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# **SCHOOL PRACTICES AND TEACHERS' STRESS DURING THE COVID-19 PANDEMIC**

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# ABSTRACT

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Work-related stress has emerged as a significant global concern affecting individuals in various professions in today's world. Notably, the teaching profession is particularly susceptible to high levels of work-related stress, making it a major occupational health issue among teachers. The COVID-19 pandemic has only intensified these challenges, with teachers around the world reporting elevated levels of work-related stress and a decline in overall well-being at work. This heightened work stress poses a serious threat to individuals' mental and physical health, underscoring the importance of addressing this issue.

Previous research has predominantly centered on examining the stress levels, anxiety, and burnout experienced by teachers both prior to and during the COVID-19 pandemic. However, there exists a scarcity of studies that delve into the factors contributing to teachers' stress specifically during the pandemic, and even fewer studies that explore the interplay between school practices and teachers' stress within this context.

To bridge this research gap, this study endeavors to investigate the intricate association between school practices, teaching methods, and the stress experienced by Finnish educators amidst the unique challenges posed by the COVID-19 pandemic. The principal objective of this thesis is to pinpoint the school practices and working methods associated with teachers' stress and to gain a deeper understanding of the dynamics of these associations. To accomplish this objective, the job demands-resources model is utilized as the foundational theoretical framework.

The data utilized in this research stems from a nationwide survey conducted in the spring of 2021, as part of the "Schooling, Teaching, and Well-Being in the School Community During the COVID-19 Epidemic" project, jointly administered by the University of Helsinki and the Tampere University. A total of 4,172 teachers participated in this electronically conducted survey. The survey encompassed inquiries into various aspects, including teachers' perceived stress, school practices, working methods, distance learning experiences, and relevant background information. The data were analysed using quantitative methods, including crosstabulation and logistic regression.

The findings of this study pinpointed notable factors connected to teacher stress. Specifically, inadequate technical support and dissatisfaction with supervisor support emerged as substantial contributors, more than doubling the odds of teachers experiencing high stress levels. Moreover, the concurrent implementation of both face-to-face and remote teaching, along with the absence of a clear policy on student absences, exhibited a robust association with teacher stress, resulting in nearly a twofold increase in the odds of experiencing high levels of stress.

This study provides valuable insights into the association between teacher stress and school practices, especially within the unique challenges posed by the COVID-19 pandemic. The findings shed light on specific working practices in schools that are closely associated with heightened teacher stress during this unprecedented time. Armed with this knowledge, targeted interventions can be deployed to alleviate these stressors, reducing the risk of health issues among teachers, including cardiovascular disease and mental health disorders. These interventions not only benefit educators but also have far-reaching positive effects, such as enhancing academic outcomes for students and bolstering teachers' overall work capacity.

Keywords: stress, work stress, teacher stress, the COVID-19 pandemic, school practices, working methods, Job Demands-Resources model

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## 1 INTRODUCTION

The COVID-19 pandemic rapidly changed the work of teachers around the world as almost half of the world's students moved from face-to-face learning to remote learning as schools and universities were closed in 102 countries worldwide (United Nations Educational, Scientific & Cultural Organization [UNESCO], 2020). While teaching was already widely recognized as one of the most stressful professions before the pandemic (Johnson et al., 2005) and teacher burnout has been identified as a global problem (Tsouloupas et al., 2010; Dicke et al., 2015), during the COVID-19 pandemic teachers around the world have reported even greater levels of work stress and lack of well-being at work (Herman et al., 2021; Klapproth et al., 2021; Sokal et al., 2021).

Teachers, in particular, have been the subject of extensive research on occupational well-being and burnout, both prior to and after the COVID-19 pandemic. Notably, the work-related well-being of teachers during the early months of the COVID-19 pandemic have emerged as a prevalent research theme. Studies in this area have revealed a substantial increase in work stress that persisted as the pandemic continued to unfold.

The majority of the research worldwide, including in Finland, has primarily concentrated on stress levels of teachers, anxiety, and burnout experienced by teachers during the pandemic and their evolution compared to pre-pandemic times. Additionally, a significant portion of the research has been dedicated to the initial phase of distance learning in the spring of 2020. These investigations have shed light on the repercussions faced by teachers and students, encompassing heightened workloads, increased stress levels, and the imperative need for adaptations in teaching and learning methods (Samela-Aro et al, 2020; Klapproth et al., 2021; Pöysä et al., 2021).

Nevertheless, a conspicuous gap exists in the research landscape, particularly regarding the unique circumstances of the spring of 2021. During this period, schools in Finland experienced a blend of partial openings and closures, with simultaneous remote and face-to-face teaching, creating a distinct educational landscape. Consequently, there is an evident dearth of research data addressing the determinants of teachers' stress during this unique crisis, necessitating a more comprehensive examination of these critical issues.

In light of these considerations, this study seeks to investigate the relationship between school practices and working methods and the stress experienced by Finnish teachers during the COVID-19 pandemic in spring 2021. Specifically, the aim is to identify which school practices and working methods are associated with teachers' stress and to explore the nature of these associations by utilizing the job demands-resources model as a foundational theoretical framework (Bakker and Demerouti, 2007). By addressing these research gaps, this study contributes to a deeper understanding of the complex dynamics between educational practices and teacher well-being during unprecedented times. Not only is teachers' stress detrimental to their own well-being and health, but many studies have shown that stress experienced by teachers is also linked to students' learning (Arens et al., 2016; Klusmann et al. 2016; Herman et al., 2018). Consequently, the stress experienced by teachers can ripple through the educational system, emphasizing the critical significance of teacher well-being for society. To cultivate a thriving future workforce, it is imperative to nurture the well-being of teachers today.

## **2 DEFINITIONS OF STRESS**

Stress is an inherent, complex, and multifaceted phenomenon that affects individuals in various aspects of their lives. It has become deeply intertwined with modern existence, impacting individuals from all walks of life. Defining stress presents a complex task, as the term can be subject to diverse interpretations among individuals and is connected to a broad array of fundamentally distinct challenges. (Selye, 1976.) The understanding of stress has undergone significant evolution over time, resulting in the emergence of multiple definitions and interpretations. In this chapter, three distinct theories of stress are introduced as acquiring a comprehensive understanding of stress is crucial for comprehending its profound impact on human functioning.

### **2.1 Fight-or-flight response**

Walter Cannon, a significant American physiologist, stands as a pioneering figure in the realm of stress studies. According to Cannon (1932), stress can be perceived as a disruption of homeostasis, occurring in situations such as exposure to cold temperatures, oxygen deprivation, low blood sugar, and similar conditions.

In the early 20th century, Cannon made a ground-breaking discovery by identifying the body's intricate physiological responses to stress, which would later become widely recognized as the fight-or-flight response (Cannon, 1915). The fight-or-flight response, also known as the acute stress response, refers to the body's instinctive mechanism for dealing with perceived threats and other strong emotions (Cannon, 1915; 1932; Fink, 2010). He observed that when faced with a stressful situation, the simultaneous activation of both the sympathetic nervous system and the endocrine system leads to rapid arousal of the body. Consequently, the fight-or-flight response elicits a range of bodily transformations, including heightened heart rate, accelerated breathing, increased vigilance, and the release of stress hormones such as adrenaline. These adaptations serve to prime the body for either confronting or fleeing the perceived threat (Cannon, 1915; 1932.)

Cannon's ground-breaking research laid the groundwork for further investigations into stress physiology and provided a framework for understanding how our bodies adapt and respond to challenging circumstances.

## **2.2 The General Adaptation Syndrome**

Hans Selye is another essential and prominent early contributor to the field of stress research, even gaining a reputation as the “father of stress” (Fink, 2010). According to Selye (1956; 1976), stress is defined in the field of biology and medicine as the "nonspecific response of the body to any demand". Selye's theory proposes that the body exhibits a consistent response to stress, regardless of the particular stressor. Drawing upon extensive research, he developed the concept of General Adaptation Syndrome to illustrate the three-stage process of the human stress response. This framework offers a comprehensive understanding of how the body adapts and manages stress over time. (Selye, 1950.)

The first stage of the General Adaptation Syndrome is called the alarm reaction. The alarm reaction encompasses the immediate response of the body when confronted with an emergency or threatening situation. In this state, an individual becomes aware of the stressor, triggering a series of physiological reactions, equipping the body with the necessary energy to address the situation effectively. (Selye, 1936; 1976.) The sympathetic part of the body's autonomic nervous system is activated leading, for instance, to heightened muscle tension, increased heart rate, and perspiration (Selye, 1950). The alarm response stage of the General Adaptation Syndrome resembles the fight-or-flight response proposed by Walter Cannon (1915).

The second stage of the General Adaptation Syndrome is called the stage of resistance during which the body tries to adapt to the prolonged stressful stimulus. In this stage, the body's immune system is boosted as the resistance to the stressor increases, which can often cause irritation, tiredness, and difficulties in concentrating. Nevertheless, as the symptoms of the alarm reaction fade away and the resistance to the initial stressful stimulus increases, concurrently, the capacity to resist other kinds of stressors diminishes. (Selye, 1950; 1976.)

If the stressful stimulus continues to persist, the resistance stage is prolonged and eventually leads to the depletion of the body's resources. Consequently, the body enters the third stage of the General Adaptation Syndrome known as the stage of exhaustion. In the exhaustion stage,

the symptoms of the alarm reaction resurface, yet the capacity to resist them is no longer attainable. As a result, the susceptibility to illness, physical or mental, increases, elevating the potential for severe consequences, including the possibility of death. (Selye, 1936; 1950; 1976.)

Selye's influential stress theory, focusing on the body's physiological responses, has undeniably shaped stress research. Nonetheless, it tends to overlook the equally important psychological and cognitive dimensions of the stress experience (Krohne, 2002). Fortunately, Richard Lazarus and Susan Folkman (1984) have offered a psychological theory that offers valuable insights into comprehending stress, considering these vital psychological and cognitive aspects.

### **2.3 The Transactional Model of Stress**

Within the field of psychology, stress is often conceptualized as a process involving the interaction between an individual and their environment (Lazarus & Folkman, 1984). Richard Lazarus and Susan Folkman (1984) proposed the Transactional Model of Stress, suggesting that stress results from an individual's assessment of the demands of a situation and their perceived ability to cope with it. When an individual appraises a situation as overwhelming or beyond their capacity and thus posing a threat to their well-being, stress arises (Lazarus & Folkman, 1984). Unlike Selye's theory, Lazarus and Folkman's perspective (1984) emphasizes the subjective and cognitive aspects of stress, acknowledging that individuals may appraise and respond to stressors differently.

Lazarus and Folkman's (1984) Transactional Model of Stress consists of three cognitive appraisal steps. The first step is called primary appraisal which involves the initial evaluation of the situation to determine whether it is relevant to one's well-being. It assesses whether the situation is perceived as irrelevant, benign or positive, or as stressful. (Lazarus & Folkman, 1984.) The secondary appraisal focuses on evaluating one's coping resources and abilities to deal with the stressor if a situation is deemed stressful. It involves assessing the available options, potential strategies, and personal efficacy in managing the stressor. (Lazarus & Folkman, 1984.) The third step of the Transactional Model of Stress is known as the reappraisal. This step involves continuous monitoring and evaluation of the stressor and one's coping resources. Reappraisal occurs throughout the stress response process and involves making adjustments or modifications to coping efforts based on changing circumstances or



new information. However, it is important to understand that cognitive appraisal processes are not always consciously undertaken. (Lazarus & Folkman, 1984.)

### **3 WORK STRESS AND THE JOB DEMANDS-RESOURCES MODEL**

In today's world and society, work stress has increasingly become a matter of concern, posing significant challenges to both the well-being of individuals and the overall effectiveness of organizations (Schaufeli & Taris, 2013). Furthermore, according to the International Labour Organization (2016), there is now widespread recognition that work-related stress is a worldwide problem impacting individuals across various professions. In addition, work stress has been recognized as a major occupational health issue with detrimental effects on physical and psychological health, job satisfaction, productivity, and overall organizational performance (Stansfeld & Candy, 2006; Schaufeli & Taris, 2013).

Over the years, numerous theories have been developed to understand and explain the causes, consequences, and mechanisms underlying work-related stress. Consequently, gaining a profound understanding of the underlying mechanisms and factors contributing to work stress is essential for developing effective strategies to manage and alleviate its negative consequences.

Many models in the occupational health literature are based on the premise that work stress is the result of a disturbed balance between the demands placed on workers and the resources available to them. According to these models, work stress occurs when the demands of a job exceed an individual's ability to cope with the demands placed on them. (Lazarus & Folkman, 1984; Hakanen et al., 2006; Bakker & Demerouti, 2007.) When individuals perceive work demands as overwhelming or beyond their capabilities, they may experience negative effects on their well-being, both at work and in their personal lives (Lazarus & Folkman, 1984).

Work stress can manifest in various ways, including physical symptoms, such as headaches and fatigue, psychological symptoms such as anxiety and irritability, and behavioural changes such as decreased productivity and withdrawal. (Lazarus & Folkman, 1984; Grandey, 2000.) Furthermore, prolonged or chronic work stress can have detrimental effects on both individuals and organizations. It can lead to physical and mental health problems, such as cardiovascular disease, depression, and burnout. (Lazarus & Folkman, 1984; Demerouti et al., 2001; Hakanen et al., 2006.) In addition, work stress can impact job satisfaction, performance, absenteeism, turnover rates, and thus the overall functioning of the organization (Karasek, 1979; Podsakoff et al., 2007).

### **3.1 The Job Demands-Resources model**

In today's fast-paced and demanding work environments, understanding the factors that influence employee well-being and organizational outcomes is of paramount importance. The Job Demands-Resources model (JD-R), developed by Arnold Bakker and Evangelia Demerouti (2007), offers a valuable theoretical framework to address these concerns. The Job Demands-Resources model (Bakker & Demerouti, 2007) has gained significant attention in the field of occupational well-being and psychology as well as in organizational behaviour (Bakker & Demerouti, 2014; Han et al., 2020) since this theory provides a comprehensive framework for understanding the relationships between job demands, job resources, work engagement, and burnout (Demerouti et al., 2001; Bakker & Demerouti, 2007). Therefore, drawing upon the aforementioned reasons, the Job Demands-Resources model was judiciously selected to serve as the theoretical framework for this study.

According to the Job Demands-Resources model (JD-R), the experience of stress and burnout are more likely to occur when there is a combination of high job demands and low job resources. Alternatively, when individuals have access to abundant job resources, they can mitigate the detrimental effects of high job demands. (Demerouti et al., 2001; Bakker et al., 2003a; Bakker et al., 2005; Bakker & Demerouti, 2007.) This model provides a comprehensive and widely applicable framework that can be universally applied across diverse occupational settings. It acknowledges that while each occupation possesses unique working characteristics and risk factors contributing to work stress, these factors can be broadly classified into two main categories: job demands and job resources. Consequently, regardless of the specific demands and resources present, the JD-R model offers a valuable framework for understanding and addressing work stress in various work environments. (Demerouti et al., 2001; Bakker & Demerouti, 2007.)

Job demands encompass the physical, psychological, social, and organizational aspects of work that require sustained effort and energy expenditure from employees, such as challenging or adverse physical surroundings, work overload, high work pressure, emotional demands, and interactions with clients that require a significant amount of emotional effort. (Demerouti et al., 2001; Bakker & Demerouti, 2007.) Job resources, which can also be known as health-protecting factors, encompass the physical, psychological, social, or organizational aspects of a job that serve functional purposes in attaining work-related objectives. They not only help

reduce job demands and the associated psychological and physiological toll but also facilitate personal growth, development and learning. Therefore, resources are not solely instrumental in managing job demands but also hold intrinsic importance in their own regard. (Demerouti et al., 2001; Bakker & Demerouti, 2007.) Examples of job resources encompass autonomy, social support, performance feedback, and prospects for personal development. (Bakker & Demerouti, 2014.)

Both job demands and job resources are prevalent in nearly every job, making them significant as they serve as triggers for two distinct and independent psychological processes that contribute to the emergence of job strain and motivation: the health impairment process and the motivational process (Demerouti et al., 2001; Bakker & Demerouti, 2007; 2014). In the health impairment process, high and extreme job demands drain employees' mental and physical resources resulting in continual overexertion that ultimately leads to exhaustion, psychosomatic health problems, and ill health. Therefore, in the context of the Job Demands-Resources model, job demands serve as the most important predictors of such outcomes, especially exhaustion. (Demerouti et al., 2001; Hakanen et al., 2006.) Conversely, in the motivational process, job resources serve as distinct predictors of work engagement, motivation, and work enjoyment (Bakker & Demerouti, 2007; Bakker et al., 2007; Bakker et al., 2010). However, insufficient resources pose challenges to fulfilling job demands, subsequently contributing to withdrawal behaviour. Over time, this withdrawal may manifest as disengagement from work and elevate the degree of burnout. (Demerouti et al., 2001; Hakanen et al., 2006.)

Furthermore, the Job Demands-Resources model proposes that the interaction between job demands and resources plays an important role in predicting occupational well-being and thus the development of job stress (Bakker & Demerouti, 2007 & 2014). Employees with access to abundant job resources are better equipped to handle their daily job demands effectively since job resources can serve as a buffer, mitigating the impact of job demands on job stress and strain (Bakker et al., 2003b; Bakker & Demerouti, 2007; Bakker & Demerouti, 2014). Job resources can serve as buffers in different ways, depending on the specific resource involved (Bakker & Demerouti, 2007). For example, a positive relationship with a supervisor can change the perception of demands, job autonomy enables effective coping, social support aids in achieving work goals, and constructive feedback enhances performance and communication. These resources play an essential part in promoting employee well-being and preventing work-

related stress and strain. (Hackman & Oldham, 1980; Jenkins, 1991; Karasek, 1998; Van der Doef & Maes, 1999; Väänänen et al., 2003.)

This hypothesis also aligns with the Demand-Control model developed by Robert Karasek (1979; 1998). However, while the Demand-Control model highlights the role of task control, or autonomy, in mitigating the impact of work overload on job stress, the Job Demands-Resources model broadens this perspective. The job Demands-Resources model places emphasis on the interaction between various types of job demands and job resources when predicting job stress and strain. Thus, according to the Job Demands-Resources model, multiple job resources can function as protective measures against various job demands. (Bakker & Demerouti, 2007.)

Subsequently, the Job Demands-Resources model has been extended to include personal resources, recognizing their significant role in predicting motivation and their potential to alleviate the adverse impact of job demands (Bakker & Demerouti, 2014). Personal resources are characterized as favourable self-evaluations associated with resilience and encompass individuals' perception of their ability to effectively control and influence their environment (Hobfoll et al., 2003, as cited in Bakker & Demerouti 2014; Judge et al., 2004). Research supports the notion that these positive self-evaluations can serve as predictors of many favourable outcomes, such as motivation, performance, goal-setting, and job and life satisfaction (Judge et al., 2004).

### **3.2 Work stress among teachers and the Job Demands-Resources model**

According to the existing literature, teaching is acknowledged as a profession that experiences above-average levels of stress when comparing work-related stress levels across different occupations. (Kyriacou, 2001; Johnson et al., 2005.) In their work, teachers face numerous job demands that cause stress, such as heavy workload, time pressure, managing classroom discipline, teaching unmotivated students, facing challenging relationships with colleagues or employers, working in unfavourable conditions, and adapting to frequent changes (Kyriacou, 2001). Furthermore, a high number of job demands are linked to the occurrence of burnout (Hakanen et al., 2006).

Even prior to the COVID-19 pandemic, teaching had gained significant acknowledgement as one of the most stress-inducing professions (Johnson et al., 2005), with teacher burnout being

recognized as a global issue (Tsouloupas et al., 2010; Dicke et al., 2015). However, the pandemic further exacerbated these challenges, as teachers worldwide reported heightened levels of work stress and diminished well-being at work (Herman et al., 2021; Klapproth et al., 2021; Sokal et al., 2021).

Bakker and Demerouti's (2007) Job Demands-Resources model has garnered extensive utilization in the field of occupational stress research (Dickie et al., 2018). Moreover, a number of studies investigating teacher occupational well-being and work-related stress have employed the job demands-resources model. For example, Dickie et al. (2018) examined the occupational well-being of German beginning teachers using the Job Demands-Resources model as the theoretical framework of their study. Their findings highlighted the direct impact of resources, specifically self-efficacy, on engagement, as well as the significant influence of demands, such as classroom disturbances, on job strain. Interestingly, a reverse path was also observed, where engagement positively impacted self-efficacy. These results underscore the vital role of self-efficacy in managing classroom stress for teachers, as it not only mitigates the negative effects of classroom disturbances but also enhances engagement. (Dickie et al., 2018.)

Furthermore, Hakanen et al. (2006) investigated the interconnectedness of Finnish teachers' working conditions to their health problems and to organizational commitment through work-related well-being, such as burnout and work engagement. To analyse these connections, the study employed the Job Demand-Resources model. The researchers made predictions concerning the detrimental impact of teachers' job demands, encompassing factors like workload, pupil misbehaviour, and physical work environment, on their overall health, highlighting the mediating role of burnout. Additionally, they posited that teachers' job resources, such as social climate, supervisory support, job control, information, and innovativeness, would significantly impact their level of organizational commitment, with work engagement acting as a mediator in this relationship. (Hakanen et al., 2006.)

As a result of their research, Hakanen et al. (2006) discovered a robust association between high levels of job demands and burnout, suggesting that an increased number of job demands significantly contribute to burnout. Furthermore, their findings revealed that job demands serve as a significant predictor of health problems, and this relationship is mediated by the presence of burnout. Furthermore, the study findings highlight a crucial relationship between teachers' possession of valuable job resources and their work-related outcomes. Specifically, teachers who have access to important job resources, including supervisory support, job control, and

innovativeness, demonstrate higher levels of vigour, dedication, work engagement, and organizational commitment. However, the study also reveals that insufficiency of essential job resources necessary to meet job demands can contribute to burnout, subsequently impairing work engagement and resulting in diminished levels of organizational commitment. (Hakanen et al., 2006.)

Similarly, a study conducted by Bakker et al. (2005), involving Dutch higher education teachers, found a notable association between the combination of high job demands and low job resources in predicting burnout. Interestingly, their findings also demonstrated that job demands such as emotional and physical demands, work overload, and work-home interference did not lead to elevated levels of burnout when teachers had access to crucial job resources such as autonomy, feedback, social support, or a positive relationship with their supervisor. These results highlight the invaluable role of job resources as protective buffers against the adverse effects of job demands, underscoring their potential to mitigate burnout (Bakker et al., 2005).

In addition, Hilger et al. (2021) have investigated changes in job characteristics and well-being at work among German teachers during school closures caused by the COVID-19 pandemic. The study employed the job demands-resources model (Bakker & Demerouti, 2007) as a framework for the analysis. The findings from Hilger et al.'s (2021) research surprisingly demonstrated that during school closures amid the COVID-19 pandemic, teachers encountered reduced job demands compared to pre-pandemic times. However, the study also revealed a decrease in job resources available to teachers during this period.

#### **4 WORK STRESS AMONG TEACHERS DURING COVID-19**

In March 2020, the World Health Organization declared the Coronavirus disease (COVID-19) a worldwide pandemic (WHO, 2020). National governments around the world ordered school closers in order to keep students and teachers safe from the spread of the virus and thus implemented various types of remote learning options (UNESCO, UNICEF, & the World Bank, 2020). Consequently, in response to the situation, the Finnish Government (2020) swiftly implemented a transition to remote learning in Finnish schools. This required adopting alternative methods of teaching, such as remote teaching, utilizing various online learning platforms and solutions, and encouraging independent learning. The organization and selection of the specific remote learning approach and tools were left to the discretion of each school and teacher, allowing them to decide how best to implement remote learning. (Finnish Government, 2020.) However, according to various research, this sudden change from face-to-face learning to remote teaching changed the job demands and resources of teachers and lead to some adverse consequences on teachers' well-being, such as high levels of work stress (Salmela-Aro et al., 2020; Pöysä et al., 2021).

Teachers' occupational well-being, and in particular burnout, has been the subject of a fair amount of research, both before and during the COVID-19 pandemic. In Finland and elsewhere in the world, research has particularly focused on stress, anxiety, and burnout experienced by teachers during the pandemic and how they changed compared to the pre-pandemic period. However, there are relatively few studies on the determinants of teachers' stress during the COVID-19 pandemic, and there are hardly any studies on the relationship between school practices and teachers' stress during that time. For example, Salmela-Aro et al. (2020) and Pöysä et al. (2021) studied Finnish teachers' work-related well-being profiles during the spring of 2020 of the COVID-19 pandemic. The research findings unveiled a significant surge in work stress among teachers during the initial months of the COVID-19 pandemic, which further increased as the pandemic progressed. Moreover, it was discovered that the COVID-19 pandemic-induced stress contributed to an elevated risk of burnout among teachers. (Salmela-Aro et al., 2020; Pöysä et al., 2021.)

In addition, Jakubowski and Sirko-Dominik (2021) conducted a comprehensive study on the mental health of Polish teachers during the initial two waves of the COVID-19 pandemic. Similarly, Klapproth et al. (2021) examined the stress levels encountered by German teachers and their coping strategies during the school closures imposed by the COVID-19 pandemic.



Both studies consistently demonstrated the prevalence of medium to high levels of stress among teachers. (Jakubowski & Sirko-Dominik, 2021; Klapproth et al., 2021). However, it is important to note that in all of the aforementioned studies, the primary emphasis has been on assessing the level of stress among teachers rather than exploring the underlying factors or school practices that contribute to their stress.

Furthermore, numerous studies, including those mentioned above, have focused on the first period remote learning, which took place in the spring of 2020, and its consequential effects on teachers and students, for example in relation to workload, level of stress and necessary teaching and learning adjustments. However, there is relatively little research data on the exceptional circumstances of spring 2021 and, in particular, on the impact of school practices on teachers' stress during this period when schools in Finland were partly open and partly closed and remote and face-to-face teaching sometimes took place simultaneously.

## **5 HEALTH EFFECTS OF WORK STRESS**

Occupational health is widely recognised as a significant public health concern given the potential for the work environment to impact the well-being and health of employees and their families. Simultaneously, the health status of individuals can also have a profound impact on their work, further underscoring the interconnectedness between health and the workplace. (Boedeker & Klindworth, 2018.)

The escalating prevalence of work-related stress in today's rapidly evolving work landscape is widely acknowledged, presenting a significant challenge in contemporary workplaces since work stress profoundly affects the occupational health of employees across diverse industries. Scientific evidence strongly supports the notion that stressful psychosocial work environments have a detrimental impact on both the mental and physical health of the employee. While stress can arise from various sources, its intensity is significantly amplified when individuals perceive a threat to their control over work demands. (Boedeker & Klindworth, 2018.) Moreover, as previously mentioned in the context of the job demand-resources model, high job demands typically lead to the exhaustion of both the mental and physical resources of employees, leading to increased stress. Prolonged exposure to work-related stress can manifest in a range of physical and mental health problems ranging from headaches and sleep problems to immune system decline, and even burnout (Demerouti et al., 2001; Hakanen et al., 2006).

### **5.1 Mental health and work stress**

Prolonged exposure to work stress can contribute to the development of various mental health problems. Excessive work demands are frequently associated with a range of strong negative emotions, including anger, as well as conditions such as irritability, mental exhaustion, and burnout. Additionally, mental disorders such as anxiety disorder, depression, and alcohol dependence are commonly linked to high work demands. (Milczarek, et al., 2009; Boedeker & Klindworth, 2018.) Furthermore, according to Boedeker & Klindworth (2018), workers who encounter high levels of work stress or experience an imbalance between effort and reward at work have an 80% higher risk of developing a common mental disorder, as opposed to those with low levels of stress. These mental health conditions not only affect the individual's psychological well-being but also impair their ability to function effectively in the workplace.

## 5.2 Cardiovascular health and work stress

Continuous exposure to work stress is also found to increase the risk of cardiovascular diseases. The continuous stimulation of the body's stress response system, involving the secretion of stress hormones such as cortisol and adrenaline, can lead to elevated blood pressure, increased heart rate, and the development of hypertension. (McEwen, 2007; Boedeker & Klindworth, 2018; Kivimäki et al., 2018.) Hypertension, in turn, is a significant risk factor for different cardiovascular diseases such as atherosclerosis, coronary heart disease, and stroke (Boedeker & Klindworth, 2018).

Furthermore, mounting epidemiological evidence shows a significant correlation between stress and elevated susceptibility to coronary heart disease as stress has been closely linked to the development of angina pectoris, a condition that frequently manifests prior to a heart attack. (Steptoe & Kivimäki, 2012; Boedeker & Klindworth, 2018.) According to Steptoe and Kivimäki (2012) as well as Kivimäki et al. (2006), chronic stress experienced at work increases the incidence of coronary heart disease by up to 50%. Furthermore, an extensive 14-year-long cohort study conducted by Netterstrøm et al. (2006) focusing on working Danish men yielded similar findings, revealing that high psychological demands at work act as risk factors for ischaemic heart disease. However, it is important to note that the study solely involved male participants, limiting its generalizability to the broader population.

Moreover, the INTHEHEART study, which is recognized as one of the largest investigations conducted on the association between long-term stress and coronary heart disease, yielded compelling findings. It revealed that prolonged exposure to stress not only escalated the risk of coronary heart disease but also heightened the likelihood of experiencing acute myocardial infarction, commonly known as a heart attack. However, it is challenging to determine whether stress is a cause or a consequence of the disease process in myocardial infarction. This is because individuals with more advanced atherosclerosis might experience greater exhaustion and perceive their environments as more stressful compared to physically fit individuals. (Yusuf et al., 2004.)

Furthermore, extensive research has provided convincing evidence regarding the indirect impact of work stress on the development of cardiovascular diseases. Studies have consistently demonstrated that work stress correlates with detrimental lifestyle behaviours, including excessive alcohol consumption, smoking, physical inactivity, and an unhealthy dietary pattern

high in saturated fat (Kouvonen et al., 2005; Rod et al., 2009; Boedeker & Klindworth, 2018). These behaviours significantly heighten the risk of developing cardiovascular diseases. Additionally, work stress has been found to be associated with the occurrence of disorders such as diabetes mellitus, which is also recognized as a risk factor for cardiovascular diseases. (Boedeker & Klindworth, 2018.)

Overall, studies have consistently demonstrated the profound influence of work stress on cardiovascular health throughout various stages of the disease process. Stress plays a crucial role in the long-term development of atherosclerosis and coronary heart disease, while also impacting cardiovascular risk factors, such as excessive alcohol consumption and reduced physical activity. (Rod et al., 2009; Steptoe & Kivimäki, 2012.) Furthermore, stress can serve as a trigger for acute cardiac events in individuals with advanced coronary heart disease. Notably, research indicates a clear association between prolonged work stress and an unfavourable prognosis in individuals already diagnosed with coronary heart disease. Additionally, stress can impede the recovery process and have long-lasting effects on the quality of life for survivors of acute coronary syndrome or stroke. (Steptoe & Kivimäki, 2012.)

### **5.3 Other adverse health effects of work stress**

The toll of work stress frequently materializes as musculoskeletal disorders, particularly evident through the development of back and neck pain. These physical consequences have been substantiated by epidemiological evidence, which underscores that factors such as time pressure, high workload, and limited control over work significantly contribute to the emergence of musculoskeletal problems. (Bongers et al., 1993). Furthermore, chronic stress can have a detrimental impact on the immune system, increasing vulnerability to infections and illnesses. The prolonged release of stress hormones can disrupt immune responses, impairing the body's ability to effectively combat pathogens. (Glaser & Kiecolt-Glaser, 2005.)

In addition, work-related stress can cause sleeping problems, especially through depression and burnout. These problems can include insomnia, difficulty falling asleep, and sleep disturbances (Knudsen et al., 2007; Boedeker & Klindworth, 2018). Consequently, sleep deprivation can further contribute to increased stress levels, higher risk of mental health problems, reduced cognitive function, and impaired overall well-being (Alhola et al., 2007; Knudsen et al., 2007; Boedeker & Klindworth, 2018).

## 6 AIM AND OBJECTIVES

The aim of this study is to investigate which school practices and working methods are associated with the stress experienced by Finnish teachers in the exceptional school conditions created by the COVID-19 pandemic, using data from the University of Helsinki's and the Tampere University's research project "Schooling, teaching and well-being in the school community during the COVID-19 epidemic". Through a thorough examination of these associations, the goal of this study is to acquire a profound understanding of the factors influencing teacher stress during this challenging period. Furthermore, the insights derived from this study are intended to offer valuable suggestions and recommendations to enhance the occupational health and well-being of teachers.

Research questions:

1. Which school practices and working methods are associated with stress experienced by Finnish teachers during the COVID-19 pandemic?
2. How are school practices and working methods associated with stress experienced by Finnish teachers during the COVID-19 pandemic?

## **7 MATERIALS AND METHODS**

### **7.1 Study design and the data source**

This study employed a cross-sectional research design and utilized data from a nationwide survey of teachers that was administered in the spring of 2021 as part of the Schooling, Teaching, and Well-Being in the School Community During the COVID-19 Epidemic project. This project was conducted in collaboration with the Centre for Educational Evaluation HEA at the University of Helsinki, the Research Group on Education, Evaluation, and Learning (REAL) at the Universities of Tampere and Helsinki, and the Research Group on Health Promotion for Children and Young People (NEDIS) at the Tampere University. The project was launched in May 2020, and it investigated the impact of the exceptional circumstances caused by the COVID-19 pandemic on schooling, teaching, and well-being totally with four surveys to students, teachers, supporting staff of schools, principals, and parents in spring 2020, autumn 2020, spring 2021, and spring 2022. However, in this study, only data from teachers' survey from spring 2021 is used.

### **7.2 Data collection and study population**

The project Schooling, Teaching, and Well-Being in the School Community During the COVID-19 pandemic, has conducted four nationwide surveys among pupils in grades 4 to 10 of basic education, pupils' guardians, teachers, principals, and other school staff. The survey data was collected electronically by sending links to questionnaires for the different groups of respondents and cover letters to all school principals in basic education, who then forwarded them to all groups of respondents using the electronic communication tools normally used by schools.

The teacher survey utilized in this study aimed to include all teachers working in basic education in Finland, such as class teachers, subject teachers, lecturers, special needs teachers, special class teachers, and guidance counselors. However, only 4172 teachers participated in the survey, indicating a relatively low participation rate compared to the total number of teachers working in basic education, which for example in 2004, the most recent data available, was estimated at 44,623 according to Statistic Finland (2004).

The surveys were conducted in spring 2020, with a response period from the 20th of May to the 7th of June 2020, in autumn 2020, with a response period from the 9th of November to the 29th of November, in spring 2021, with a response period from the 12th of April to the 17th of May and in Spring 2022. However, this study focuses solely on the results of the survey conducted in spring 2021 among teachers, in order to be able to investigate the exceptional circumstances of spring 2021 when schools in Finland operated under a hybrid model of partially remote and partially face-to-face teaching. Teachers were thus obligated to balance between these two models, making it a unique context to explore the associations between school practices, working methods, and teacher stress.

The questionnaire for teachers used in this study consisted of 68 questions, most of which were quantitative, multiple choice, and Likert scale-type questions. Some questions also included an option for an open response. The questions of the questionnaire were divided into 7 different categories including “Educational content and pedagogy”, “Teaching community and teaching”, “Support for learning and schooling”, “Digital boundary conditions”, “Cooperation between home and school”, “Support structures for pupils and teachers”, and “Work-related pressures”. In addition, background information was collected comprehensively. However, the analysis in this study only includes questions related to perceived stress, school practices, working methods, remote learning, and relevant background information.

### **7.3 Study variables**

In this study, the outcome variable was teacher stress, and it was measured based on the question “Stress is defined as a state in which a person feels tense, restless, nervous, anxious, or has difficulty sleeping because of constant stress. Do you currently feel this kind of stress?” Participants could answer the multiple-choice question as “Not at all”, “Some”, “Moderately”, “A fair amount” or “A very high amount”. For the analyses, the original categories were collapsed into two categories: "Little or no stress" (which included the "Not at all" and "Some" categories) and "High amount of stress" (which included the "Moderately", "A fair amount", and "A very high amount" categories).

Explanatory variables school practices and working methods were measured with eight different questions, listed in Table 1 below. The selection of controlled variables was based on existing literature, which has shown that these factors are associated with teacher stress and the

variables found in the data. Controlled variables included gender, job role in basic education, and total work experience in basic education measured by years. The questions and answer options for measuring the controlled variables can be seen in Table 2 below. In this study, some variables were recategorized to clarify the analysis, and these recategorizations are also presented in Tables 1 and 2 below.

TABLE 1. Variables used to measure the school practices and working methods.

Question	Original answer options	Recategorizations
“At the moment I mainly teach:”	“Face-to-face” “Remotely” “Both face-to-face and remotely at the same time” “Alternately face-to-face and remotely”	
“Has your school agreed on common assessment practices for the current semester?”	“Yes, the school principal or education provider has issued guidelines on assessment practices that everyone should follow” “Yes, teachers have mutually agreed on a common assessment policy” “No, each teacher acts at his or her own discretion”	
“Is there a common policy in your school if a pupil has to be absent for long periods of time?”	“Yes, same as before covid” “Yes, policies have been developed during the covid period” “No” “Do not know”	
“To what extent do the following statements describe the way teachers work in your school?” ➤ “It is typical for teachers in my school to share the teaching methods they have found to work” ➤ “We develop teaching methods with other teachers through joint discussions”	1=“Strongly disagree” 2 3 4 5 6 7=“Strongly agree”	A sum variable was made → “Cooperation and information sharing between teachers” Scale 5–35 Continuous variable



<ul style="list-style-type: none"> <li>➤ "Teachers at my school hardly ever discuss teaching-related issues"</li> <li>➤ "In my school, teachers are encouraged to share information with each other"</li> <li>➤ "At my school, we believe that improving teaching requires collaboration."</li> </ul>		
<p>"Does your school or employer offer technical support for distance learning?"</p>	<p>"Yes" "Partially" "No"</p>	
<p>"Does your school have a policy for contacting parents or guardians if the student cannot be reached?"</p>	<p>"Yes" "No" "Do not know"</p>	
<p>"Support from your supervisor and colleagues this spring semester."</p> <ul style="list-style-type: none"> <li>➤ "Are you satisfied with the support received from your supervisor?"</li> <li>➤ "Are you satisfied with the support received from your colleagues?"</li> </ul>	<p>1="Highly satisfied" 2 3 4 5 6 7="Highly dissatisfied"</p>	<p>"1=Satisfied" (Including the old values 1 &amp; 2) "2=Neither satisfied nor dissatisfied" (Including the old values 3,4,5) "3=Dissatisfied" (Including the old values 6 &amp; 7)</p>

TABLE 2. The questions and answer options for measuring the controlled variables.

Question	Answer options	Recategorizations
“Gender”	“Female” “Male” “Other” “Do not wish to declare”	
“Job role in basic education”	“Class teacher” “Special needs teacher” “Special class teacher” “Subject teacher/lecturer” “Guidance counselor” “Other, which?”	
“Total work experience in basic education (in years)”	“Less than a year (1)” . . . “Over 30 (32)”	“0–5” “6–10” “11–20” “20–30” “31+”

## 7.4 Statistical methods

This study used quantitative methods to analyse the data, and due to the nature of the cross-sectional design, the analysis remained predominantly descriptive, albeit with some measures of association.

In this study, data analysis was performed using the IBM SPSS version 28.0 software. In addition, Microsoft Office Word was used for data visualizations. The statistical methods used in this study include descriptive statistics, crosstabulations, and logistic regression. The significance level of the results was set to  $p < 0.05$ .

Descriptive statistics were used to describe the study population and, for quantitative variables, to identify distributions and measures of central tendencies. Crosstabulation was then conducted to analyse the associations between teacher stress variable and school practices and working methods variables when both dependent and independent variables were categorical. The statistical inference was measured using the Chi-square ( $\chi^2$ ) test. In addition, group

medians (lower and upper quartiles) were used to analyse the association between teacher stress variable and school practices and working methods variables when variables were continuous and normal distribution could not be assumed. The statistical inference was then measured with the Mann-Whitney test.

After crosstabulations, binary logistic regression was used to further analyse the associations between the outcome and explanatory variables. At first, a univariate logistic regression model was used to analyse all the associations, and subsequently, adjusted for relevant background variables which included gender, job role in basic education, and total work experience in basic education measured by years. However, the groups "Other" and "Do not wish to declare" were excluded from the analysis of gender variables due to their small sample sizes. Each school practice and working method variable was individually entered into a logistic regression model and adjusted for control variables resulting in eight different models. Lastly, a multivariate regression model was made in which the stress variable and all variables related to school practices and working methods were controlled against each other.

## **7.5 Ethical considerations**

Permission to use the data from the research project *Schooling, Teaching, and Well-Being in the School Community During the COVID-19 Epidemic* was granted by those in charge of the study material. The project in question collected questionnaires anonymously, and responding to the surveys was voluntary. Consent to participate in the survey was deemed to have been obtained if the respondent answered the questionnaire.

In addition, data was processed at all stages of the research project *Schooling, Teaching, and Well-Being in the School Community During the COVID-19 Epidemic* in accordance with the EU General Data Protection Regulation (2016/679) and in accordance with any other applicable data protection legislation. Furthermore, this study followed the research guidelines of Tampere University and the APA referencing format.

## **8 RESULTS**

### **8.1 Characteristics of the study population**

Based on the responses collected, it was found that 44.9% of the participants identified themselves as class teachers, while 34.1% reported being subject teachers and lecturers. Among the participants, 8.2% identified as special class teachers, 6.9% as special needs teachers, and 1.7% as guidance counselors. Furthermore, 4.2% of the participants selected the "other" option, providing titles such as resource teacher, preschool teacher, school assistant, and preparatory education teacher in the open response section.

In terms of gender, 79.0% of the participants were female, while 19.2% were male. A minority of 0.1% identified as "other," and 1.8% chose not to disclose their gender. Regarding teaching experience, 32.6% of the participants reported having ten years or less of teaching experience, while 32.9% reported having 11–20 years of experience. Of the participants, 24.0% reported having 21–30 years of teaching experience, and 10.5% reported having 31 years or more of experience as basic education teachers.

### **8.2 Teacher's stress according to gender, job role and work experience**

Of the teachers who participated in this study, 53.7% reported experiencing high levels of stress. Furthermore, of the female participants, 55.3% ( $p < 0.001$ ) experienced high stress, compared to 45.8% of male participants ( $p < 0.001$ ).

This study also revealed that teachers' levels of stress varied depending on their job roles. Subject teachers and lecturers reported the most stress, with up to 58.1% of them experiencing high levels of stress. Similarly, special needs teachers experienced nearly as much stress as subject teachers and lecturers, with 57% of them reporting high levels of stress. Furthermore, these results were statistically significant ( $p = 0.002$ ). The results of cross-tabulations between teacher stress and job role are presented in Table 3.

TABLE 3. The proportions of teacher stress according to job role and work experience, % (n).

Variable	Little or no stress % (n = 1698)	High amount of stress % (n = 1970)	P value <sup>1</sup>
<b>Job role in basic education</b>			0.002
Class teacher	49.0 (816)	51.0 (850)	
Special needs teacher	43.0 (110)	57.0 (146)	
Special class teacher	50.0 (149)	50.0 (149)	
Subject teacher, lecturer	41.9 (522)	58.1 (723)	
Guidance Counselor	49.1 (28)	50.9 (29)	
Other	52.2 (71)	47.8 (65)	
<b>Work experience in basic education</b>			0.37
0–5 years	48.1 (276)	51.9 (298)	
6–11 years	44.0 (243)	56.0 (309)	
11–20 years	45.3 (554)	54.7 (670)	
21–30	48.4 (434)	51.6 (462)	
31 or more years	45.2 (174)	54.8 (211)	

<sup>1</sup> P-value indicates whether the difference between categories is statistically significant.

Interestingly, high levels of stress were experienced almost equally across all categories of work experience in basic education. Specifically, among teachers with 6–10 years of experience, 56% reported high levels of stress, which was the highest compared to other work experience categories. However, the results were not statistically significant. The results of the cross-tabulations between teacher stress and work experience are presented in Table 3.

### 8.3 Association between teacher stress and cooperation and information sharing

Due to the continuous sum variable and non-normal distribution, the association between teacher stress and cooperation, and information sharing was measured using the median and interquartile range. The median opinion of cooperation and information sharing between teachers for participants who experienced little or no stress was 29.000 (Q1 = 25.0000, Q3 = 32.0000). For participants who experienced a high amount of stress, the median was 28.0000 (Q1 = 23.0000, Q3 = 32.0000). Participants who experienced little or no stress had higher scores in their opinion of cooperation and information sharing between teachers. Therefore, it can be inferred that there is an association between teacher stress and cooperation and information sharing with colleagues.

In conclusion, the higher the score, the better teachers perceived collaboration and information sharing in their school. According to the Mann-Whitney test, there was also a statistically significant negative association ( $P < 0.001$ ) between teacher stress and cooperation and information sharing between teachers. Teachers who experienced a high amount of stress

received lower scores in their opinion of cooperation and information sharing between teachers in their school and in contrast, teachers who experienced little or no stress received higher scores in their opinion of cooperation and information sharing between teachers in their school. In other words, teachers who perceived cooperation and information sharing as good in their school experienced less stress than teachers who perceived them as worse.

#### **8.4 Teacher stress according to school practices and working methods**

All the results of the cross-tabulation between teacher stress and school practices and working methods are presented in Table 4. However, the key findings are summarized below.

Among teachers delivering face-to-face and remote teaching simultaneously, the prevalence of high stress was the highest (69.4%) compared to other forms of teaching. Similarly, teachers delivering remote teaching reported notable levels of high stress, with 64.4% experiencing high-stress levels. Additionally, there was a statistically significant association ( $p < 0.001$ ) between teacher stress and the mode of teaching delivery, whether remotely or face-to-face.

Furthermore, the lack of agreed policies on long-term pupil absences was associated with higher teacher stress. In particular, 63.8 % of teachers in schools without such policies experienced high levels of stress, which was approximately 10 percent units more than in schools where policies were in place. Additionally, a statistically significant association ( $p = 0.003$ ) was found between teacher stress and the presence of policies for long-term pupil absences.

Interestingly, the provision of technical support for remote learning was associated with lower rates of teacher stress. Teachers in schools without technical support reported notably higher levels of stress, with 72.0% experiencing high levels of stress which were nearly 20 percent units higher than those whose schools did provide support. Moreover, there was a statistically significant association ( $p < 0.001$ ) between teacher stress and the degree of technical support provided by the school.

Moreover, the absence of a policy for contacting parents or guardians when a pupil cannot be reached was found to be associated with higher levels of teacher stress. Among teachers in schools without such a policy 62.1% experienced high stress and 60.5% of teachers who were unsure of the policy's existence reported high levels of stress. In contrast, the number of

teachers experiencing high levels of stress was around 10 percent unit lower in schools where such a policy was in place. Additionally, a statistically significant association ( $p < 0.001$ ) was found between teacher stress and the presence of a policy for contacting parents or guardians.

Lastly, the level of satisfaction with supervisor support was found to have a notable association with teacher stress, with 62.8% of teachers who were dissatisfied experiencing high levels of stress, compared to 46.1% of those who were satisfied. Moreover, a statistically significant association ( $p < 0.001$ ) was found between teacher stress and their level of satisfaction with the support received from their supervisor.

Table 4. The proportions of teacher stress according to school practices and working methods, % (n).

Variable	Little or no stress % (n = 1698)	High amount of stress % (n = 1970)	P value <sup>1</sup>
<b>At the moment I mainly teach:</b>			<0.001
Face-to-face	47.4 (1541)	52.6 (1712)	
Remotely	35.6 (16)	64.4 (29)	
Both face-to-face and remote teaching at the same time	30.6 (59)	69.4 (134)	
Alternately face-to and remotely	47.0 (78)	53.0 (88)	
<b>Has your school agreed on common assessment practices for the current semester?</b>			0.001
Yes, the school principal or education provider has issued guidelines on assessment practices	48.4 (841)	51.6 (896)	
Yes, teachers have mutually agreed on a common assessment policy	46.5 (342)	53.5 (394)	
No	42.8 (490)	57.2 (656)	
<b>Is there a common policy in your school if a pupil has to be absent for long periods of time?</b>			
Yes, same as before COVID-19	48.5 (384)	51.5 (397)	
Yes, policies have been developed during the corona period	47.0 (1042)	53.0 (1176)	
No	36.2 (104)	63.8 (183)	
Do not know	45.2 (147)	54.8 (178)	
<b>Does your school or employer offer technical support for distance learning?</b>			<0.001
Yes	46.3 (589)	53.7 (682)	
Partly	33.8 (204)	66.2 (400)	
No	27.7 (18)	72.3 (47)	
<b>Does your school have a policy for contacting parents or guardians if the student cannot be reached?</b>			<0.001
Yes	48.3 (1188)	51.7 (1274)	
No	37.9 (44)	62.1 (72)	
Do not know	39.5 (300)	60.5 (459)	
<b>Are you satisfied with the support received from your supervisor?</b>			<0.001
Highly satisfied	53.9 (919)	46.1 (787)	
Neither satisfied nor dissatisfied	40.6 (566)	59.4 (828)	
Highly dissatisfied	37.2 (199)	62.8 (336)	

**Are you satisfied with the support received from your colleagues?**

<0.001

Highly satisfied	50.8 (1082)	49.2 (1049)
Neither satisfied nor dissatisfied	38.1 (376)	61.9 (610)
Highly dissatisfied	43.5 (219)	56.5 (284)

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<sup>1</sup> P-value indicates whether the difference between categories is statistically significant.

Table 5 displays the results of the univariate logistic regression model, which were adjusted for gender, job title, and work experience as a teacher. However, the key findings from the logistic regression analysis are presented below.

The results showed that lack of technical support for remote learning was associated with more than a twofold increase in the odds of teacher stress (OR=2.39, P=0.003). Furthermore, partial technical support for remote learning also increased the odds of stress by 1.67-fold (P<0.001). In addition, dissatisfaction with supervisor support was also a significant predictor of teacher stress, with odds increasing by almost twofold (OR=1.96, P<0.001). Simultaneously teaching face-to-face and remotely also increased the odds of teacher stress by almost twofold (OR=1.87, P<0.001). Additionally, teachers who were neither satisfied nor dissatisfied with their supervisor's support had a 1.65-fold increase in the odds of experiencing stress (P<0.001).

In addition, the absence of policies to contact parents or guardians in situations where a student could not be reached increased the odds of teacher stress 1.54-fold (P=0.03). Similarly, the lack of a commonly agreed policy on student absences was associated with a 1.46-fold increase in the odds of teacher stress (P=0.004). Dissatisfaction with colleagues' support was also found to be a notable predictor of teacher stress, with odds increasing by 1.34-fold (P=0.004). Surprisingly, participants who reported neutral feelings towards their colleagues' support had a 1.62-fold increase in the odds of experiencing stress (P<0.001).

Regarding the continuous variable “Cooperation and information sharing between teachers”, the analysis showed that as the number of sum points increased, the odds of teacher stress decreased by a factor of 0.98 (P<0.001). In simpler terms, the findings suggest that teachers experience less stress as they perceive greater levels of cooperation and information sharing among their colleagues within the school.



TABLE 5. Adjusted<sup>1</sup> association between school practices and working methods and the level of stress experienced by teachers. Results of binary logistic regression with working methods, OR, 95% CI and P-value. Univariate model.

Variable	OR	Teacher stress 95% CI	P
<b>At the moment I mainly teach:</b>			
Face-to-face	1		
Remotely	1.44	0.77–.69	0.26
Both face-to-face and remote teaching at the same time	1.87	1.35–2.59	<0.001
Alternately face-to and remotely	0.90	0.64–1.26	0.53
<b>Has your school agreed on common assessment practices for the current semester?</b>			
Yes, the school principal or education provider has issued guidelines on assessment practices	1		
Yes, teachers have mutually agreed on a common assessment policy	1.10	0.92–1.31	0.31
No	1.19	1.02–1.39	0.03
<b>Is there a common policy in your school if a pupil has to be absent for long periods of time?</b>			
Yes, policies have been developed during the Corona period	1		
Yes, same as before COVID-19	0.93	0.78–1.10	0.37
No	1.46	1.13–1.90	0.004
Do not know	1.06	0.83–1.35	0.65
<b>Does your school or employer offer technical support for distance learning?</b>			
Yes	1		
Partly	1.67	1.35–2.05	<0.001
No	2.39	1.34–4.26	0.003
<b>Does your school have a policy for contacting parents or guardians if the student cannot be reached?</b>			
Yes	1		
No	1.54	1.04–2.27	0.03
Do not know	1.41	1.19–1.68	<0.001
<b>Are you satisfied with the support received from your supervisor?</b>			
Highly satisfied	1		
Neither satisfied nor dissatisfied	1.65	1.43–1.91	<0.001
Highly dissatisfied	1.96	1.60–1.41	<0.001
<b>Are you satisfied with the support received from your colleagues?</b>			
Highly satisfied	1		
Neither satisfied nor dissatisfied	1.62	1.38–1.89	<0.001
Highly dissatisfied	1.34	1.10–1.64	0.004
<b>Cooperation and information sharing between teachers (continuous variable)</b>			
	0.98	0.97–0.99	<0.001

<sup>1</sup> Adjusted for gender, job role in basic education, and total work experience in basic education measured by years.

Table 6 displays the results of the multivariate regression model. The results show that the factors most strongly associated with teacher stress, in terms of school practices and working methods, were lack of technical support with more than a twofold increase in the odds of teacher stress (OR=2.32, P=0.01), dissatisfaction with supervisor's support with more than twofold increase in the odds of teacher stress (OR=2.22, P<0.001) and face-to-face and remote teaching at the same time with 1.73-fold increase in the odds of experiencing stress (P=0.004). In addition, the lack of a commonly agreed policy on student absences showed a rather strong association with teacher stress with a 1.63-fold increase in the odds of teacher stress (P=0.04).

TABLE 6. Adjusted<sup>1</sup> association between school practices and working methods and the level of stress experienced by teachers. Results of binary logistic regression with working methods, OR, 95% CI and P-value. Multivariate model.

Variable	OR	Teacher stress 95% CI	P
<b>At the moment I mainly teach:</b>			
Face-to-face	1		
Remotely	1.50	0.75–2.99	0.25
Both face-to-face and remote teaching at the same time	1.73	1.19–2.52	0.004
Alternately face-to and remotely	0.84	0.58–1.21	0.35
<b>Has your school agreed on common assessment practices for the current semester?</b>			
Yes, the school principal or education provider has issued guidelines on assessment practices	1		
Yes, teachers have mutually agreed on a common assessment policy	0.98	0.75–1.29	0.91
No	1.08	0.84–1.37	0.56
<b>Is there a common policy in your school if a pupil has to be absent for long periods of time?</b>			
Yes, policies have been developed during the Corona period	1		
Yes, same as before COVID-19	1.00	0.77–1.32	0.98
No	1.63	1.02–2.59	0.04
Do not know	0.95	0.60–1.50	0.81
<b>Does your school or employer offer technical support for distance learning?</b>			
Yes	1		
Partly	1.42	1.12–1.79	0.003
No	2.32	1.20–4.49	0.01
<b>Does your school have a policy for contacting parents or guardians if the student cannot be reached?</b>			
Yes	1		
No	0.96	0.54–1.71	0.89
Do not know	1.51	1.15–1.97	0.003
<b>Are you satisfied with the support received from your supervisor?</b>			
Highly satisfied	1		
Neither satisfied nor dissatisfied	1.43	1.10–1.86	0.008
Highly dissatisfied	2.22	1.49–1.30	<0.001
<b>Are you satisfied with the support received from your colleagues?</b>			
Highly satisfied	1		
Neither satisfied nor dissatisfied	1.41	1.05–2.89	0.02
Highly dissatisfied	0.90	0.62–1.31	0.59
<b>Cooperation and information sharing between teachers (continuous variable)</b>			
	1.01	0.99–1.03	0.41

<sup>1</sup> Multivariate model includes all the factors from the table and gender, job role in basic education, and total work experience in basic education measured by years.

## **9 DISCUSSION**

### **9.1 The main results of the study and comparison with previous studies**

The objective of this study was to explore the association between school practices, working methods, and the stress experienced by Finnish teachers during the COVID-19 pandemic's exceptional school conditions. The study identified significant factors that were associated with teacher stress, including insufficient technical support and dissatisfaction with supervisor support, both of which more than doubled the odds of experiencing high stress among teachers. Additionally, the simultaneous implementation of face-to-face and remote teaching, along with the lack of a clear policy on student absences, also exhibited a strong association with teacher stress, resulting in nearly a twofold increase in the odds of experiencing a high level of stress.

This research also found a substantial number of participating teachers (53.7%) experiencing high levels of stress, supporting the existing literature, including the work of Jakubowski and Sirko-Dominik (2021) as well as Klapproth et al. (2020), both of whom reported medium to high levels of stress among teachers during the COVID-19 pandemic. Additionally, Salmela-Aro et al. (2020) and Pöysä et al. (2021) also reported a significant increase in work stress among Finnish teachers during the COVID-19 pandemic.

### **9.2 Results of the study in relation to the Job Demands-Resources model**

The findings of this study align closely with prior research, exemplified by Kyriacou (2001), who emphasized the various job demands that contribute to teachers' stress. These demands encompass challenging relationships with colleagues and supervisors, unfavourable working conditions, and the adaption to frequent changes. Similarly, in my study, a noteworthy observation was that the lack of support from supervisors notably increased the odds of high stress among teachers. Moreover, in the univariate logistic regression model, not only did dissatisfaction with the support received from colleagues increase the odds of high stress among teachers, but the perceived lack of cooperation and information sharing between colleagues also amplified the odds of experiencing stress. However, in the multivariate model, in which the school practice and working method variables were adjusted for each other, these specific odds appeared weaker or even acted in the opposite direction, failing to reach statistical

significance. Nevertheless, this study confirms the pivotal role of challenging relationships, specifically the absence of support from supervisors, as a significant job demand in the teaching profession. These challenging relationships are associated with heightened stress levels among teachers, significantly increasing the odds of experiencing stress within this occupation.

In addition, the job demands, working in unfavourable conditions, and adaption to frequent changes, mentioned by Kuracou (2001) can also be found in the results of this study. The lack of technical support was found to be the factor that increased the odds of high stress the most among teachers out of all the school practice and working method variables. Also, the lack of a clear policy on student absences and not knowing whether the school has established policies and guidelines on how to reach parents or guardians in situations where the student cannot be reached increased the odds of teacher stress. These are factors that affected the working conditions of teachers during COVID-19 and can be regarded as unfavourable working conditions due to the unclearness and challenging nature of the practices. Furthermore, during the COVID-19 pandemic, teachers had to adapt quickly to the change from traditional face-to-face teaching to remote teaching. Adapting to frequent change is one of the job demands that cause stress in the teaching occupation (Kuracou, 2001) and similarly in this study, teaching remotely and simultaneous face-to-face and remote teaching increased notably the odds of teacher stress.

While it is commonly acknowledged that the teaching profession entails various job demands that can lead to stress, this study, however, delved into the specifics and provides a more detailed understanding of the actual job demands experienced by teachers during the COVID-19 pandemic. To effectively mitigate or alleviate work-related stress experienced by teachers in the future, schools should prioritize certain strategies.

First and foremost, offering comprehensive training on technical devices and providing necessary support to ensure teachers' proficiency in using these tools for teaching situations is crucial. Additionally, establishing clear and well-defined working practices and policies within schools can play a pivotal role in preventing work stress among teachers. This clarity will aid teachers in navigating their roles and responsibilities more effectively, reducing ambiguity and stress. Furthermore, it would be beneficial for schools to reconsider the approach to remote teaching. Avoiding the simultaneous provision of face-to-face and remote teaching can significantly contribute to reducing teacher stress. Also, a more structured and focused approach to remote teaching can enhance teacher well-being.

Lastly, supervisory support has been identified as a key protective factor against stress resulting from high job demands (Bakker et al., 2005; Hakanen et al., 2006). Following the insights from Hakanen et al. (2006) and Bakker et al. (2005), schools should emphasize the importance of providing adequate support and guidance to teachers to help them cope with the challenges they face. Moreover, offering job resources in general, such as autonomy and social support, can serve as protective measures against work stress caused by job demands, as emphasized by Hakanen et al. (2006) and Bakker and Demerouti (2007). By fostering a supportive and empowering work environment, schools can better equip teachers to handle the demands of their profession and thus reduce their stress levels.

These strategies mentioned above hold significant importance not only in safeguarding teachers' well-being during extraordinary circumstances like the COVID-19 pandemic but also in maintaining their resilience during what is commonly referred to as "normal" times. Consequently, investing in these strategies is not merely a response to crises but a proactive measure that can enhance the well-being and effectiveness of teachers in all circumstances.

### **9.3 The importance of the results for public health**

The significance of these findings for public health in Finland cannot be overstated, demanding a thorough evaluation from a public health perspective. Firstly, stress has been consistently associated with an increased risk of cardiovascular diseases, a prevalent and pressing public health issue in Finland (McEwen, 2007; Boedeker & Klindworth, 2018; Kivimäki et al., 2018; Official Statistics Finland, 2021). Official Statistics Finland (2021) have identified cardiovascular diseases as the leading cause of death in the country. Stress also increases the risk factors for cardiovascular diseases, including elevated blood pressure, increased alcohol use, poor dietary habits, inactive lifestyle, and smoking (Kouvonen et al., 2005; Rod et al., 2009; Boedeker and Klindworth, 2018). Therefore, understanding the implications of stress on this particular health concern is imperative for developing effective interventions and strategies not only for teachers but also for the broader population.

Furthermore, the connection between stress and mental health problems adds another layer of complexity to the public health landscape in Finland. Mental health issues are already a significant public health concern, as highlighted by the Finnish National Institute for Health and Welfare (2019). Stress contributes to the exacerbation of these problems (Milczarek, et al.,

2009; Boedeker & Klindworth, 2018), underscoring the need for targeted mental health initiatives and support systems to address this critical issue.

In addition to these crucial aspects, studies have shed light on the potential association between teacher stress and its impact on poorer pupil learning outcomes (Arens et al., 2016; Klusmann et al. 2016; Herman et al., 2018). While further research is needed to establish a definitive connection, it raises intriguing questions about the potential ripple effect of stress within the educational system. Understanding whether teachers' stress levels influence those of their pupils and, consequently, the overall health of students, is a promising avenue for future research.

Moreover, it is essential to recognize that work stress and the illnesses it can exacerbate not only affects individual health but also has broader societal implications. The strain on teachers' working capacity and increased utilization of healthcare services can impose a significant economic burden on the nation (Finnish institute for health and welfare, 2022). This aspect highlights the interplay between individual well-being and the overall health of the country's population, as well as its economic stability.

In conclusion, the results presented in this study hold substantial implications for public health in Finland. Based on the findings of this study, specific working practices in schools were identified as being associated with elevated levels of work stress among teachers during the COVID-19 pandemic. Equipped with this knowledge, we are better prepared to target and address these stress-inducing factors, not only in times of crisis like the COVID-19 pandemic but also in what we consider "normal" circumstances. By proactively reducing these stressors, we can effectively mitigate high teacher stress, subsequently safeguarding teachers against well-documented public health risks such as cardiovascular diseases and mental health disorders. These strategic interventions not only benefit the health and well-being of educators but also have a ripple effect on other critical aspects of society, including enhancing academic outcomes for students and improving the overall working capacity of teachers. Consequently, this positively impacts the broader public health landscape in Finland and contributes to the national economy's well-being.

## 9.4 Limitations and strengths

One of this study's limitation is linked to the somewhat limited response rate among surveyed teachers. While the study did have a substantial number of participating teachers, it remained relatively modest in proportion to the overall population of Finnish teachers. It is important to note that the voluntary nature of teacher participation may have contributed to this limitation, as the survey link distribution was exclusively directed to school principals within the Finnish primary schools. Consequently, it remains uncertain whether each school's principal diligently disseminated the survey link to all of their teaching staff, potentially depriving certain teachers of the opportunity to partake in the study. Consequently, the study's findings on the prevalence of stress among teachers cannot be generalized to the broader population of teachers during the same time period.

However, it is crucial to emphasize that the principal aim of this research was not to conduct a prevalence study concerning the phenomenon of stress among teachers. Rather, the primary objective was to investigate the association between teacher stress and working methods and school practices. Nonetheless, it is prudent to consider alternative explanations for the limited response rate, such as teachers' time constraints or already burdensome workloads. Additionally, it is worthwhile to ponder whether teachers within schools characterized by unclear work practices or those who lacked the energy to engage with the survey may have been systematically excluded. The inclusion of responses from these teachers might have potentially influenced the study's outcomes. Nevertheless, it is reasonable to contend that the final results of the survey would likely have remained qualitatively consistent, with any notable variations primarily impacting the strength of observed associations between variables.

The second limitation of this study pertains to the research design. Due to the cross-sectional study design employed, it is imperative to note that this study does not provide a basis for establishing causality between the variables under examination. Instead, a potential association between school practices, working methods, and teacher stress can be explored. However, it does not provide the capacity to definitively ascertain whether these variables directly precipitated the stress experienced by teachers. In the future, conducting a longitudinal study on this subject would be invaluable for unraveling the causal relationships between teachers' stress and school practices as well as their working methods.



Lastly, the honesty of respondents when completing the questionnaire cannot be definitively ascertained, leaving open the possibility of either exaggeration or underreporting of stress, for example. Likewise, it is uncertain whether all participants uniformly comprehended the questions, potentially leading to misunderstandings in their responses.

Above all, the study exhibits several noteworthy strengths. One of the study's paramount significance lies in its ability to offer fresh insights into the association between teacher stress and school practices, particularly in the context of the unprecedented challenges posed by the COVID-19 pandemic. By design, the study effectively measures the intended variables, affording a thorough exploration of its research inquiries. This comprehensive approach not only expands our comprehension of these complex relationships but also delivers precise and well-substantiated responses to both research questions.

## **9.5 Ethical considerations**

It is essential, not to disregard the notable ethical strengths of this study. First and foremost, the research upholds the principles of ethical conduct by maintaining the voluntariness of survey participation and safeguarding the anonymity of responding teachers. This ethical commitment ensures the integrity of data collection and fosters a sense of trust and confidence among participants.

Another compelling strength is that the study demonstrates transparency and integrity at every stage, from its careful conduct to the comprehensive reporting of results. The study refrains from selective reporting and presents all the results obtained in a complete and unfiltered way within the framework of the study. This firm commitment to transparency enhances the credibility and reliability of the study.

In conclusion, the research exhibits ethical integrity, methodological transparency, and a robust capacity to shed light on critical aspects of teacher stress and school practices during the COVID-19 pandemic. These strengths collectively underscore the study's significance and its capacity to advance our understanding of the subject matter.

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