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Exploring technostress in disruptive teaching practices

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Abstract

Purpose – In this study, the authors explore teachers' experiences of work during the pandemic using the analytic lens of technostress. More specifically, the authors investigate how the sudden transition to distance education induces technostress among teachers in relation to their teaching practice.
Design/methodology/approach – The data gathering method constitutes a questionnaire that explores how teachers' work situation was affected by shifting to distance education. 286 Swedish teachers answered the open-ended questionnaire.
Findings – The results demonstrate how technostress creators, technostress strains and teachers' coping strategies are expressed in teaching practice during an extreme case of digitalization.
Originality/value – The authors contribute to the work on technostress by suggesting the theoretical concept of "technorest" to shed light on alternative effects of the digitalization of work practice. Furthermore, the authors give examples of technorest creators which the authors term "techno-shields" and "techno-security". The results could be interesting to enhance the understanding of the digitalization of work practices and cultivate a more favorable work situation.

Keywords Digitalization, Teacher, Remote work, Technostress, Technorest
Paper type Research paper

1. Introduction

The COVID-19 crisis turned our daily and professional lives upside down, with the requirements for organizations to transition operations to enable remote work (e.g. Karanika-Murray and Ipsen, 2022; Nosratzadeh and Edrisi, 2022; Panteli *et al.*, 2022; Reineholm *et al.*, 2022; Waizenegger *et al.*, 2020). Education constituted no exception and in light of the pandemic, students, teachers and school leaders around the world were directed to distance education and teaching practice which refers to classroom teaching and related duties (Willermark, 2018) was heavily disrupted (Carlsson *et al.*, 2022; Carpenter *et al.*, 2020; Kaden, 2020). Thus, although the digitalization of education has been ongoing for the last decades, the pandemic caused an extreme case of digitalization. Currently, there is an abundance of research that deals with

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education during the pandemic from different perspectives and contexts (e.g. Carpenter *et al.*, 2020; Hartshorne *et al.*, 2020; Kaden, 2020; Leithwood *et al.*, 2020). Several studies reveal challenges, such as creating content for online spaces, learning new delivery tools and becoming familiar with online pedagogy (Hartshorne *et al.*, 2020). Studies also report difficulties caused by insufficient technological and pedagogical support at the local school as well as a lack of competence and experience in the daily use of digital technology (Dong, 2020; Whalen, 2020). It has been suggested that the integration of technology in teaching may become a focus of tension and anxiety among teachers, causing fragmentation and stress (Penado Abilleira *et al.*, 2021; Özgür, 2020). Stress related to the use of technology in the workplace is often described as technostress (Ayyagari *et al.*, 2011). Previous research on technostress points out stressors related to the use of technology as information overload (Tarafdar *et al.*, 2007), work overload (Ayyagari *et al.*, 2011) and blurred boundaries between private and professional life (Tarafdar *et al.*, 2007). In the context of education, the incorporation of technology may become a focus of stress and anxiety among teachers, influencing their daily lives, both professional and private (Fernández-Batanero *et al.*, 2022). These situations can create negative stressors among the teachers and affect their work environment and health (Fernández-Batanero *et al.*, 2021). In this study, we explore teachers' experiences of work during the pandemic using the analytic lens of technostress. We ask the following research question:

RQ1. How does the sudden transition to distance education induce technostress among teachers in relation to their teaching practice?

The remaining part of this article will be structured as follows. First, a presentation of related research on work during the pandemic will be provided. Next, we present our theoretical perspective of technostress. After that, we present our methodology, including the context for data production, data collection, data analysis and ethics. Thereafter we present our results followed by a discussion and conclusions.

2. Related work

Due to the pandemic, the number of people working from home increased drastically in various professions. In a report, Eurofound (2020) investigated people's living and working conditions during the pandemic by collecting data across the European Union. The results show that many employees report a positive experience. Still, employees who worked from home more frequently report working in their free time they more often reported feeling isolated. Similarly, Ipsen *et al.* (2021) explored European knowledge workers' experiences of working from home during the early weeks of the pandemic. The study mapped the most important advantages and disadvantages of working from home. The results showed that most people stated a more positive rather than negative experience of working from home, with the main advantages of work–life balance, improved work efficiency and greater work control. The main disadvantages reported included home office constraints, work uncertainties and inadequate tools.

Additionally, researchers have explored education during the pandemic, from students' (Gonzalez *et al.*, 2020; Loeb and Windsor, 2020), school leaders' (Azorín *et al.*, 2020; Leithwood *et al.*, 2020; Pollock, 2020) and teachers' perspective (e.g. Kaden, 2020; Klapproth *et al.*, 2020). In this study, we focus on teachers' experiences. For example, Kaden (2020) used a single case study to explore the transition for a teacher in a primary school in the US and illustrates how the transition to distance learning brings an increased workload for the teacher. Through a cross-sectional survey in Germany where 380 teachers from different school forms participated, Klapproth *et al.* (2020) explores the level of stress that teachers perceived during the transition to distance education. The results show that teachers experienced medium to high levels of stress. The vast majority reported technical barriers, yet most of the teachers felt capable to cope with the stress. Whalen (2020) studied teachers'

experiences during the transition to distance education via a survey that received 325 responses from K-12 educators. The results show an important variation in teachers' readiness to use technology to teach distance education. Teachers who frequently used technology in their daily teaching practice reported an easier transition. Some studies shed light on teachers' experiences in a Swedish context. For example, Olofsson *et al.* (2021) used interviews to explore the experience of Swedish upper secondary schools during the first six months of distance education during the pandemic. The results showed how distance education functioned as a positive catalyst for teachers' digital competence and their schools' digitalization. Besides, teachers experienced decreased workloads. Willermark and Gellerstedt (2022) explored secondary teachers' experiences of distance education via a survey with 1,109 respondents from 15 high schools in Sweden. The results show distinct differences in teachers' perceptions of how teaching has worked and present four ideal types: 1) the enthusiast, 2) the skeptic, 3) the pessimist and 4) the affirmative, to capture the essence of teachers' multifaceted experiences, of the transition to distance education. The study illustrates how different teachers perceived the extreme form of digitalization that the pandemic entailed in their work practices. In this paper, we explore teachers' different experiences from the transition to distance education via the theoretical lens of technostress.

3. Theoretical perspective

It has long been discussed in research that digital technologies can induce technostress. The research field of technostress investigates how and why the use of technology causes various demands on the individual (Tarafdar *et al.*, 2007). Stress exemplifies the state of imbalance experienced by an individual between the demands of a certain situation and the individual's capability to meet them (Tarafdar *et al.*, 2007). That is stress that is created using technologies and experienced by the individual user (Ragu-Nathan *et al.*, 2008; Tarafdar *et al.*, 2007). Recent research does not view technostress as an isolated phenomenon created merely by the technology, but as a reaction that is created in the interaction between the user and the technology (Ayyagari *et al.*, 2011; Salo *et al.*, 2019). Furthermore, researchers point out that stress in itself is neutral, it is when it is experienced by an individual and interpreted by the individual that the stress gains value (Gimpel and Schmied, 2019; Salo *et al.*, 2019). That is, the emergence of technostress depends on the individual users' experiences, capabilities, evaluations and the type of technology being used in what context (Gimpel and Schmied, 2019). Traditionally researchers have assumed that stress is negative, but recent research encourages future research to go beyond that assumption and look at positive stressors (Califf *et al.*, 2020). In addition, research has emphasized that stressors at work can be viewed as challenge stressors and hindrance stressors (Podsakoff *et al.*, 2007), that is both negative and positive sides of technostress. Challenge stressors are experienced by the individual as positive (Tarafdar *et al.*, 2019) and related to accomplishing workplace tasks and are evaluated and experienced by the individual as valuable (Cavanaugh *et al.*, 2000; Podsakoff *et al.*, 2007). Hindrance stressors are linked to pressures and anxieties at work induced by the use of technology and are consequently experienced as harmful and negative by the individual (Hargrove, 2013). Challenges and hindrances related to technostress were studied by Califf *et al.* (2020) who investigated how healthcare workers experienced psychological stress induced by the implementation of technology in healthcare. Their results emphasize that the challenge stressors have a positive effect on the nurse's job satisfaction and were also related to the level of involvement in the technology implementation. Similarly, individuals who experienced negative stress, that is hindrance stressors felt less satisfied with their job situation. Benlian (2020) study on challenges and hindrance stressors emphasizes that the experiences of negative or positive technostress should not be considered as consistent. That

is, one person can have different experiences from one day to another. Consequently, the authors highlight the importance of viewing challenge and hindrance stressors as interconnected rather than as separate and distinct phenomena.

3.1 Technostress creators

In the present study, we use the established set of techno stressors that researchers have used for the organizational context. Several frameworks have been developed to illustrate the techno stressors and strains deriving from technology use. Ayyagari *et al.* (2011) created a technostress framework containing the main concepts of stress, that is stressors and strains based on the technical characteristics. Following this framework, a user's perception of features and attributes of digital technology (technology characteristics) can lead to stress-creating stimuli which again create responses and outcomes for the user (strains) (Ayyagari *et al.*, 2011; Salo *et al.*, 2019). Techno stressors that are often used to explain technology stressors are; 1) techno-overload, 2) techno-invasion, 3) techno-complexity, 4) techno-uncertainty and 5) techno-insecurity (Ragu-Nathan *et al.*, 2008; Singh *et al.*, 2022; Tarafdar *et al.*, 2007, 2011). Techno-overload refers to the requirement to work faster and longer hours due to technology-related demands. Techno-invasion concern constant connectivity which brings blurred lines between work and private life. Techno-complexity means that a person has difficulty understanding a certain chore or situation. Techno-uncertainty refers to situations characterized by ambiguous expectations or outcomes. Techno-insecurity can be expressed by employees feeling threatened of losing their jobs due to due automation or because of insufficient technological skills (Rohwer *et al.*, 2022). Therefore, techno stressors contribute to strains and negative or positive effects, including lack of productivity and organizational commitment (Sarabadani *et al.*, 2018) poor well-being, exhaustion, lack of productivity, decreased organizational commitment and burnout (Maier *et al.*, 2015; Ragu-Nathan *et al.*, 2008; Tarafdar *et al.*, 2007), or motivation, positive effects on self-esteem and professional identity (Califf *et al.*, 2020) (See Figure 1).

3.2 Coping strategies for dealing with technostress

Researchers have also investigated the outcomes of technostress in the form of individuals' *coping strategies*. Two main categories have evolved, emotion-focused strategies and problem-focused strategies. Monat and Lazarus (1991), emphasize that problem-focused coping refers to the improvement efforts toward the troubled individual employee and work context relationship. For example, the employees experiencing technostress can seek information about what to do, hold back from impulsive and premature actions and confront the person or persons responsible for their difficulty. *Emotion-focused coping* refers to thoughts or actions to relieve the emotional impact of stress. Such strategies of coping do not alter the threatening or damaging conditions, but they can make the person feel better. Examples are avoiding thinking about the trouble, denying that anything is wrong, distancing or detaching oneself as in joking about what makes one feel distressed or taking tranquilizers as an attempt to relax. In a recent review of research, Rohwer *et al.* (2022) explore research on how to prevent and cope with work-related technostress. They investigate a total of 62 studies published between 2008 and 2021. In the review, the authors map environmental resources together with personal resources and problem- and emotion-focused coping strategies to reduce work-related technostress. They conclude both behavioral and structural prevention measures are needed to overcome work-related technostress in practice. Furthermore, it is argued that employees and managers should be supported in developing useful coping strategies to handle work-related technostress. They argue that future research needs to focus more on preventing and coping with technostress and examining its positive effects (Rohwer *et al.*, 2022).

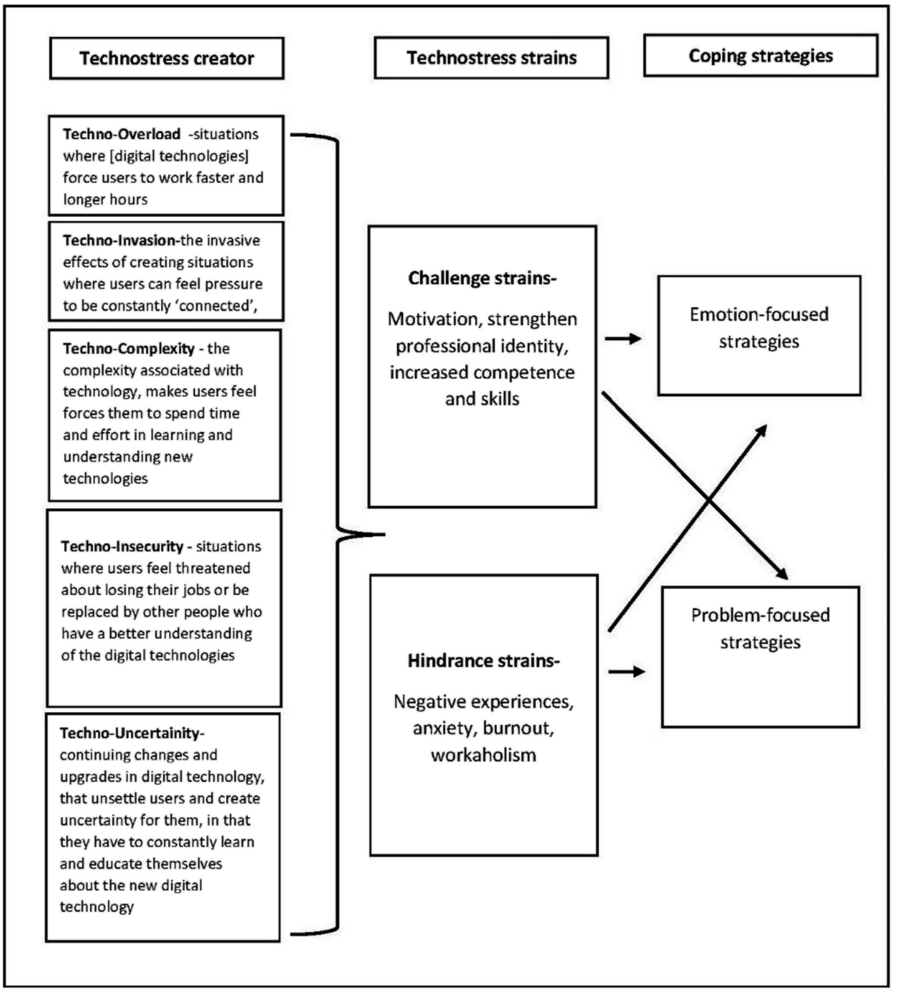


Figure 1.
Theoretical framework summarizing previous work of Ayyagary *et al.*'s (2011), Monat and Lazarus (1991) and Tarafdar *et al.*'s (2007)

Source(s): Authors's own creation

3.3 Teachers and technostress

Internationally, researchers have problematized technostress within various professional groups (Çoklar *et al.*, 2017; La Torre *et al.*, 2019; Tarafdar *et al.*, 2019). Khlaif *et al.* (2022) describe technostress in a school context as the stress, pressure, or discomfort that a teacher experiences when he/she uses new technology in the form of hardware and software in the teaching and learning process. Furthermore, Penado Abilleira *et al.* (2021)explored technostress among university teachers in light of the pandemic. Results show that female teachers who are older and have more years of experience suffered the most from negative technostress. Özgür (2020) studied technostress among high school teachers. The result shows that both school support and teachers' technological-pedagogical content knowledge (TPACK) (Mishra and Koehler, 2006) experienced a lower level of technostress. However, there was no statistically significant connection between teachers' gender and technostress levels. Aktan and Toraman (2022) investigated teachers' technostress in connection to the

pandemic. They show that the intensification of technology usage during distance education negatively affected teachers' life, performance and workload. Furthermore, in a recent literature review, Fernández-Batanero *et al.* (2021) explored technostress in the education context. The findings display that teachers present high levels of anxiety or stress due to technology usage in the classroom and stress the need for research that investigates strategies to prevent the emergence of anxiety and stress. One step in that direction is to explore the exact stressors that teachers face. Thus, while other studies have observed that teachers experienced technostress (Fernández-Batanero *et al.*, 2021) our study sets out to investigate when and how technostress is triggered.

4. Method

4.1 Context for research

This study is carried out in the context of four Swedish high schools. In March 2020, the Swedish government announced that high schools and universities would be run exclusively at a distance. On 29 May 2020, the Minister of Education announced that as of 15 June 2020, the schools would reopen to close again but these were then closed again in December 2020 due to the increased spread of infection. This study explores teachers' experiences from the first period of distance education (Mars – June 2020). The Swedish education system is one of the most digitalized in the European Union and the Government has implemented a national strategy for the digitalization of the school sector indicating that Sweden should be world-leading in using the opportunities with digital technologies. Most schools have so-called 1:1, i.e. one computer (or tablet) per student (European Commission 2020). In this study, the school administrators at the participating schools made a recommendation for teachers to continue working from their usual workplace during the initial two weeks of distance education. This allowed them to seek support from their school leaders and colleagues.

4.2 Data collection

The data collection was carried out to explore teachers' experiences from quickly switching to distance education. The data selection was based on obtaining a representation of both theoretical and practical programs (i.e. higher education preparatory program and vocational program). Thus, the sample can be described as strategic (Bryman, 2015). A qualitative teacher survey was distributed to all teachers working in the four schools, at the school's initiative. The survey was distributed to a total of 408 teachers, based on the municipality's information on active teachers. The list includes teachers who were on sick leave or other leave and could include staff who recently quit and who have not yet been removed from the system. This means that the survey is distributed to a wider group of teachers than the target group (i.e. teachers who worked at one of the four schools during distance education), which could affect the response rate negatively. Yet, the requirements for participation were specified in the survey letter. A reminder was sent specifically to 136 teachers who had not clicked on the link a few days after the distribution. A total of 303 began to answer the survey and of these 286 completed the survey. The survey was designed with free-text answers to provide an open and nuanced exploration of teachers' experiences, without anticipating the answers. In a recently published article, the first author explored teachers' interaction with students during distanced education (Willermark, 2021). As for this study, we explored how teachers perceived technostress by exploring how they perceived that their motivation for work has been affected (Califf *et al.*, 2020) since the transition to distance education, through open-ended response types. The question was formulated as: "How has the transition to distance education affected your motivation for teaching and other assignments?" In this way, we could focus on how the intensified digitalization of teaching practice created

technostress among teachers and describe their work situation in their own words without relating to predetermined categories.

4.3 Data analysis

As for this particular study, the teacher's responses to the questionnaires were abductively analyzed (Bryman, 2012). First, the analysis focused on teachers' perspectives from the lens of technostress and whether teachers' experiences had the character of *challenged strains* or *hindrance strains*. Thus, excerpts that related to accomplishing teaching-related tasks and that were evaluated and experienced as valuable were categorized as challenge strains. It could include increased motivation, strengthened professional identity and increased competencies. For example, "I have worked harder but the results are worse" or "I feel isolated, stressed and tiered". Excerpts linked to anxieties induced using technology and that are experienced as harmful and negative by the teacher were categorized as *hindrance strains*. It could include negative experiences of anxiety, screen fatigue and burnout. For example, "It is a valuable experience" or "I have learned a lot" or "I have identified a lot of new possibilities". Most of the answers ended up in one of the two categories, but some were of the kind that parts of the answer were categorized as challenge strains while other parts were categorized as hindrance strains. Then, the answers in the two categories were re-analyzed through an open coding procedure (Schreier, 2013), which gave rise to subcategories that capture the nature of the challenge and hindrance strains based on teachers' free-text answers. All answers were read, analyzed and categorized. In practical terms, the analysis was carried out in the MAXQDA software program developed to support qualitative and mixed methods research. The tool was chosen to support systematically organizing, evaluating and interpreting the data and to enable visualization of the code distribution of data. The analysis was carried out by the first author. In the results section, the quotes are coded with R (=respondent) and the unique ID (number) of the teacher behind the quote.

4.4 Ethics

In this study, the research ethical principles for humanistic and social science research from the Swedish Research Council have been applied. It includes four principles 1) the information requirement, 2) the consent requirement, 3) the confidentiality requirement and 4) the use requirement. Thus, participants were informed of the purpose of the study and that it is voluntary to participate. Anonymization has been applied to avoid revealing the identity of the participants and the material has not been used for commercial or other non-scientific purposes. The handling of the data followed the ethical guidelines of scientific research and the guideline set by the Ethical Review Authority to minimize harm to the individuals taking part.

5. Results

When teachers report how their motivation for work has been affected, there is a large spread in the data. Some state that motivation has hardly been affected at all, while others experience that the foundation for their incentives has changed radically. Some teachers feel isolated and how the teaching profession has suddenly become a lonely job. Furthermore, many teachers experience that they are inferior teachers in distance education who cannot use their entire professional repertoire. At the same time, other teachers describe how they have been strengthened in their teaching and some describe that they prefer distance education and that they have had the opportunity to apply their techno-pedagogical knowledge into practice. A total of 144 excerpts are categorized as *hindrance strains*, while 175 excerpts are categorized as challenge strains (see Table 1) which is elaborated on below and illustrated in Figure 2.

5.1 Hindrance strains

Teachers express despair, frustration and powerlessness in the new situation. In some cases, distance education is described as turning a hand, from appreciating and finding great meaning in their work to doing one's duty, which can be illustrated by; "*I have worked because I must. Usually, I work because it's fun*" (R127) or "*There has been no room to look for motivation!//Teaching via a screen offers very little stimulus, so the work is becoming boring*" (R26).

5.1.1 Facing an overwhelming work situation. Recurring is an overwhelming work situation where harder work is not enough to handle the new situation. Teachers describe how they struggle with stress, working overtime and still cannot compensate for the negative effects of distance education. Teachers in different ways express an overwhelming situation where they are insufficient and out of control as illustrated by; " It *has been constant stress, where you never really felt in phase . . .*" (R168) or *"I have felt stressed and inadequate as a teacher with an incredibly large workload. There is lacking legal certainty concerning students' exams and how we deal with cheating"* (R194).

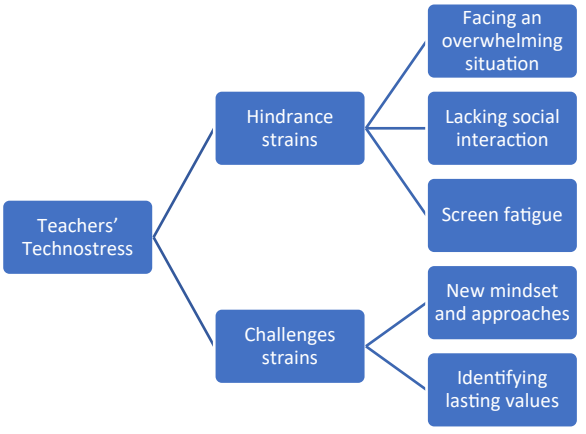
5.1.2 Lacking social interaction. Difficulties related to social interaction with students and colleagues are a decisive factor for mistrust, as illustrated by *"I experience frustration concerning not meeting students physically and being tied to the computer all the time*" (R103) or "*I feel that the teaching profession has become lonely. I miss the social parts both with students and with colleagues. I did not become a teacher to talk to a computer all day long*" (R41) and "*Something that I think that I share with others is that I feel drained of energy. The joy of work lives in the social interaction*" (R51). In some cases, teachers go further and describe how they feel disconnected from their teaching profession and losing their professional identity in favor of some new and diffuse role, as illustrated by: "*I miss tutoring. This is what the teachers'*

Technostress during COVID-19

Type	*Number*
Hindrance strains	144
Challenges strains	175
Total	319

Source(s): Author's own creation

Table 1.
Overview of data categorization and the number of excerpts



Source(s): Author's own creation

Figure 2.
Overview of data categorization

vital force is, this is where we teachers get energy and joy, in the meeting with the students. Work has become boring, and my job becomes like a support function at a large company. I have responded to a lot of messages from students and colleagues, but I have not taught as I usually do. My life has become more boring, and I have become fatter" (R54) and "*In terms of teaching, it [distance education] has meant a spiritual death as the interaction with the students becomes very limited and poor"* (R225).

5.1.3 Screen fatigue. The teacher describes how many hours in front of the screen create physical problems with headaches, dry eyes and pain in the neck and shoulders. Besides, distance education has meant an inactive lifestyle where hour after hour is spent in front of the screen. The problems create a difficult work situation and partly a feeling of hopelessness, which is illustrated by: "*This situation of sitting still in front of a computer has made me very brain tired and exhausted*" (R201) or "*There is a lot of time in front of the screen which becomes tiring for eyes, ears, and head*" (R132).

5.2 Challenge strains

Teachers express how the new and demanding situation has challenged them to develop both mindsets, attitudes and methods to meet the new situation and that they have developed new professional skills. Feeling that they have managed the situation has meant a sense of pride and induced new energy into the work. Teachers describe how they have searched for constructive ways of coping with the new situation.

5.2.1 New mindset and approaches. Teachers reveal how the pandemic in some sense became an alibi for breaking new ground and trying new things without knowing the result, as illustrated by: "*It has been fun to try something new without having to be an expert at it"* (R100) or "*I have had to re-think and try out new things. It keeps me on my toes*" (R185) or "*Now I dare to take on new pedagogical approaches, which I have hardly dared to imagine before*" (R113).

Teachers also express an increased self-efficacy and increased self-confidence for coping with the unexpected situation, as illustrated by: "*I think it was exciting to be 'forced' to change. I can handle more than I think!* (R67) or "*It is nice to discover that it has worked out so well*" (R46). Furthermore, the radical form of digitalization of teaching practice has meant a closer link to students' (digital) everyday life as illustrated by: "*I think we modernized our methods when we had to rethink our approaches and had to let go of some routines and methods. We have received a refreshing didactic think tank*." (R231). Similarly, experience is expressed by another teacher, who also highlights the importance of both embracing and critical reflection upon the experience with distance education as illustrated by;

> It felt as if the school took a giant step into the digital world as we were forced to rethink and expand our idea of how teaching can be conducted. In a way, we may have come closer to the students' digital everyday life, and we have an enormous ability within us to adjust to new situations when we must! We have been forced into digitalization. In the end, it was not so dangerous, rather interesting, fun, and contained much more possibilities. At the same time, I think it is important to STOP and reflect and not just keep going. (R138).

Several respondents also describe a process of feeling anxious to find constructive solutions and being strengthened by coping with the challenging task. A teacher describes the initial experience in terms of an identity crisis, which is illustrated by: *In the beginning, it was almost like an identity crisis, I did not know who I was as a teacher [in the new situation] and then the motivation dropped. But as we got more students on the track and their digital skills increased, we were able to vary the teaching more and then the motivation increased*" (R53). Teachers describe how the motivation came from discovering that they make distance education, yet often at the expense of increased workload, especially initially.

5.2.2 Identifying lasting values. Respondents explained how they discover methods and approaches in the new situation that could be utilized after the crisis. It includes new teaching approaches, new ways of facilitating engagement and interaction and new ways to examine students' work as illustrated by; "*Figuring out how to keep student engagement up and how to get interaction going is exciting. I have found hidden gems that I will continue to use under regular conditions*" (R116) or "*I bring with me a lot of new knowledge about digital tools that can be used under normal conditions//, response, assessment, etc. that I have discovered during the spring term*" (R91). That the school's digitalization is here to stay is also emphasized as an important reason to utilize the experiences from the pandemic, as illustrated by; "*Most indications are that digitalization will be an increasingly important element in the school of the future. So I feel the motivation to develop and help my colleagues to be at the forefront when it comes to using digital resources as resources. Because that's exactly what they are, something that should help us, not terrify us*" (R75).

Additionally, teachers describe how the collaboration between colleagues has been deepened considering the pandemic. It includes closer collaboration and more frequent exchanges of ideas, knowledge and approaches, as illustrated by; "*Now I have a closer collaboration with my colleagues, and we are moving in the same direction. We help each other more*" (R31) or "*I am more motivated to discuss overall strategies with colleagues who teach the same classes*" (R156). Lastly, teachers also portray how the enforced work situation meant less fragmentation and how they want to keep and cultivate a more cohesive work situation. Thus, working from home means better control over interruptions and disturbances, than being on-site at the school, partly at the expense of accessibility, as illustrated by: "*I feel less divided during a working day at a distance. I am far more motivated to work and dig into different tasks because there are fewer 'disruptions' to react to compared to when colleagues or students regularly ask things. It is worth thinking about how to streamline accessibility so that you reach an intermediate level where you are accessible to students but at the same time can focus on what you are working on*" (R156). Similar reflections are given by other teachers who perceive increased efficiency during a workday; "*I am unexpectedly positive about distance education after these months when I worked from my kitchen table. Just as meetings have proven more effective online, so can lessons*" (R169) or "*Having the opportunity to partially work from home has meant greater efficiency and the opportunity to calmly create teaching and get to know new things. The work with planning and assessment has benefited from working in peace and quiet*" (R225). Thus, teachers describe how a previously fragmented work situation has become more cohesive.

In summary, the results reveal a complex picture of teachers' experiences of technostress in a situation characterized by a sudden intensification of digitalization in their teaching practice.

6. Discussion

The present study sheds light on teachers' experiences of technostress in a new teaching situation characterized by disruption. Thus, teachers had to adapt quickly, show resilience, and find innovative ways to ensure continuity of education amidst the challenges posed by the pandemic. The result shows how various technostress creators (Tarafdar *et al.*, 2011) operate in the new teaching context. Teachers testify to *techno-overload* where they feel pressured to work longer hours to cope with distance education. Teachers also describe *techno-invasions* in terms of pressure to stay connected and available for different stakeholders such as students, colleagues and management. Additionally, teachers explain how the new situation makes them forced to learn new software, features and working methods at a fast pace and as they go, i.e. *facing techno-complexity*. Lastly, they also described techno-insecurity, making them disconnected from and unsure of, their teaching role in the new setting (Ragu-Nathan *et al.*, 2008; Singh *et al.*, 2022; Tarafdar *et al.*, 2007, 2011).

Hindrance stressors are linked to pressures and anxieties at work induced by the use of technology and are consequently experienced as harmful and negative by the individual (Hargrove, 2013). The technostress strains, in this case, involve hinders strains (Ayyagari *et al.*, 2011) such as decreased motivation as teachers feel powerless and overwhelmed by the upcoming situation. Teachers also described frustration linked to lacking social interaction and feeling disconnected from the teaching profession. Additionally, hinders strains involve screen fatigue with direct physical consequences such as headaches, dry eyes and pain. Coping strategies often included teachers' thoughts and actions to make them feel better, for example by reminding them that the situation is temporary or that other occupations are possible for them (Monat and Lazarus, 1991).

As for the technostress challenge strains (Cavanaugh *et al.*, 2000; Podsakoff *et al.*, 2007), teachers describe coping strategies that mean increased motivation due to strengthened professional identity and self-efficacy because of dealing with the unforeseen situation. Teachers describe a disturbance that required them to rethink and develop new mindsets and approaches, which was both constructive and gave an injection to the work. It is in line with previous research stressing that when people and organizations are forced to react to disruptions, it involves a process of changes and learning (Mariano *et al.*, 2020). Challenge strains can also be linked to developing a new techno-pedagogical approach to teaching which teachers will benefit from even after returning to normal (Ayyagari *et al.*, 2011). It also includes new approaches to colleagues and recognizing the need to shield themselves from others during parts of their work to be able to focus on tasks without experiencing constant division.

6.1 Beyond positive technostress

Even though technostress both includes negative and positive stress (Califf *et al.*, 2020) teachers also in some cases describe how they can make use of the upcoming situation in a way that is the opposite of stress. It is in line with the positive aspects of working from home during the pandemic including better work–life balance, improved work efficiency, and greater work control (Ipsen *et al.*, 2021). To conceptualize the phenomenon that appears in the data, we introduce the concept "technorest". Techno-rest should be understood as opportunities for rest and/or recovery due to the use of technology in the workplace. Below, we discuss two examples of technorest creators which we term "techno-shields" and "techno-security".

6.1.1 Techno-shields. Some teachers describe how distance education brings a less fragmented work situation with fewer disruptions and disturbances; thus, technology becomes a shield against unintended interaction. For example, teachers find ways to focus on one task at a time as they can shelter themselves from colleagues who ask questions and students who knock on the door or chaos in the corridor. These aspects would otherwise constitute constant elements in the brick-and-mortar school. In distance education, the teacher can instead choose when to be available for interaction, which can make the working day more efficient and less stressful. The situation that teachers describe is where technology becomes a shield against unintended interaction and fragmentation and prevents them from being constantly interrupted impeding their professional work. It can be linked to previous research that suggests that distance education during the pandemic can involve a decreased workload and an improved working environment for some teachers and situations (Olofsson *et al.*, 2021).

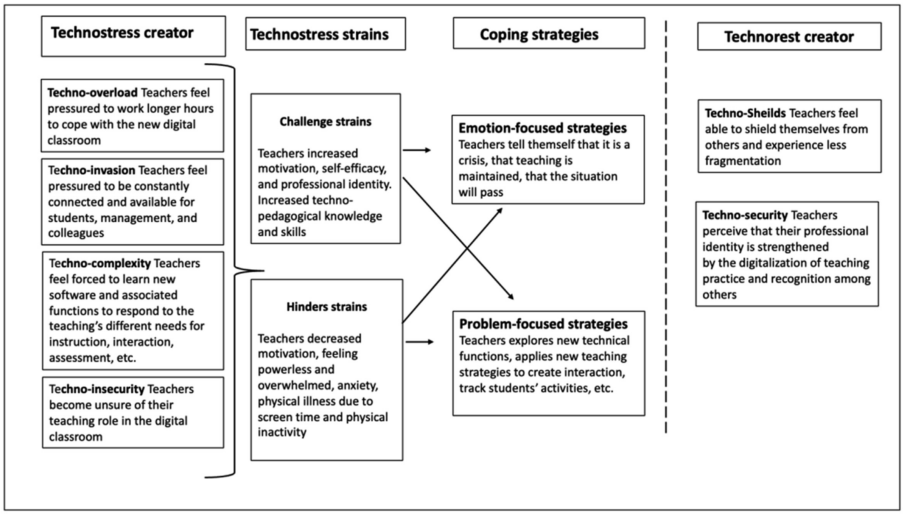
6.1.2 Techno-security. Some teachers describe that they experience that their role as a teacher has been strengthened in the new situation and that the effect is immediate. Suddenly, teachers get the opportunity to put established knowledge and strategy into practice and can feel a sense of security in the profession that is deepened with intensified digitalization. It is aligned with previous studies on how some professionals, including teachers, are strengthened in their professional identity and professional role in connection to the digitalization of work practices (Högberg and Willermark, 2020).

6.2 A situated framework

Below we present an overview of how teachers' technostress is manifested in the specific case. Furthermore, we have developed the figure by adding 'technorest' as a category with associated creators of techno-shields and techno-security (See Figure 3). Note that since techno-uncertainty did not emerge as a distinct category in the data analysis, it has been excluded from the figure.

6.3 Limitations and future directions

This study has limitations that should be addressed. The study takes place in and is bound to, a Swedish high school context which, among other things, is characterized by a high degree of digitalization in the school system. Furthermore, the study is based on limited data from 286 respondents. Both factors make it difficult to generalize the results of the individual study (Yin, 2017). In qualitative studies, the crucial question is not whether the findings can be generalized to a broader population, but rather how effectively they contribute to theory development based on those findings, known as "theoretical generalization" (Mitchell, 1983). Therefore, the empirical results of this study should be viewed as having the potential to enhance theoretical understanding rather than applying to a specific population. As a result, the assessment of the results should focus not on statistical criteria, but on the explanatory power of theoretical reasoning. The position of this paper is that the results from this study have broader theoretical implications than to explain this specific study, as it explicates how technostress could be manifested in teaching practice as well as introduce a new theoretical concept of "technorest". The concept sheds light on the alternative effects of the digitalization of work practice and how it can be manifested and utilized. At the same time, there are differences in the data and not everyone teacher experiences "technorest". Thus, it would be of interest to further explore these concepts to understand more about what conditions are required for them to be used in practice. Furthermore, a future area of research will be to explore technorest in other technology-intense contexts and among different professions. It can be of important theoretical concept to explore in future research with a focus on health promotion measures and explore.



Source(s): Author's own creation

Figure 3.
A situated and developed theoretical framework based on Ayyagary *et al.*'s (2011), Monat and Lazarus (1991) and Tarafdar *et al.*'s (2007), presented in Figure 1

7. Conclusion

In this study, we show how technostress is manifested in the teaching practice when teachers experience a sudden disruption with an immediate call to transition to distance education. The study contributes to theory and research on technostress by proposing the theoretical concept of "technorest" to shed light on opportunities for rest and/or recovery due to the use of technology in the workplace. Furthermore, we introduce and theorize about technorests creators which we term "techno-shields" and "techno-security". We believe these three concepts can be useful for understanding, describing and analyzing the complexity of the digitalization of professional life and contribute to theory development in technostress. Furthermore, the study contributes to the knowledge of teachers' work situation during the pandemic as well as technostress in teaching practice. We demonstrate how technostress takes different forms and shed light on teachers' need to create opportunities for rest to manage the often tough and challenging work of being a teacher. Even though it is important to stimulate student-teacher interaction within distance education, this study stresses the need for teachers to rest, recharge and spend time away from students and colleagues. Being able to shield themselves from unintended interactions is vital for teachers' physical and mental well-being as well as their engagement in teaching and learning activities. Therefore, the practical contributions of this paper include identifying coping strategies and further creating technorest could be one way to avoid tension and anxiety among teachers, causing fragmentation and stress.

References

Aktan, O. and Toraman, Ç. (2022), "The relationship between Technostress levels and job satisfaction of Teachers within the COVID-19 period", *Education and Information Technologies*, Vol. 27 No. 7, pp. 1-25, doi: 10.1007/s10639-022-11027-2.

Ayyagari, R., Grover, V. and Purvis, R. (2011), "Technostress: technological antecedents and implications", *MIS Quarterly*, Vol. 35 No. 4, pp. 831-858, doi: 10.2307/41409963.

Azorín, C., Harris, A. and Jones, M. (2020), "Taking a distributed perspective on leading professional learning networks", *School Leadership and Management*, Vol. 40 Nos 2-3, pp. 111-127, doi: 10.1080/13632434.2019.1647418.

Benlian, A. (2020), "A daily field investigation of technology-driven spillovers from work to home", *MIS Quarterly*, Vol. 44 No. 3, pp. 1259-1300.

Bryman, A. (2012), *Social Research Methods*, Oxford University Press, Oxford, Vol. 4.

Bryman, A. (2015), *Social Research Methods*, Oxford University Press, Oxford.

Califf, C.B., Sarker, S. and Sarker, S. (2020), "The bright and dark sides of technostress: a mixed-methods study involving healthcare IT", *MIS Quarterly*, Vol. 44 No. 2, pp. 809-856, doi: 10.25300/MISQ/2020/14818.

Carlsson, S., Flensner, K.K., Svensson, L. and Willermark, S. (2022), Teaching vocational pupils in their pyjamas: a socio-material perspective on challenges in the age of Covid-19, *The International Journal of Information and Learning Technology*, Vol. 40, No. 1, 2023, pp. 84-97, doi: 10.1108/ijilt-03-2022-0064.

Carpenter, J.P., Krutka, D.G. and Kimmons, R. (2020), "RemoteTeaching &# RemoteLearning: educator tweeting during the COVID-19 pandemic", *Journal of Technology and Teacher Education*, Vol. 28 No. 2, pp. 151-159.

Cavanaugh, M.A., Boswell, W.R., Roehling, M.V. and Boudreau, J.W. (2000), "An empirical examination of self-reported work stress among US managers", *Journal of Applied Psychology*, Vol. 85 No. 1, p. 65, doi: 10.1037/0021-9010.85.1.65.

Çoklar, A.N., Efilti, E. and Sahin, L. (2017), "Defining teachers' technostress levels: a scale development", *Online Submission*, Vol. 8 No. 21, pp. 28-41.

Dong, S. (2020), "Practical exploration of Using'Cloud classroom'to organize online learning: a case study of Jianye district, Nanjing during the COVID-19 pneumonia", *Science Insights Education Frontiers*, Vol. 5 No. 2, pp. 553-556, 10.2139/ssrn.3565629.

Eurofound (2020), *Living,Working and COVID-19*, COVID-19 Series., Issue.

Fernández-Batanero, J.-M., Román-Graván, P., Reyes-Rebollo, M.-M. and Montenegro-Rueda, M. (2021), "Impact of educational technology on teacher stress and anxiety: a literature review", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 2, p. 548, doi: 10.3390/ijerph18020548.

Fernández-Batanero, J.M., Cabero-Almenara, J., Román-Graván, P. and Palacios-Rodríguez, A. (2022), Knowledge of university teachers on the use of digital resources to assist people with disabilities. The Case of Spain", *Education and Information Technologies*, Vol. 27 No. 7, pp. 9015-9029, doi: 10.1007/s10639-022-10965-1.

Gimpel, H. and Schmied, F. (2019), "Risks and side effects of digitalization: a multi-level taxonomy of the adverse effects of using digital technologies and media", *Proceedings of the 27th European Conference on Information Systems (ECIS)*, Stockholm and Uppsala, June 8-14, 2019.

Gonzalez, T., De La Rubia, M., Hincz, K.P., Comas-Lopez, M., Subirats, L., Fort, S. and Sacha, G. (2020), "Influence of COVID-19 confinement on students' performance in higher education", *PloS One*, Vol. 15 No. 10, e0239490, doi: 10.1371/journal.pone.0239490.

Hargrove, M.B., Nelson, D.L. and Cooper, C.L. (2013), "Generating eustress by challenging employees: helping people savor their work", *Organizational Dynamics*, Vol. 42, pp. 61-69, doi: 10.1016/j.orgdyn.2012.12.008.

Hartshorne, R., Baumgartner, E., Kaplan-Rakowski, R., Mouza, C. and Ferdig, R.E. (2020), "Special issue editorial: preservice and inservice professional development during the COVID-19 pandemic", *Journal of Technology and Teacher Education*, Vol. 28 No. 2, pp. 137-147.

Högberg, K. and Willermark, S. (2020). "Among followers and rebels: professional identity and digitalization of work", *Proceedings of the 53rd Hawaii International Conference on System Sciences 2020*, pp. 1-10.

Ipsen, C., van Veldhoven, M., Kirchner, K. and Hansen, J.P. (2021), "Six key advantages and disadvantages of working from home in Europe during COVID-19", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 4, p. 1826.

Kaden, U. (2020), "COVID-19 school closure-related changes to the professional life of a K–12 teacher", *Education Sciences*, Vol. 10 No. 6, p. 165, doi: 10.3390/educsci10060165.

Karanika-Murray, M. and Ipsen, C. (2022), "Guest editorial: reshaping work and workplaces: learnings from the pandemic for workplace health management", *International Journal of Workplace Health Management*, Vol. 15 No. 3, pp. 257-261.

Khlaif, Z.N., Sanmugam, M., Joma, A.I., Odeh, A. and Barham, K. (2022), *Factors Influencing Teacher's Technostress Experienced in Using Emerging Technology: A Qualitative Study*, Knowledge and Learning, Technology, pp. 1-35.

Klapproth, F., Federkeil, L., Heinschke, F. and Jungmann, T. (2020), "Teachers' experiences of stress and their coping strategies during COVID-19 induced distance teaching", *Journal of Pedagogical Research*, Vol. 4 No. 4, pp. 444-452, doi: 10.33902/JPR.2020062805.

La Torre, G., Esposito, A., Sciarra, I. and Chiappetta, M. (2019), "Definition, symptoms and risk of techno-stress: a systematic review", *International Archives of Occupational and Environmental Health*, Vol. 92 No. 1, pp. 13-35.

Leithwood, K., Harris, A. and Hopkins, D. (2020), "Seven strong claims about successful school leadership revisited", *School Leadership and Management*, Vol. 40 No. 1, pp. 5-22, doi: 10.1080/13632434.2019.1596077.

Loeb, H. and Windsor, S. (2020), "Online-and-alone (och ofta i sängen)–Elevers berättelser om gymnasietidens sista månader våren 2020. [Online-and-alone (and often in bed) - students'

stories about high school last months in the spring of 2020]", *Paideia*, Vol. 20, pp. 39-52, available at: https://tidsskrift.dk/Paideia/article/view/130120

Maier, C., Laumer, S., Weinert, C. and Weitzel, T. (2015), "The effects of technostress and switching stress on discontinued use of social networking services: a study of Facebook use", *Information Systems Journal*, Vol. 25 No. 3, pp. 275-308, doi: 10.1111/isj.12068.

Mariano, S., Casey, A. and Olivera, F. (2020), "Organizational forgetting Part II: a review of the literature and future research directions", *The Learning Organization*, Vol. 27 No. 5, pp. 417-427.

Mishra, P. and Koehler, M. (2006), "Technological pedagogical content knowledge: a framework for teacher knowledge", *Teachers College Record*, Vol. 108 No. 6, p. 1017, doi: 10.1111/j.1467-9620.2006.00684.x.

Mitchell, J.C. (1983), "Case and situation analysis", *The Sociological Review*, Vol. 31 No. 2, pp. 187-211.

Monat, A. and Lazarus, R.S. (1991), "Stress and coping: some current issues and controversies", *Stress and Coping: An Anthology*, Vol. 1, pp. 1-15.

Nosratzadeh, H. and Edrisi, A. (2022), "An assessment of tendencies toward teleworking using TAMs: lessons from Covid-19 era for post-pandemic days", *International Journal of Workplace Health Management*, Vol. 16 No. 1, pp. 38-56.

Olofsson, A.D., Lindberg, O.J. and Fransson, G. (2021), "Swedish upper secondary school teachers' experiences with coping with emergency remote teaching (ERT)–emerging pedagogical issues in pandemic times", *Education in the North*, Vol. 28 No. 3, pp. 85-99.

Özgür, H. (2020), "Relationships between teachers' technostress, technological pedagogical content knowledge (TPACK), school support and demographic variables: a structural equation modeling", *Computers in Human Behavior*, Vol. 112, 106468, doi: 10.1016/j.chb.2020.106468.

Panteli, N., Nurse, J.R., Collins, E. and Williams, N. (2022), "Trust disruption and preservation in the Covid-19 work from home context", *Journal of Workplace Learning*, Vol. 35, No 3, pp. 306-321.

Penado Abilleira, M., Rodicio-García, M.-L., Ríos-de Deus, M.P. and Mosquera-González, M.J. (2021), "Technostress in Spanish university teachers during the COVID-19 pandemic", *Frontiers in Psychology*, Vol. 12, 617650, doi: 10.3389/fpsyg.2021.617650.

Podsakoff, N.P., LePine, J.A. and LePine, M.A. (2007), "Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: a meta-analysis", *Journal of Applied Psychology*, Vol. 92 No. 2, p. 438, doi: 10.1037/0021-9010.92.2.438.

Pollock, K. (2020), "School leaders' work during the COVID-19 pandemic: a two-pronged approach", *International Studies in Educational Administration*, Vol. 48 No. 3, p. 38.

Ragu-Nathan, T., Tarafdar, M., Ragu-Nathan, B.S. and Tu, Q. (2008), "The consequences of technostress for end users in organizations: conceptual development and empirical validation", *Information Systems Research*, Vol. 19 No. 4, pp. 417-433, doi: 10.1287/isre.1070.0165.

Reineholm, C., Ståhl, C. and Lundqvist, D. (2022), "Bringing risk back in: managers' prioritization of the work environment during the pandemic", *International Journal of Workplace Health Management*, Vol. 16 No. 1, pp. 4-19, doi: 10.1108/IJWHM-03-2022-0041.

Rohwer, E., Flöther, J.-C., Harth, V. and Mache, S. (2022), "Overcoming the 'dark side' of technology—a scoping review on preventing and coping with work-related technostress", *International Journal of Environmental Research and Public Health*, Vol. 19 No. 6, p. 3625.

Salo, M., Pirkkalainen, H. and Koskelainen, T. (2019), "Technostress and social networking services: explaining users' concentration, sleep, identity, and social relation problems", *Information Systems Journal*, Vol. 29 No. 2, pp. 408-435, doi: 10.1111/isj.12213.

Sarabadani, J., Carter, M. and Compeau, D. (2018), "10 Years of Research on technostress Creators and inhibitors: synthesis and critique", *Twenty-fourth Americas Conference on Information Systems*, New Orleans.

Schreier, M. (2013), *Qualitative Content Analysis in Practice*, Sage, London.

Singh, P., Bala, H., Dey, B.L. and Filieri, R. (2022), "Enforced remote working: the impact of digital platform-induced stress and remote working experience on technology exhaustion and subjective wellbeing", *Journal of Business Research*, Vol. 151, pp. 269-286, doi: 10.1016/j.jbusres.2022.07.002.

Tarafdar, M., Tu, Q., Ragu-Nathan, B.S. and Ragu-Nathan, T. (2007), "The impact of technostress on role stress and productivity", *Journal of Management Information Systems*, Vol. 24 No. 1, pp. 301-328, doi: 10.2753/MIS0742-1222240109.

Tarafdar, M., Tu, Q., Ragu-Nathan, T. and Ragu-Nathan, B.S. (2011), "Crossing to the dark side: examining creators, outcomes, and inhibitors of technostress", *Communications of the ACM*, Vol. 54 No. 9, pp. 113-120, doi: 10.1145/1995376.1995403.

Tarafdar, M., Cooper, C.L. and Stich, J.F. (2019), "The technostress trifecta-techno eustress, techno distress and design: theoretical directions and an agenda for research", *Information Systems Journal*, Vol. 29 No. 1, pp. 6-42.

Waizenegger, L., McKenna, B., Cai, W. and Bendz, T. (2020), "An affordance perspective of team collaboration and enforced working from home during COVID-19", *European Journal of Information Systems*, Vol. 29 No. 4, pp. 429-442.

Whalen, J. (2020), "Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic", *Journal of Technology and Teacher Education*, Vol. 28 No. 2, pp. 189-199.

Willermark, S. (2018), "Digital Didaktisk Design: att utveckla undervisning i och för en digitaliserad skola Högskolan Väst]".

Willermark, S. (2021), "Who's there? Characterizing interaction in virtual classrooms", *Journal of Educational Computing Research*, Vol. 59 No. 6, pp. 1036-1055, 0735633120988530, doi: 10.1177/07356331209885.

Willermark, S. and Gellerstedt, M. (2022), "Facing radical digitalization: capturing teachers' transition to virtual classrooms through ideal type experiences", *Journal of Educational Computing Research*, Vol. 60 No. 6, pp. 1351-1372, doi: 10.1177/073563312110694.

Yin, R.K. (2017), *Case Study Research and Applications: Design and Methods*, Sage Publications, London.

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