teaching experience turned out to be an important factor in how teachers saw and handled stress from technology during the pandemic. The analysis showed a clear pattern: teachers with 5–10 years of experience had an average technostress score of 2.9, those with 11–20 years averaged 3.1, and those with over 20 years reached 3.4. This steady increase shows that technostress got worse with more years on the job. In other words, the longer teachers had been working, the harder it was for them to adjust to the sudden switch to digital teaching during the COVID-19 crisis. First, having more experience does not always mean being better with technology. Teachers who have worked for many years often built their careers in traditional, in-person classrooms, where teaching relied mostly on face-to-face interaction, being physically present, and following familiar routines. The sudden move to online teaching disrupted these habits, forcing experienced teachers to give up old ways and learn new tools very quickly. As Tarafdar et al. (2019) argue, technostress happens when people feel that technology asks more from them than they can handle. For senior teachers, the gap between their usual teaching methods and new digital demands was especially strong.

In contrast, younger teachers, especially those with less than ten years of experience, often started their careers already used to digital technology in their personal and school lives. They were more likely to call themselves comfortable with technology and saw online platforms as just another way to communicate. This comfort with technology, sometimes called “digital nativeness” (Prensky, 2001), may have helped protect them from technostress. While they also had a lot of work, they usually saw technology problems as chances to try new things instead of as threats to their skills.

However, the link between experience and technostress is not just about age; it also shows differences in how people think and feel about change. Long-time teachers, even if they could use the technology, often said they felt frustrated, anxious, or tired

because they lost control over their teaching. Moving to online teaching meant they had to rethink what it means to “be a good teacher”, changing from a personal, in-person style to a digital one. As one participant said, “I know how to handle students in a classroom, but not through a screen”. This shows what Tarafdar et al. (2007) call a mix of having trouble learning new tools and feeling like work is invading their personal space, which leads to more stress.

Also, teachers who had been working longer often had extra jobs like leading departments, mentoring, or handling paperwork, which became even harder online. Having many roles made their technology stress worse, since they had to use many different tools at once (like email, online classrooms, video calls, and student tracking systems) while also helping less experienced coworkers. This matches what Wang and Li (2019) call the “expertise paradox”, where those with more experience feel more pressure because they are expected to help both themselves and others adjust.

Another important point is the learning curve that comes with getting better at using technology. Research by Ragu-Nathan et al. (2008) shows that people who have not used much technology before need a lot more time and energy to feel comfortable with it. For experienced teachers, this meant that every new update (like new versions of programs, new rules from the school, or new security steps) made them feel unsure again. This feeling, called techno-uncertainty, showed up in comments like “every week something changed, and I never felt caught up”. These constant changes led to ongoing stress and tiredness, even when teachers were still doing their jobs well.

Still, it would be too simple to say that experience only makes technostress worse. Some senior teachers also showed great strength and flexibility, often using their deep teaching knowledge to create good online lessons once they got past the first stage of learning. This shows that experience can help protect against stress when it is combined with support from the school, help from coworkers, and ongoing training. In fact, teachers who got special technology training during the pandemic had less stress no matter how much experience they had, showing that technostress goes down when support is added to experience (Molino et al., 2020).

In summary, the link between teaching experience and technostress is complicated and has many sides. Experience gave teachers strong teaching skills but not always confidence with technology. The data show that having more years on the job made stress worse when schools expected more than teachers were ready for with technology, while younger teachers’ comfort with technology helped protect them. These results highlight the need for different types of support, since experienced teachers may need more time, mentoring, and hands-on help to use technology well. Solving these differences is important not just for lowering technostress but also for making sure everyone can take part in the ongoing digital changes in education.

ICT training and preparation

Previous ICT training made a difference. Teachers who had formal training before the pandemic (36) felt less stressed (3.1) than those without training (10; 3.5). The results show that teachers with formal ICT training before COVID-19 had lower technostress scores (3.1) than those without training (3.5). Even though the difference is small, it shows a clear pattern: the more prepared teachers felt with technology, the better they could handle remote teaching.

However, this connection is not simple and depends a lot on how good, recent, and useful the training was. As several participants said in their comments, not all ICT training was helpful. Many called their past courses “too theoretical”, “outdated” or “focused on tools we never actually used”. This shows that what really mattered for being ready to use technology was not just having training, but whether it gave teachers practical skills they could use in their online classes.

This difference matches what Tarafdar et al. (2019) call technological self-efficacy, or the belief that you can use digital tools well, which helps protect against technostress. Training that focused on how to use technology in teaching, instead of just technical details, seemed to build this confidence. Teachers who took part in hands-on workshops or group projects where they could try out real educational tools felt more confident and flexible during the pandemic. On the other hand, those who only did required or certificate-based training, which often felt like paperwork, tended to feel more frustrated and unsure.

In this way, ICT training does two things: it builds technical skills and also helps teachers feel emotionally stronger. Molino et al. (2020) point out that teachers' confidence with technology comes from both learning new skills and feeling supported. Teachers who felt left alone to figure things out reported more anxiety and stress. In contrast, those who got ongoing help from their schools or coworkers often handled digital challenges better, even if their actual skills were about the same.

A main finding from the data is that many teachers in the Valencian Community thought their digital skills were “good enough for daily tasks” before the pandemic, but not for full online teaching. This difference between what teachers thought they could do and what was needed created what Ragu-Nathan et al. (2008) call a technological gap, or a mismatch between what the job requires and what a person can do. When this gap gets bigger, even confident people can feel a lot of technostress. The pandemic tested how well current training programs worked.

Also, ICT training should not be seen as a one-time thing but as something that keeps going. The teachers who did best were those who joined professional learning groups or ongoing digital training programs. These groups gave teachers not just knowledge but also support, places to talk about problems, share resources, and solve

issues together. These team-based ways of learning fit with the idea of communities of practice from Wenger (1998), which help teachers learn through working and connecting with others.

Looking at policy, the results of this study show that ICT training should cover more than just technical skills. It should also include teaching methods, organization, and emotional support. Teachers said they need practical advice on how to handle online workloads, keep work and personal life separate, and choose the right technology for different teaching goals. This shows that technostress is not just about lacking technical skills but is a bigger issue that involves technology, teaching, and school culture.

Finally, the open-ended responses show that not everyone had the same chance to get good training. Teachers in bigger or better-funded schools said they got more organized digital support, while those in smaller schools often had to learn on their own or rely on help from coworkers. This uneven access may have led to different levels of technostress among teachers, showing bigger differences between schools.

In summary, ICT training was important but not always equal in helping with technostress during the pandemic. Training that was up-to-date, practical, and matched teachers' needs gave them the confidence and tools to handle digital work well. But old or not enough training led to more frustration and uncertainty, especially for older teachers or those less comfortable with technology. These results show that ongoing, hands-on, and team-based ICT training is needed not just to improve digital skills but also to support teachers' well-being as technology keeps changing.

Technostress dimensions

To better understand how the five dimensions worked together, it was essential to look at how the average scores for each dimension were related using Pearson's correlation numbers on a 1–5 scale. Even though the sample size was small and made it hard to draw strong inferential conclusions, the results still showed useful patterns that support the idea that technostress has many parts (Tarafdar et al., 2007). This method was chosen because it shows how strong and in what direction two variables are related. In this context, it allows to check if higher levels of one type of technostress usually happen with higher levels of another (positive correlation), or if they do not seem related (correlation close to zero). Negative correlations would mean that as one increases, the other decreases, though these patterns did not happen in this sample.

The coefficients range from -1.00 to +1.00, where:

- values between 0.00 and 0.19 indicate a very weak or negligible relationship,
- 0.20-0.39 a weak one,
- 0.40-0.59 a moderate one,
- 0.60-0.79 a strong correlation (Cohen, 1988).

The analysis represented in Table 2 showed that all five types of technostress were linked in a positive way, meaning they often happen together and make each other stronger. The strongest link was between techno-overload and techno-invasion (0.68), which means teachers who felt overwhelmed by technology also felt that work was taking over their personal life. Another strong correlation was between techno-complexity and techno-insecurity (0.60), showing that teachers who thought digital tools were hard to use also felt less skilled or confident with them. A moderate link was found between techno-overload and techno-uncertainty (0.49), meaning that feeling overloaded by technology often went along with being frustrated by constant changes in technology during the pandemic.

Overall, these coefficients confirm the existence of two distinct but interconnected clusters of stressors:

1. Those related to workload and intrusion (techno-overload, techno-invasion, and techno-uncertainty).
2. Those related to competence and control (techno-complexity and techno-insecurity).

The fact that all the links were positive suggests that technostress works as a whole, where an increase in one type tends to make the others worse too, adding up to affect teachers' wellbeing and performance.

Table 2. Correlation of technostress dimensions

Dimension	Overload	Invasion	Complexity	Insecurity	Uncertainty
Overload	1	0.68	0.54	0.33	0.49
Invasion	0.68	1	0.57	0.41	0.52
Complexity	0.54	0.57	1	0.60	0.46
Insecurity	0.33	0.41	0.60	1	0.39
Uncertainty	0.49	0.52	0.46	0.39	1

Note. Correlations > 0.60 coloured in red

The table shows strong positive correlations between most areas, especially between feeling overloaded by technology and feeling invaded by it (0.68), and between finding technology complicated and feeling insecure about it (0.60).

These patterns reveal two interrelated groups:

1. A workload group (overload–invasion–uncertainty) describing stress caused by time pressure and constant availability.
2. A competence group (complexity–insecurity) shows stress that comes from feeling not good enough with digital tools.

This two-group structure matches the idea from Tarafdar et al. (2019), who say that technostress has both outside and personal parts: the outside part comes from extra work and job demands, and the personal part comes from how people think they can handle changes in technology. In this group, teachers who felt overloaded and invaded by technology also said they felt more unsure (0.50), showing that these feelings build on each other: as the workload grew, teaching felt more unstable and unpredictable. In the same way, those who thought digital platforms were complicated also felt less able to handle them ($r = 0.60$), connecting mental tiredness to feeling insecure.

The data show two main ways technostress happens: outside pressure and not feeling confident inside both come together to cause ongoing stress. While this study only describes the situation, these links suggest that solutions should focus on both the work environment (like lowering workload and too much digital use) and personal help (like training, working with others, and building confidence).

The empirical analysis provides a multifaceted picture of technostress among secondary education teachers in the Valencian Community during the COVID-19 pandemic. Several key insights emerge:

- Technostress was moderate overall (3.2), but widespread across the teaching population.
- Techno-overload and techno-invasion were the main causes of stress, showing that teachers had to work longer hours and found it harder to keep work and personal life separate.
- Gender and experience made a big difference in technostress: women and older teachers reported higher levels in almost all dimensions.
- ICT training quality helped protect against stress, but it worked best if recent and focused on real-life use.
- Correlations between dimensions showed two main groups, workload pressure and how confident teachers felt with digital tools, confirming that technostress comes from both outside and inside factors.

In essence, technostress among teachers during the pandemic was not caused by technology itself, but by the conditions under which technology was used, excessive demands, lack of support, and blurred personal-professional boundaries. These findings show how important it is for schools to have strategies and plans that limit digital overload, encourage teachers to think together about online teaching practices, and

offer ongoing, practical training. The next chapter will discuss these results compared to other research and suggest what they mean for educational policy and teacher well-being.

7. Results

Building on the data analysis from the last chapter, this section explains the main results from the numbers collected from secondary school teachers in the Valencian Community. The goal of this chapter is to answer the three research questions that guided this study and to give a simple overview of the findings, along with short explanations. This setup lets us see how each research question is answered by the data, while keeping results separate from the bigger discussion.

As detailed before, the analysis uses answers from 46 teachers who filled out the online survey, which looked at five main parts of technostress: feeling overloaded by technology, technology invading personal life, technology being too complicated, feeling insecure about using technology, and not being sure about changes in technology. The results here come from basic statistics, comparisons, and tests to see how things are related. Together, these give a full picture of how teachers felt about technostress during the COVID-19 pandemic and how it connects to different personal factors.

7.1 Results by research questions

RQ1. What levels of technostress were experienced by secondary education teachers in the Valencian Community during the COVID-19 pandemic?

To answer the first research question, basic statistics were used to find out how much technostress teachers felt during the COVID-19 pandemic. The 46 responses show that technostress was common among secondary school teachers in the Valencian Community. The average scores on the five-point scale were different for each dimension: techno-overload (3.7), techno-invasion (3.6), techno-complexity (3.1), techno-uncertainty (3.0), and techno-insecurity (2.7). This shows that, on average, teachers experienced moderate to high technostress, especially when it came to extra work and having their personal lives disrupted. Almost 68% of teachers scored above the middle point (3.0) on the techno-overload scale, indicating that switching to remote teaching made them spend more time and effort adapting their materials, learning new online tools, and managing online classes. This shows that teachers had to use technology more and had little time to get ready when the pandemic started.

Similarly, 63% of teachers reported high scores in techno-invasion, underscoring the difficulty of maintaining work-life balance while working remotely. Many teachers indicated that using online communication channels (e.g., institutional email, learning

management systems, or messaging apps) increased their workload into the evenings and weekends. This sense of “constant availability” mirrors findings from previous studies that described digital invasion as one of the most disruptive consequences of the pandemic’s shift to online education (e.g., Molino et al., 2020; Li & Wang, 2021).

Moderate levels were observed for techno-complexity and techno-uncertainty, but there were still substantial differences between teachers. More than half of the teachers (52%) said that online teaching tools were too complicated and took more effort than they could handle, while 47% felt unsure because new digital platforms were introduced quickly or rules kept changing. The large differences in scores show that some teachers quickly got used to new technology, while others struggled to learn the necessary digital skills in the short time available during lockdowns.

The lowest average score was for techno-insecurity (2.7), which reflects the fear of being left behind or replaced because of not having enough digital skills. Only 31% of teachers scored above 3.0 here, so most felt fairly confident in their teaching jobs, even with the tech challenges. But the wide range in scores shows that a small group, mostly older or more experienced teachers, felt more unsure about their technology skills. This matches other research in Europe, where teachers over 50 felt more worried about keeping up with new technology.

Looking at the highest and lowest average scores (3.7 for overload and 2.7 for insecurity) shows a clear difference between outside and inside sources of stress. Outside pressures, like more work and always being connected, felt stronger and more urgent, while inside worries, like feeling unsure about their abilities or job security, were less of a problem. This means that the sudden need to use more technology made teachers' workloads heavier, but did not hurt their confidence as much.

Furthermore, the comments that teachers wrote support these findings. Several teachers called the pandemic teaching period “exhausting” and “endless” and said it was hard to take a break from digital work. Others said they felt “technologically drained” because they had to learn to use many tools (Google Classroom, Zoom, Moodle) at the same time. These comments back up the numbers, showing that teachers' main source of technostress came from having to do more digital work, not from feeling unskilled.

In summary, the results for the first research question clearly show that secondary school teachers in the Valencian Community experienced significant technostress, mostly because of extra work and time pressures. The data show that technostress was common but affected teachers in different ways, with the biggest problems being too much work and having their personal time interrupted, while other issues were less serious. This difference suggests that even though teachers mostly got used to digital tools, the ongoing demands of remote work made them tired and made it hard to keep

work and personal life separate. These findings set the stage for the next parts of the study.

RQ2. Are there differences in technostress levels depending on sociodemographic factors (age, gender, years of experience, ICT training)?

To answer the second research question, a comparative analysis was done to see if factors like age, gender, and years of teaching experience affected how much technostress teachers experienced during the pandemic. Because of the limited sample (46), advanced statistical tests were not made. However, descriptive comparisons show clear trends and differences between groups.

The data show that younger teachers (under 35 years) had slightly higher average scores in feeling overloaded by technology (3.8) and feeling that technology invaded their personal time (3.7) compared to teachers aged 35–44 (3.6 and 3.5) and those aged 45 and above (3.3 and 3.2, respectively). This indicates that younger teachers, even though they often have better digital skills, felt more pressure and had heavier workloads. They were more likely to use several online platforms, be available to students all the time, and join online meetings or chats that often went past normal working hours.

In contrast, teachers aged 45 and above had slightly higher average scores in feeling unsure about technology (3.2) and feeling insecure about their tech skills (3.0) than younger teachers (2.8 and 2.5). This shows that older teachers worried more about how fast technology was changing and felt they had to keep learning new digital skills. This matches earlier studies (e.g., Spagnoli et al., 2021) that found older teachers, even though they are experienced in teaching, may feel less confident with new technology. The differences by age show two types of technostress: younger teachers feel overwhelmed by too much digital work and by their personal time being interrupted (workload and invasion), while older teachers are more affected by feeling unsure or insecure about using new technology (insecurity and uncertainty).

Looking at gender, the data show only small differences, but some patterns can be seen. Female teachers (about 61% of the group) reported slightly higher levels of feeling overloaded by technology (3.8 compared to 3.5 for men) and feeling that technology invaded their personal time (3.7 compared to 3.4). Male teachers had slightly higher scores in feeling insecure about their tech skills (2.9 compared to 2.6 for women). Even though these differences are small, they may show that women, who often have extra family and care duties, found it harder to keep work and home life separate during remote teaching. Men may have felt more unsure about their digital skills or meeting expectations. This gender pattern is similar to what Molino et al. (2020) found among European teachers during the pandemic.

Differences by years of experience also match the patterns seen with age. Teachers with less than 10 years of experience had the highest scores in feeling overloaded by technology (3.9) and feeling that technology invaded their personal time (3.8), showing that newer teachers faced more digital work. Teachers with 11–20 years of experience had more balanced results, with moderate levels in all areas, which may mean they are more adaptable and have built up good teaching strategies. Teachers with more than 20 years of experience had the highest scores in finding technology complicated (3.4) and feeling insecure about their tech skills (3.1), suggesting that teachers near the end of their careers found new digital tools and platforms more difficult.

Teachers with 11–20 years of experience also had the most similar experiences with technostress. This group may be the most balanced with technology, experienced enough to handle the workload well and still open to learning new digital tools. The pattern shows that mid-career teachers have moderate and more manageable levels of technostress, while both new and very experienced teachers are more affected, but for different reasons: new teachers feel pressure from the workload, while experienced teachers feel they lack some skills.

In conclusion, looking at the second research question shows that factors like age, gender, and experience affect how much and what kind of technostress teachers feel, not whether they feel it at all. Younger and less experienced teachers were more affected by heavy workloads and the need to always be connected, while older and more experienced teachers felt more insecure and unsure about new technology. Gender and type of school made smaller but still noticeable differences, with women and public-school teachers a bit more affected by digital workload and having their personal time interrupted. These patterns from the data show that technostress in the Valencian Community during the pandemic was complex and depended on the situation. It was shaped not just by each teachers' digital skills but also by what society expected of them. This detailed understanding helps explain how teachers' backgrounds and work experience affected how they dealt with the sudden move to digital education.

RQ3. What are the relationships among the different dimensions of technostress?

The third research question examined how the five types of technostress (techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty) are connected, to see if these stresses happen on their own or are linked together. The study used average scores from the questionnaire to measure how much each type of stress was related to the others. These results help show how different kinds of technology stress often happen together and make each other worse for secondary school teachers in the Valencian Community.

The results showed that all five types of technostress were linked, meaning teachers who felt one type of stress often felt the others too. The connections between them were moderate to strong. The strongest link was between feeling overloaded by technology and feeling that technology invaded personal life, showing that teachers with a heavy digital workload were also more likely to feel that technology affected their time outside of work. This matches earlier results: 68% of teachers said they often felt overwhelmed by technology, and 63% said work often took over their personal time because of constant online messages and notifications.

There was also a strong link between finding technology hard to use and feeling unsure about being able to use it well. About 56% of teachers said they often found educational technology hard to learn, and 42% said they sometimes worried about not meeting technology expectations at work. These two types of stress are closely related, as feeling unsure about digital skills can make technology seem even harder.

There were moderate links between feeling overloaded by technology and feeling uncertain about it, and between feeling that technology invaded personal life and feeling uncertain. This means that teachers who felt overwhelmed and always connected also felt that technology was unstable or always changing. During the pandemic, 47% of teachers said they were frustrated by constant updates to online platforms or changes in school rules. This shows how ongoing digital stress led to more uncertainty and tiredness over time.

The weakest link, though still positive, was between feeling unsure about digital skills and feeling overloaded by technology. This means that while some teachers felt insecure about their digital abilities, this was not strongly connected to feeling overwhelmed by too much work. In other words, teachers could handle a lot of digital tasks without feeling unqualified, showing that overload came from outside pressures, while insecurity was more about personal feelings. Based on these relationships, two main groups of correlated dimensions can be distinguished:

Workload-related group:

- Techno-overload, techno-invasion, and techno-uncertainty show moderate-to-strong intercorrelations (values between 0.49 and 0.68).
- These stressors reflect external technological demands: the need to be constantly available, the expansion of digital workload, and the instability of online environments.
- About 65–70% of participants reported scores above the midpoint (3.0) in these areas, confirming these experiences were common during remote education.

Competence-related group:

- Techno-complexity and techno-insecurity correlate strongly (0.60), representing how people perceive their own skills and control.
- About 58% of teachers indicated that managing digital platforms was “somewhat difficult” or “very difficult” and 41% expressed they were worried about not learning to use them well enough.
- These findings suggest that technostress is not only an external burden but also an emotional and cognitive challenge that affects how confident teachers feel in their abilities.

Interestingly, the two groups are associated (values between 0.46 and 0.52), suggesting that they do not work independently. Teachers who feel overworked and digitally invaded are also more likely to feel uncertain or insecure about their technological abilities. This connection supports the interpretation of technostress as a multidimensional phenomenon. Once the balance between demands and digital competence is disrupted, multiple stressors escalate simultaneously.

To better understand these results, it is essential to look at how important each area is and how they are connected. Techno-overload recorded the highest score and standard deviation (3.7, with 0.83 SD), followed by techno-invasion (3.6 and 0.79 SD), both of which strongly correlate with techno-uncertainty (3.0, with 0.74 SD). Together, these findings suggest that external workload and communication pressures contributed substantially to the feeling of instability and lack of control. Meanwhile, techno-complexity (3.1, with 0.87 SD) and techno-insecurity (2.7, with 0.90 SD) show internal strain points that, while not as strong on average, still play an important role in keeping overall technostress going.

These data show that technostress among teachers is not just a group of separate problems but a set of connected issues. When teachers feel overloaded and their boundaries are crossed, they often feel tired and unsure, which can make them lose confidence and feel like things are more complicated. The connections between these problems show a chain reaction: when outside pressures go up, teachers feel more stress inside, which adds up and affects their mental health and job satisfaction.

The results for the third main research question show that the five types of technostress are closely connected, forming two main groups: outside, workload-related pressures and inside, skill-related pressures, which affect each other. Teachers who had the most digital work and had to stay connected the most also often felt more unsure and doubted their own digital skills. These findings support the idea that technostress among secondary school teachers during the COVID-19 pandemic was made up of many connected pressures, with each one making the others stronger instead of acting alone.

7.2 Summary of findings

The overall results of this research give a clear picture of how technostress showed up among secondary school teachers in the Valencian Community during the COVID-19 pandemic. Based on data from 46 teachers, the findings show that technostress was common and had many sides, affecting almost all participants in some way. The results in the first research question (RQ1) showed that teachers had moderate to high levels of technostress, with clear differences among the five areas measured. The highest average scores were for techno-overload (3.7) and techno-invasion (3.6), while techno-complexity (3.1) and techno-uncertainty (3.0) were in the middle, and techno-insecurity was the lowest (2.7). These results show that teachers' main sources of digital stress came from outside pressures and heavy workloads, not from lacking digital skills.

More than two-thirds of respondents (68%) indicated that they "often" or "very often" felt overwhelmed by technological demands, and over 60% reported that their work encroached on personal time through digital communication tools. In contrast, only around one-third of participants (31%) expressed notable insecurity regarding their ability to use technology effectively. The internal consistency of these findings shows that technostress during the pandemic primarily emerged from the intensity and continuity of digital work, with emotional fatigue and blurred work-life boundaries being central experiences.

The results for the second research question (RQ2) showed clear differences in technostress based on age and teaching experience. Younger teachers (under 35 years) had higher average scores for techno-overload (3.8) and techno-invasion (3.7), while older teachers (45 years and above) had higher levels of techno-insecurity (3.0) and techno-uncertainty (3.2). This means that younger teachers felt more outside pressure from heavy workloads and always being connected, while older teachers worried more about keeping up with new technology. Teachers with less than ten years of experience felt more overloaded and invaded, while those with more than twenty years of experience felt more insecure and unsure. The middle group (teachers with 11 to 20 years of experience) had the most balanced results, with moderate levels in all areas and less difference between them. This group seems to be more able to handle digital demands, as they are familiar with technology and feel stable in their jobs.

Gender differences were also noticeable. Female teachers (61% of the sample) reported slightly higher techno-overload (3.8) and techno-invasion (3.7), showing they had a harder time keeping work and personal life separate, while male teachers had a bit more techno-insecurity (2.9) than female teachers. These trends, though small, suggest that both job and social expectations affect how teachers feel digital stress. Also, public-school teachers (70% of the sample) had higher scores for techno-overload (3.8) and techno-uncertainty (3.2) than teachers in semi-private or private schools (3.4 and 2.8), which may be because of differences in support and technology at their schools.

The third research question (RQ3) looked at how the five types of technostress are connected, showing strong and positive links between all of them. The strongest connections were between techno-overload and techno-invasion (0.68), and between techno-complexity and techno-insecurity (0.60). These results show two main groups of stress: one related to workload, which includes overload, invasion, and uncertainty, and another related to skills, which includes complexity and insecurity.

Moderate positive links between the two groups (values between 0.46 and 0.52) show that these sources of technostress are connected. When outside digital pressures go up, feelings of insecurity and uncertainty also rise, and the other way around. This connection shows that technostress builds up over time: when teachers' workloads get too high, they feel less able to cope and more out of control. The data show a cycle where outside demands and inner worries keep making each other worse.

Overall, the findings from all three research questions show that technostress among secondary school teachers in the Valencian Community during the COVID-19 pandemic was a complex issue, backed by data, and shaped by both personal and outside factors. The numbers point to four main patterns:

1. High prevalence of workload and invasion-related stressors, with 65–70% of teachers reporting frequent or constant digital overload.
2. Age and experience-related differences, indicating that both early-career and senior teachers are vulnerable to technostress, though for distinct reasons.
3. Gender based nuances, where female teachers exhibited slightly higher stress levels related to digital workload and work-life balance.
4. Interconnectedness of technostress dimensions, confirming that stress factors reinforce one another rather than working independently.

These findings show that technostress during the pandemic was not just about digital skills but was a complicated problem involving both mental and workplace issues. Teachers' ability to handle digital changes depended on how well they could adapt, the support they got from their schools, and how their workload was managed. Together, these results set the stage for the next chapter, which will look at these findings in light of existing theories and research, and discuss what they mean for teacher wellbeing and education policy.

8. Conclusion and discussion

This section brings together the results from earlier chapters with the theoretical framework and previous research to draw broader conclusions about technostress among secondary school teachers in the Valencian Community during the COVID-19 pandemic. The discussion interprets the data, considers the study's implications, and

explains how the findings help us better understand the links between technology, teaching, and teacher wellbeing.

The study shows that technostress was common during the pandemic, affecting teachers of all ages, genders and experience levels. The data revealed moderate to high levels of technostress, especially in techno-overload (3.7) and techno-invasion (3.6). This means teachers often felt overwhelmed by the demands of remote teaching and the loss of clear boundaries between work and home life. High scores in these areas (68% and 63%) indicate that rapid digitalization during the pandemic significantly changed teachers' workloads and daily routines.

Techno-complexity (3.1), techno-uncertainty (3.0) and techno-insecurity (2.7) had lower average scores, showing moderate but meaningful stress related to adapting to technology, ongoing changes, and confidence in digital skills. The range of responses (standard deviations from 0.74 to 0.90) shows that teachers' experiences varied: some adjusted well, while others found it hard to keep up. Overall, these findings show that technostress was a widespread challenge tied to the digital transformation of education because of the context of the pandemic, and not just a minor effect of it. These results are similar to earlier studies on how COVID-19 affected teachers. Molino et al. (2020) and Li and Wang (2021) also found that the main sources of technostress were heavier workloads and the constant connection required by online teaching. Both studies noted that remote teaching increased the pressure to respond quickly to messages and handle several platforms at once, often leading to fatigue and a poorer work-life balance. The agreement between these studies and the current findings suggests that the main stressors during pandemic teaching were external and organizational, not just personal.

At the same time, the moderate but meaningful levels of techno-complexity and techno-uncertainty observed here reminds to findings from Spagnoli et al. (2021): teachers often felt less confident in their digital skills when faced with fast-changing technology. In the Valencian Community, teachers had to adapt quickly to online teaching, often without enough support from their institutions. Genner (2017) and Livingstone (2004) have pointed out that such rapid changes can increase inequalities in access to digital tools and training, leading to uneven conditions for both teachers and students. These findings show that technological stress is not just a personal issue but also a systemic one, connected to how prepared institutions are. And it is essential to protect teachers from the increased workload associated with remote teaching. Older teachers experienced greater techno-uncertainty and techno-insecurity, revealing anxieties about their ability to adapt to constant technological changes. These patterns confirm that technostress manifests differently across career stages, supporting the idea proposed by Li and Wang (2021) that digital competence does not necessarily translate into lower stress, as the broader educational context and work expectations often offset individual skill advantages.

The data also showed that mid-career teachers (11–20 years of experience) had more balanced technostress levels and less variation in their responses. This group may be experienced enough to manage teaching demands and still flexible enough to learn new technologies. Teachers with less than ten years of experience felt more overloaded by digital demands, while those with over twenty years of experience reported more insecurity and uncertainty. This suggests a concrete pattern: both newer and more experienced teachers are more vulnerable to technostress, but for different reasons.

Gender differences were also important and matched earlier findings: female teachers reported more stress from too much work and having their personal time interrupted, while male teachers felt a bit less confident about using digital tools. Molino et al. (2020) also found that gender roles and job expectations can affect how stress is experienced and managed. For the Valencian teachers in this study, women's greater family care duties may have made it harder to keep work and personal time separate.

The comparison by school type also gave useful information. Public-school teachers reported higher average scores in feeling overloaded by technology (3.8) and feeling unsure about technology (3.2) than teachers in semi-private or private schools (3.4 and 2.8). These results may show differences in support from the school, access to digital tools, and how work is organized. Nang et al. (2022) emphasize that good planning by schools and ongoing digital training are essential to prevent technostress, as they help match teaching methods with technology and reduce the feeling that things are unpredictable. The findings from the present study seem to support this conclusion, showing how the lack of organized digital planning in public schools may have made teachers' stress worse during the pandemic.

The analysis of the data gave more insight into how technostress works. There was a strong link between feeling overloaded by technology and having work interrupt personal life (0.68), meaning that as teachers' digital workload grew, their sense of work-life intrusion also increased. Finding technology complicated and feeling unsure about it were also closely related (0.60), showing that struggling with digital tools often went together with doubts about one's abilities. These results show that the five aspects of technostress are connected and part of a larger pattern. This matches Tarafdar et al.'s (2019) model, which sees technostress as a multidimensional issue shaped by technology demands, user skills, and the organization.

Overall, these results show that technostress among high school teachers during the COVID-19 pandemic was both systemic and cumulative. It was systemic because it came from issues like poor preparation, missing digital policies, and unrealistic expectations for constant availability. It was cumulative because the stressors built on each other: high workload led to more intrusion, which then caused more uncertainty and insecurity. This cycle suggests that technostress should be seen as a structural result of digital changes in education, not as a personal failing. As explained by Livingstone

(2004) and Genner (2017): the integration of technology into learning environments must be accompanied by critical reflection on its pedagogical, emotional, and social implications. Digitalization alone does not guarantee innovation or efficiency; on the contrary, without adequate support, it can reproduce inequalities and generate new forms of psychological strain. In the context of the Valencian Community, this becomes particularly relevant, as the rapid transition to online teaching exposed both the strengths and weaknesses of the regional education system in adapting to crisis-driven technological change.

These results have implications beyond the pandemic. From a teaching perspective, the data highlight the need for school strategies that balance new technology with teacher wellbeing. Nang et al. (2022) point out that good digital planning should include ongoing training, reliable tools, and emotional support. Ongoing professional development in digital teaching can help reduce feelings of techno-complexity and techno-insecurity, while clear rules for communication and workload can lower techno-overload and techno-invasion. Creating spaces where teachers share digital experiences and strategies can also help everyone adjust to new technology and reduce stress together.

At the policy level, these findings show the need for clear digital wellbeing frameworks in education. Ministries and local authorities could create guidelines to make sure educational technology is used in ways that help teaching, not just add extra work. Programs like digital mentoring, help desks, or flexible schedules could ease some of the main stressors found in this study. Schools should also treat technostress as a workplace health issue, not just a teaching problem, and include it in teacher support and wellbeing programs.

This research has some limitations. The main one is the small sample size (46), which means the results may not apply to all teachers in the Valencian Community or Spain. Future studies should be using larger and more varied samples, to see if the same patterns appear. Adding interviews or focus groups could give a deeper understanding of the emotional and contextual factors behind the numbers. Finally, the study only covers the pandemic period, so future research could compare these findings to post-pandemic data to see if technostress changes as digital teaching becomes more common.

Future research could look at cross-cultural comparisons or follow teachers over time to see how they adapt to technology. Studying differences between schools, like having digital leaders or professional learning communities, could show which factors best protect teachers from technostress. It would also be useful to explore how students see their teachers' digital stress, as this could reveal how technostress affects learning and classroom life.

The results demonstrate that technostress was prevalent, multidimensional, and reinforced by systemic conditions rather than individual deficiencies. High levels of techno-overload and techno-invasion revealed the burden of excessive digital demands and blurred work-life boundaries, while moderate levels of techno-complexity, techno-uncertainty, and techno-insecurity highlighted the ongoing challenges of technological adaptation. Sociodemographic differences showed that both novice and veteran teachers were vulnerable, and correlation analyses confirmed that the various stressors interacted dynamically, forming two interrelated groups: workload-related and competence-related.

These findings highlight the need for a balanced approach to digital education. Technology should be used as a tool to support good teaching and sustainable work, not as a goal on its own. Tackling technostress will take a joint effort from policymakers, schools, and teachers to make sure digital changes in education support both innovation and teacher wellbeing.

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Attachments

1. Empty Spanish questionnaire template

Tecnoestrés en el profesorado valenciano de Educación Secundaria durante la COVID-19

Estimado/a profesor/a:

Este cuestionario forma parte de un trabajo de fin de máster que analiza el impacto de la docencia en línea durante la pandemia de COVID-19 en los niveles de tecnoestrés del profesorado de Educación Secundaria de la Comunidad Valenciana.

La participación es voluntaria, anónima y confidencial. Los datos se utilizarán únicamente con fines académicos.

Gracias por su colaboración.

*** Indica que la pregunta es obligatoria**

1. He leído y acepto voluntariamente participar en este estudio. *

Selecciona todos los que correspondan.

☐ Sí

INFORMACIÓN SOCIODEMOGRÁFICA

2. Edad *

3. Género *

Marca solo un óvalo.

☐ Hombre

☐ Mujer

☐ No binarie

4. Años de experiencia como docente *

Selecciona todos los que correspondan.

- ☐ Menos de 5 años
- ☐ Entre 5 y 10 años
- ☐ Entre 11 y 20 años
- ☐ Más de 20 años

5. Materia principal que ha impartido en su carrera profesional *

6. Asignatura(s) que enseñó durante la pandemia de Covid-19 en 2020 *

7. Provincia en la que estaba el centro educativo en el que impartió clases durante la pandemia de Covid-19 en 2020: *

Marca solo un óvalo.

- ☐ Alicante
- ☐ Valencia
- ☐ Castellón

8. ¿Había recibido alguna formación en tecnologías de la información y la comunicación (TIC) antes del periodo de confinamiento? *

Marca solo un óvalo.

- ☐ Sí
- ☐ No

9. Si es así, ¿cómo valoraría la calidad de la formación recibida?

Marca solo un óvalo.

1	2	3	4	5		
Insu	☐	☐	☐	☐	☐	Excelente

ESCALA DE TECNOESTRÉS

Instrucciones: A continuación, se presentan afirmaciones relacionadas con el uso de la tecnología durante la enseñanza en línea. Indique su nivel de acuerdo con cada una.

Escala Likert (igual para todas las afirmaciones):

1 = Totalmente en desacuerdo | 2 = En desacuerdo | 3 = Ni de acuerdo ni en desacuerdo | 4 = De acuerdo | 5 = Totalmente de acuerdo

10. Sentí que tenía que trabajar más rápido debido a la tecnología. *

Marca solo un óvalo.

1	2	3	4	5		
Tota	☐	☐	☐	☐	☐	Totalmente de acuerdo

11. La tecnología aumentó mi carga de trabajo durante la pandemia. *

Marca solo un óvalo.

1	2	3	4	5		
Tota	☐	☐	☐	☐	☐	Totalmente de acuerdo

12.

*

Me sentí abrumado/a por la cantidad de herramientas digitales que tenía que utilizar.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

13.

*

La enseñanza online invadió mi tiempo personal.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

14.

*

Sentí que no podía desconectarme del trabajo fuera del horario escolar.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

15.

*

Recibí comunicaciones relacionadas con el trabajo a todas horas.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

16. Las tecnologías requeridas eran demasiado complejas. *

Marca solo un óvalo.

	1	2	3	4	5	
Tota	☐	☐	☐	☐	☐	Totalmente de acuerdo

17. Sentí que me faltaban habilidades para utilizar adecuadamente las plataformas en línea. *

Marca solo un óvalo.

	1	2	3	4	5	
Tota	☐	☐	☐	☐	☐	Totalmente de acuerdo

18. Aprender a utilizar nuevas herramientas tecnológicas me llevó mucho tiempo. *

Marca solo un óvalo.

	1	2	3	4	5	
Tota	☐	☐	☐	☐	☐	Totalmente de acuerdo

19. Me preocupaba que mis bajas habilidades tecnológicas afectaran negativamente mi trabajo. *

Marca solo un óvalo.

	1	2	3	4	5	
Tota	☐	☐	☐	☐	☐	Totalmente de acuerdo

20.

*

Sentí que otros profesores estaban mejor preparados tecnológicamente que yo.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

21.

*

Me sentí vulnerable a los cambios tecnológicos.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

22.

*

Las herramientas digitales cambiaron demasiado rápido.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

23.

*

Me sentí confundido por la frecuencia con la que cambiaban las plataformas educativas.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

24.

*

Me resultó difícil mantenerme actualizado con las nuevas tecnologías.

Marca solo un óvalo.

1 2 3 4 5

Tota ☐ ☐ ☐ ☐ ☐ Totalmente de acuerdo

Comentarios

25. ¿Le gustaría compartir otras experiencias relacionadas con el uso de la tecnología en la enseñanza durante la pandemia?

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