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Teachers' well-being and their teaching quality during the COVID-19 pandemic: a retrospective study

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During the COVID-19 pandemic, teachers reported low levels of well-being. Lower levels of well-being can negatively impact job performance and teaching quality. This study aims to examine whether the quality of teaching changed between before and during the pandemic, in two settings: remote and restricted in-person settings, and whether teachers' well-being was related to the quality of teaching. 279 German-speaking (primary and secondary) teachers were retrospectively surveyed with an online questionnaire. Results showed that even if teachers reported being emotionally exhausted, they still were satisfied with their profession, highlighting the multidimensionality of well-being. For online instruction, teachers reported decrease in teaching quality in terms of cognitive activation, classroom management, and learning support compared to pre-pandemic times. Additionally, according to the teachers, their teaching quality did not return to its original state when schools reopened. However, the data does not show that this decrease is associated with teachers' well-being. This study suggests that it is not only the quantity of learning that may have caused students' learning losses, but also its quality. As a possible practical consequence, it seems helpful to provide teachers not only with technical, but also pedagogical support when teaching online and after having returned to in-person settings.

KEYWORDS

teaching quality, teachers' well-being, COVID-19, cognitive activation, learning support, classroom management, emotional exhaustion, stress

1. Introduction

As a result of the COVID-19 pandemic, schools were closed for several weeks worldwide in the spring of 2020, with additional closures in some countries during the years 2020–2021. When schools were open again, most countries implemented new regulations that included mask mandates, testing mandates, reduced group sizes, or quarantine regulations (World Health Organization, 2021). Germany has not been exempted from these constraints.

Teaching practices have been largely transformed since the start of the pandemic—teachers' routines were altered, their workload and responsibilities increased (Shoulders et al., 2021). Especially, at the begin of the pandemic teachers also had to familiarize themselves with technologies in order to maintain teaching and learning continuity (OECD, 2020). In reaction to the unexpected changes throughout the pandemic, teachers experienced high levels of stress and workload (Allen et al., 2020), of emotional exhaustion (Chan et al., 2021), and low job

satisfaction (Shoulders et al., 2021). Moreover, these alterations were enhanced by too little training in online teaching methodologies (Chan et al., 2021, 533). Teachers reported many challenges regarding the use of digital tools, the time spent on preparing online content, and the limited communication with students during online teaching (Almazova et al., 2020).

Because professional performance is related to well-being, the overall decrease in teachers' well-being may lead to a decline in teaching quality (Chan et al., 2021), that is, to teachers' ability to provide effective and high-quality learning opportunities for students (Kunter et al., 2017).

While teachers' well-being during the pandemic has been studied in several studies (Sokal et al., 2020; Alves et al., 2021; Chan et al., 2021; Kim et al., 2021a,b; Shabbir et al., 2021), only few studies have linked teachers' well-being during the pandemic to their teaching behaviors, i.e., the quality of their teaching. The present study aims to fill this gap by exploring this relationship among teachers in Germany.

2. Related work

Our study is grounded in the theoretical framework developed by Klusmann et al. (2008), which combines the transactional perspective, the extended process-product model, and the expertise approach from research on learning. This framework (Figure 1) posits that both features of the working environment (institutional characteristics) and teachers' personal characteristics are antecedents of occupational well-being, which is associated with instructional performance and, in turn, with students' learning outcomes (Klusmann et al., 2008). This article focuses on the relationship between teachers' well-being and their quality of instruction. According to the framework, teachers' well-being can affect their instructional quality. For instance, when teachers experience high levels of stress or burnout, they may become less engaged and motivated. Low levels of well-being can also impact teachers' ability to manage the classroom: when overwhelmed, they are more likely to react negatively to challenging students' behavior.

2.1. Teachers' well-being during the COVID-19-pandemic

Based on the idea that occupational well-being is multidimensional construct, van Horn et al. (2004) defined it as "a positive evaluation of various aspects of one's job, including affective, motivational, behavioral, cognitive and psychosomatic dimensions" (p. 366). Following this definition, Klusmann et al. (2008) stated that teachers' well-being includes emotional exhaustion, stress and burnout, as well as job satisfaction.

Teachers' psychological state has been highly affected during the COVID-19-pandemic due to the unforeseen circumstances and challenges they faced daily (Alves et al., 2021; Hascher et al., 2021; Shabbir et al., 2021). The novel situations induced high levels of *stress* for teachers regarding different dimensions. Stachteas and Stachteas (2020) reported that teachers experienced stress due to the fear of being infected with the COVID-19 virus or having relatives infected. Students' learning loss and lack of involvement with remote learning was an important concern for teachers, as well as their students' well-being and mental health during the pandemic (Kim et al., 2021a,b). Many families encountered difficulties during the pandemic—financial insecurities, social distancing, and confinement—that directly influenced students' well-being (Prime et al., 2020). Because of the school closures, teachers were not able to monitor how the students were coping and how their families were handling the difficulties (Kim et al., 2021a). However, Pressley et al. (2021) found that 40% of teachers surveyed reported a decrease in stress levels over time, meaning that some teachers have found the strength to face the challenges of the pandemic.

Teachers' *job satisfaction* has also undergone changes in times of the school closure. For instance, Shoulders et al. (2021) reported that a higher level of stress during the pandemic is related to less job satisfaction. In England, a survey of 1821 primary and secondary school teachers found that nearly one in four were dissatisfied with their jobs (Walker et al., 2020). Job satisfaction during the pandemic was also lowered due to alterations in work-family balance compared to before the pandemic (Hong et al., 2021) and to increased work demands (Hong et al., 2021; Mahmood et al., 2021), especially for older teachers (> 45 years) who perceived higher work from teaching

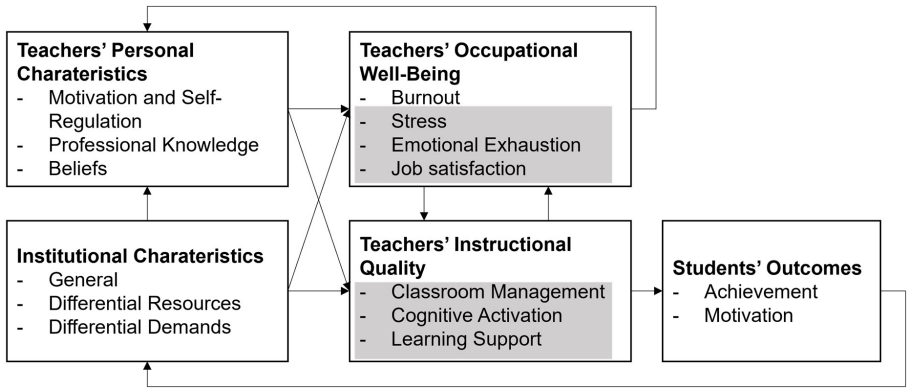

FIGURE 1
Model of teacher and institutional characteristics, teachers' occupational well-being, and instructional performance (Klusmann et al., 2008). Only the gray sections were examined.

from home than younger teachers (Mahmood et al., 2021). Teachers' job satisfaction generally derives from daily work activities—"working with children, seeing students make progress, working with supportive colleagues, and overall school climate" (Klassen and Chiu, 2010, 742). The fact that these activities were interrupted as soon as schools closed at the beginning of the pandemic and that work conditions were poorer at this time (Klassen and Chiu, 2010) may plausibly explain the reported decrease in job satisfaction for some teachers. However, even though teachers missed the physical and social environment of in-person teaching (Moorhouse and Kohnke, 2021), studies on job satisfaction are nuanced in regard to teaching trough digital media. Trinidad (2021) showed that face-to-face teaching was related with higher satisfaction than distance education, while Basu (2021) reported that most teachers were satisfied with online teaching. This discrepancy could be due to methodological and cultural differences between the two studies: the first study was conducted with 1,061 teachers in the United States, while the second one was conducted with 220 teachers in India. But these results are in line with previous studies showing that teachers do not necessarily despise teaching at remote (Stickney et al., 2019; Hampton et al., 2020). Another study found high job satisfaction among German teachers at the start of the pandemic (Dreer and Kracke, 2021). The hypothesis that some teachers took advantage of the situation to update their skills, strengthen their teaching methods, and transform their practices is plausible as teachers find satisfaction in their work even when challenged. In this sense, a longitudinal survey showed that teachers experienced a greater sense of accomplishment over time during the pandemic (Sokal et al., 2020).

On another aspect of well-being, teachers reported high levels of *emotional exhaustion* from the beginning of the pandemic (Chan et al., 2021). Emotional exhaustion can be defined as "feelings of emotional overstrain and reduced emotional resources" (Arens and Morin, 2016, 800). This issue has been identified for the context of the pandemic among the workforce in many countries and in various jobs (Meyer et al., 2021), and a Canadian study showed an increase of teachers' emotional exhaustion over time during the pandemic (Sokal et al., 2020). Research conducted in Germany provides a nuanced perspective. While Bleck and Lipowsky (2022) and Weißenfels et al. (2022) found that teachers' emotional exhaustion remained stable during the initial months of the pandemic, Federkeil et al. (2020) have reported an increase in teachers' emotional exhaustion.

In short, research shows that teachers' well-being during the pandemic is diversified and multidimensional. While some teachers reported highly negative impact on their occupational well-being, other teachers managed to find meaning in the challenges provided by emergency remote teaching and developed new skills and teaching practices (Moorhouse and Kohnke, 2021).

2.2. Occupational well-being and job performance

Beyond the personal—psychological and health related—consequences of professional well-being, well-being is connected to work performance (Klusmann et al., 2008; Arens and Morin, 2016). Across professions, a recent meta-analysis on 113 articles revealed a significant and positive relationship between job satisfaction and job performance ($r = 0.34$; Katebi et al., 2022), confirming the findings of many previous studies and meta-analysis. Therefore, it can be inferred that when teachers experience low job satisfaction and high feelings of stress and of emotional exhaustion, their job performance, and more precisely, their teaching quality, is likely to decrease. In this regard, Arens and Morin (2016) showed that teachers' well-being and student outcomes are positively correlated, suggesting indeed that teaching quality is a function of teachers' well-being. Further, they found that teachers' emotional exhaustion was a strong predictor of students' perceptions of support and achievement. This latter result was also identified by Klusmann et al. (2016), as they controlled teacher characteristics—gender, diploma, and years of experience—and classroom composition—socioeconomic status, cognitive ability, and native language. Ansari et al. (2022) showed in a recent study, that the emotional exhaustion of teachers did not predict the delivery of instruction (namely the time spent in academics as well as the math and literacy instruction level) or the use of different activities, but that emotionally exhausted teachers showed lower quality of instructional and emotional support, and classroom organization (Ansari et al., 2022; Klusmann et al., 2022). It should be noted, however, that these correlations may result from the fact that well-being affects performance, but they may also result from the fact that low performance reduces well-being.

Levels of well-being and feelings of burnout are further associated with empathy (Trauernicht et al., 2021). In the classroom context, empathy is "the ability to perceive and understand students' emotions and needs" (Aldrup et al., 2022). When teachers' feel burned-out, they might experience less empathy as they tend to focus more on themselves and less on others (Trauernicht et al., 2021). Empathy allows teachers to identify when students have difficulty to understand, when they feel boredom or to identify reasons for classroom disturbances. Understanding these cues allows teachers to adapt teaching strategies and classroom management and to create positive relationships with their students (Emmer and Stough, 2001). Hence, in the teaching profession, lower empathy can decrease job performance (Aldrup et al., 2022).

2.3. The three dimensions of teaching quality

During the COVID-19 pandemic, the teaching process underwent significant changes. School closures necessitated a shift to digital tools, while the reopening of schools saw the implementation of new hygiene regulations that disrupted established routines. The challenges that teachers experienced in adapting to these new circumstances has been documented (Jaekel et al., 2021; Kim et al., 2021a,b). Despite the wealth of research examining the organizational aspects of teaching during the pandemic, such as the use of digital tools and methods for maintaining contact with students (e.g., König et al., 2020; van der Spoel et al., 2020), little is known about how the quality of the teaching process itself, specifically the interactions between students and teachers, has been affected.

Teaching quality can be distinguished between three different dimensions (e.g., Decristan et al., 2015): effective classroom management, cognitive activation, and constructive learning support for students (e.g., Lipowsky et al., 2009; Kunter and Voss, 2011; Kunter et al., 2017; Praetorius et al., 2018; Fauth et al., 2021).

Classroom management refers to the set of strategies and techniques used by teachers to minimize disruptions, and use instructional time in the most efficient way possible (Emmer and Stough, 2001; Kunter et al., 2007). Effective classroom management involves managing discipline issues clearly and fairly, keeping students focused with engaging tasks and provide smoothly functioning activities with few thematic jumps. Classroom management is facilitated when teachers are constantly aware of what is happening in the classroom and are able to deal with different issues simultaneously, without disrupting the collective learning activities (Korpershoek et al., 2016).

Cognitive activation—also called cognitive engagement or higher order thinking—refers to a mental learning process, in which existing knowledge structures are rearranged, connected, and new structures of knowledge are built (Lipowsky et al., 2009). This process must be handled by the students themselves and cannot be enforced by the teachers. However, cognitive activation can be stimulated trough pedagogical activities—challenging questions and problem-solving tasks, discussions, and cognitive conflicts (Lipowsky et al., 2009; Kunter and Trautwein, 2013). Complex—but not overwhelming—tasks and tasks that encourage to build on prior knowledge, to question concepts, to connect content, and to apply it to new situations are more cognitively stimulating than repetitive tasks. Further, in cognitively activating lessons and tasks, students are required to explain, elaborate, discuss, and question their own thoughts (e.g., Reusser, 2022).

The third dimension of teaching quality, learning support, includes providing elaborate and constructive feedback, valuing mistakes as learning opportunities, adapting task difficulty and learning pace, and fostering a positive relationship between students and teachers (Klieme et al., 2009). Learning support involves implementing positive and trustworthy learning environments in which teachers can be sensitive to their students' needs and address comprehension problems in the classroom (Praetorius et al., 2018; Fauth et al., 2021).

Although these three dimensions are not necessarily exhaustive to describe all processes in the student-teacher interaction, empirical evidence indicates that they represent a useful framework to describe teaching quality (Hattie, 2009; Fauth et al., 2014; Praetorius et al., 2018). Studies have shown that better classroom management and higher cognitive activation are predictive for students' achievement and that learning support is particularly relevant for students' motivational development (Seidel and Shavelson, 2007; Hattie, 2009; Praetorius et al., 2018).

Little is known how the pandemic situation has affected the processes of teaching quality (Jaekel et al., 2021; Steinmayr et al., 2021).

2.4. The present study—research questions and hypotheses

During the pandemic, teachers delivered their courses remotely and in person under restricted conditions (distancing and wearing face masks). This study aims to examine if teaching quality changed between "normal" (pre-pandemic) and two pandemic conditions (remote settings and restricted in-person settings).

The study is set in Germany, where the organization of school life varied across different phases in the pandemic. Schools were closed in March 2020 until the end of the summer break and distance learning was established (ending between 5th of August and 12th of September 2022). At the start of school year 2020–2021, all grades were taught face-to-face in the classroom with hygiene measures such as reducing group size, stability of group members, wearing facemasks, quarantine regulations, and ventilation requirements being observed (KULTUSMINISTERKONFERENZ, 2020). With rising infection figures in December 2020 again, schools were closed for most of the students in Germany. Depending on the grade level and type of school, the requirements varied from alternating models of in class teaching to distance learning. This time, online learning and daycare were provided (Fickermann and Edelstein, 2021). This situation extended (with the exception of graduation classes and a little later of grades 1–6) until April 2021. In April 2021, teachers answered the questionnaire underlying this study.

First, the study aims to examine three dimensions of teachers' well-being during the pandemic: job satisfaction, emotional exhaustion, and stress. The following question is addressed: what are the levels of well-being—job satisfaction, emotional exhaustion, and stress—experienced by teachers during COVID? (RQ1). Different factors in the pandemic situation can have a negative impact on teachers' well-being: lack of daily classroom activities, high workload, low self-efficacy regarding teaching strategies, and poor working conditions (Klassen and Chiu, 2010).We thus expect low levels of well-being in a significant part of teachers, in line with other studies demonstrating this effect (Sokal et al., 2020; Alves et al., 2021; Chan et al., 2021; Shabbir et al., 2021; Kim et al., 2021a,b). However, research also suggests that some teachers rather thrived, rediscovered themselves, and developed new skills (Sokal et al., 2020; Pressley et al., 2021). We thus also expect normal or high levels of well-being in a significant part of teachers, especially because our data collection took place in April 2021, when the pandemic had been going on for over a year.

Our second question refers to the teaching quality: How does teaching quality differ at different times of the pandemic? (RQ2). Virtually all research investigating teaching aspects during the pandemic examine teaching during distance learning, with a specific focus on use of digital tools. However, teaching was also affected when students went back to school, and to date we know very little how the pandemic restrictions have affected in-class teaching. In this study, we therefore focus on the processes of teaching quality, namely the three dimensions—classroom management, cognitive activation, and learning support—and investigate to what degree they vary in different phases of the pandemic. To do so, we compared teaching quality at three different times: before the pandemic, during the pandemic in remote conditions (when most teaching took place in remote, with teachers and students at home) and during the pandemic in restricted in-person conditions (when teachers and students returned to the classrooms). We expect a decrease in *cognitive activation* because distance learning is unfamiliar to teachers and, without specific training on teaching methods available (Kim et al., 2021b), they may have difficulty designing challenging tasks and fostering cognitive conflicts during remote settings, but not specifically in the restricted in-person conditions. In addition, the uncertainty created by pandemic conditions made the choices of content and methods difficult to plan in advance (Kim et al., 2021a) and time constraints (e.g., due to more tasks that arose on a professional as well as private level) possibly prevented teachers from preparing their lessons

intensively, another barriers to cognitive activation. Concerning *classroom management*, it may be easier for teachers in terms of classroom order, but not in terms of helping students focus on tasks while both can be easier in the restricted face-to-face conditions, considering the strict rules framing schools and classrooms conditions at that time. As remote teaching led to less interactions between teachers, students and parents, less immediate feedback, and more difficulties to follow students' pace (Kim et al., 2021a), we hypothesize a decrease in *learning support* during remote settings. However, this might not be the case in the restricted face-to-face conditions.

As a third objective, we investigate the relationship between professional well-being and teachers' job performance as indicated in their teaching quality during the pandemic. The following question is addressed: does teachers' well-being predict teaching quality in remote settings and in restricted in-person settings? (RQ3). As generally with decrease of well-being and empathy, teachers tend to fail meeting students' needs (Trauernicht et al., 2021), we hypothesize that emotional exhaustion and high levels of stress during the pandemic are related to lower teaching quality. In addition, lower job satisfaction is related to lower commitment to professional tasks (Klassen and Chiu, 2010) meaning that, if teachers are dissatisfied with their job, it might reduce teaching quality. We also expect an interaction between job satisfaction and emotional exhaustion on teaching quality: satisfied teachers with high emotional exhaustion might thrive to keep their teaching quality high, while dissatisfied teachers with high emotional exhaustion might fail to maintain the quality of their teaching.

3. Methods

3.1. Sample and design

The present research was conducted as an *ex post facto* design using an online questionnaire in Germany. The online questionnaire was created using LimeSurvey. The survey was posted online and was accessible to teachers via both a link and a QR code. The online survey was available from April 2021 to May 2021. The participants voluntarily agreed to participate in the study. Teachers were personally recruited and recruited via flyers and social networks (Facebook and Instagram). The duration of participation was approximately 25 min. No personal data was collected, and no incentive was provided.

The survey link was opened by 935 teachers, but 281 of them answered more than one question. Two teachers were then removed from the sample because they do not teach in Germany.[1] A total of 279 teachers (108 females, nine males, one diverse, and 161 missing values) of a mean age of 35.42 years ($SD = 8.53$) are included in the data analysis. Their average work experience was 8.94 years ($SD = 7.28$) including preparatory service. 25.4% of teachers teach at elementary school, 63.5% teach at lower secondary school, and 8.5% teach at upper secondary school.

1 These participants were removed from the analyses because the questionnaire examined teaching dimensions at three different and strategic points of the pandemic and rules were different in other countries.

3.2. Instruments

3.2.1. Teaching quality

The survey included questions about teaching quality at three different times: before the pandemic (before March 2020), during the pandemic in remote settings (T2), and during the pandemic in restricted face-to-face settings (T3). As the questionnaire was *post hoc*, teachers were asked to focus on these different times. They were provided cues to help them remember:

- Before the pandemic: "The questions that now follow refer to the time before the outbreak of the pandemic. Please focus on your lessons before March 2020."
- During the pandemic, remote teaching: "Remote teaching refers to distance lessons that were synchronously accompanied by conference systems."
- During the pandemic, in-person restricted teaching: "Restricted face-to-face teaching includes face-to-face teaching for all students at the same time, in compliance with special hygiene requirements. Depending on the infection situation, the health department may order the mandatory wearing of a mouth-nose covering."

For each time, the three following dimensions were assessed:

Cognitive activation was assessed with eight items (e.g., "In discussions, I made sure that different opinions were deliberately juxtaposed"), adapted from Baumert et al. (2009). *Classroom management* was assessed with seven items, adapted from Baumert et al. (1997) and Kunter et al. (2017). This dimension includes items regarding waste of time (e.g., "I often had the impression that a lot of time was wasted in my classes") and monitoring students' doings (e.g., "I noticed immediately when students started doing something else"). *Learning support* was assessed with seven items (e.g., "I took care of my students when they had problems), adapted from Baumert et al. (2009). The assessment of these scales was based on a six-point Likert scale ranging from (1) = "strongly disagree" to (6) = "strongly agree." Internal consistency was measured with McDonald's ω (Béland et al., 2018), presented in Table 1. All subscales present a good fit (i.e., $\omega > 0.7$).

3.2.2. Teachers' well-being during COVID-19

Teachers' well-being during the COVID-19-pandemic was measured through job satisfaction, emotional exhaustion, and well-being related to the pandemic. For each scale, teachers rated their agreement with statements on a six-point Likert scale ranging from (1) = "does not apply" to (6) = "does apply." All items are presented in Table 2.

Job satisfaction was measured with four items adapted from Hackman and Oldham (1975) and *Emotional exhaustion* was measured with four items from the German version (Enzmann and Kleiber, 1989) of the Maslach Burnout Inventory (Maslach et al., 1996). The two scales presented an acceptable fit: $\chi^2(2) = 7.600$, $p = 0.022$; Comparative Fit Index (CFI) = 0.984 for job satisfaction; Standardized Root Mean Square Residual (SRMR) = 0.024 and $\chi^2(2) = 1.261$, $p = 0.532$; CFI = 1.000; SRMR = 0.013 for emotional exhaustion.

Stress caused by the COVID-19 pandemic was measured with four items from Eickelmann and Drossel (2020). As it is not a validated

scale, exploratory factor analysis was conducted to examine the structure of the items. The analysis revealed a one-dimension structure (details of this analysis will be provided on demand) with an acceptable fit: $\chi^2(2) = 0.666$, $p = 0.717$; CFI = 1.000; SRMR = 0.011.

Internal consistency of each scale was measured with McDonald's ω (Béland et al., 2018), presented in Table 1. All subscales presented a good fit ($\omega > 0.7$).

TABLE 1 Internal consistency of scales.

		ω
Before COVID	Cognitive activation	0.91
	Classroom management	0.85
	Learning support	0.93
During COVID—remote	Cognitive activation	0.91
	Classroom management	0.74
	Learning support	0.87
During COVID—in-person	Cognitive activation	0.93
	Classroom management	0.79
	Learning support	0.88
Teachers' well-being	Job satisfaction	0.94
	Emotional exhaustion	0.88
	Stress caused by COVID-19	0.83

3.3. Data analysis

The three dimensions of teachers' well-being during the pandemic (emotional exhaustion, job satisfaction, and stress caused by the pandemic situation) were investigated with descriptive analyses including item-level analyses—frequencies.

To determine whether the three dimensions of teaching quality (cognitive activation, classroom management, and learning support) were different according to different times—before and during the pandemic in the remote and restricted in-person conditions—one-way repeated-measures ANOVA were conducted using Field (2013) procedures. Pairwise comparisons were checked with Bonferroni post-hoc tests. Prior, Mauchly's tests were ran to check the assumption of sphericity (the hypothesis that the variances of the differences between conditions are equal; Field, 2013).

Correlations between teaching quality during the pandemic and teachers' well-being were conducted as preliminary analyses. Spearman correlations were chosen because the normality assumption was not fulfilled. Then, regression analyses were conducted to highlight the predictive value of teachers' well-being on their teaching quality during the pandemic in remote and in in-person conditions. Regression analyses included teachers' characteristics—age, gender, and years of experience.

4. Results

4.1. Teachers' well-being during the COVID-19-pandemic

Table 2 presents frequencies for items related to job satisfaction, emotional exhaustion, and stress caused by the COVID-19 pandemic. Teachers had to answer these items on a scale from 1 to 6; to simplify the reading of the results, their scores were marked as "disagree" from 1 to 3 and as "agree" from 4 to 6.

For job satisfaction, the scale mean was 4.68 ($SD = 1.46$), and the median 5.25. Given the theoretical scale mean of 3.5, these can be considered high values. About 21–23% of teachers reported that if they could choose again, they would choose another profession and that they regret their professional choice. One third of teachers have thought at least once that another profession would be better for them. However, for most teachers (84.6%), there is no better profession. Overall, most teachers believe that their job is meaningful and job satisfaction is relatively good.

They reported medium to high emotional exhaustion ($M = 3.99$, $SD = 1.38$, $Mdn = 4.25$); 75.4% of teachers get depressed at the end of the workday and 70% feel exhausted and unenthusiastic at work. Half of the teachers feel overwhelmed by the amount of work.

Teachers reported medium to high stress ($M = 4.00$, $SD = 1.60$, $Mdn = 4.25$). About 75% of them are concerned about their health and 60% are afraid of catching the coronavirus. Moreover, the uncertainty of the pandemic situation was very stressful for 91% of them.

Distributions for the scales are presented in Figure 2. Most teachers reported high job satisfaction. Regarding emotional exhaustion, scores are distributed more evenly: a non-negligeable part of teachers reported low to medium emotional exhaustion and a majority of teachers reported high emotional exhaustion.

Table 3 presents distributions and intercorrelations between the three aspects of teachers' well-being. Job satisfaction and emotional exhaustion are correlated, as well as emotional exhaustion and stress caused by COVID-19.

4.2. Teaching quality before and during COVID-19

Descriptives for the dimensions of teaching quality are displayed in Table 4. To examine if there are variations in teaching quality since the start of the pandemic, one-way repeated measures ANOVA were conducted. The condition of sphericity was not met for cognitive activation and learning support. As sphericity was >0.7, the Huynh-Feldt correction was applied in both cases to correct degrees of freedom (Field, 2013).

The results show that teachers reported different levels of cognitive activation before and during the pandemic—$F(1.602, 145.827) = 30.234$, $p < 0.0001$, $\eta^2 = 0.249$. Pairwise comparisons reveal that they reported the highest levels of cognitive activation for the time before the pandemic, and lower levels for the restricted in-person teaching, and even lower levels for the remote teaching.

Classroom management also differed from before to during the pandemic—$F(2, 184) = 21.926$, $p < 0.0001$, $\eta^2 = 0.192$. Pairwise comparisons show that teachers reported higher levels for the time before the pandemic, but equal levels for online or restricted in-person settings.

10.3389/feduc.2023.1136940

TABLE 2 Teachers' well-being: item-level analyses.

	Disagree (%)	Agree (%)
Job satisfaction		
• If I could choose again, I would become a teacher again in a heartbeat.	22.9	77.1
• Not only once did I consider whether it would have been better for me to take up another profession.	33.9	66.1
• I sometimes regret becoming a teacher.	78.8	21.2
• For me, there is no better profession.	15.4	84.6
Emotional exhaustion		
• Sometimes I get really depressed at the end of the workday.	24.6	75.4
• I often feel exhausted at work.	30.5	69.5
• I feel overloaded by the overall work.	55.9	44.1
• I notice more often at work how unenthusiastic I am.	30.5	69.5
Stress caused by COVID-19		
• I am afraid to go to school because of the Corona situation.	24.6	75.4
• I am afraid of catching the Corona virus from the students.	41.5	58.5
• Since the Corona pandemic, I have become more concerned about my health.	27.1	72.9
• I find it very stressful not to be able to know what will happen in the coming months.	9.3	90.7

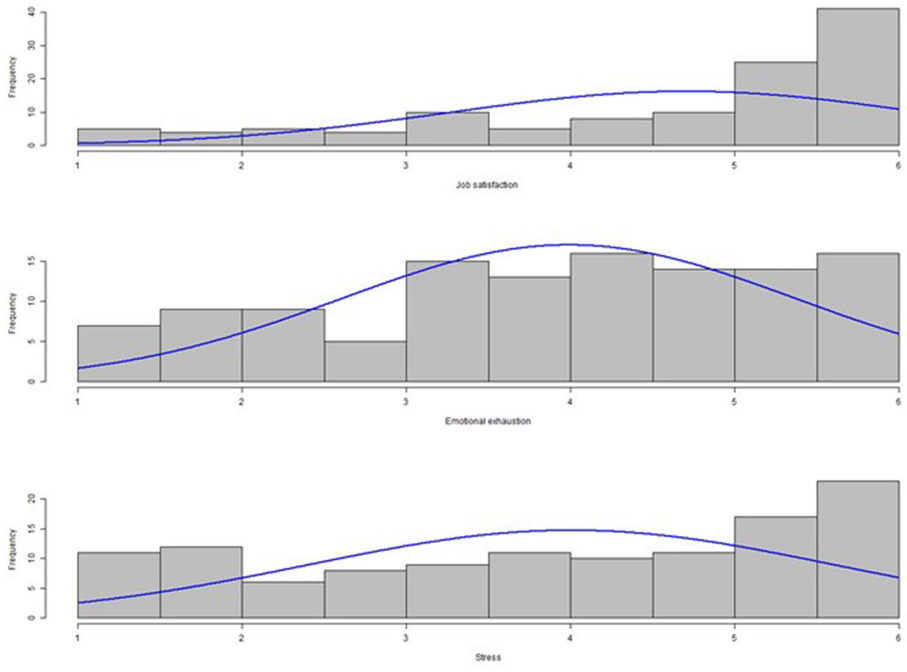

FIGURE 2
Distributions for teachers' well-being.

TABLE 3 Distributions and intercorrelations between well-being aspects.

	M	*SD*	*Mdn*	1	*p*	2	*p*
1. Job satisfaction	4.68	1.46	5.25	—			
2. Emotional exhaustion	3.99	1.38	4.25	**−0.53**	**0.000**	--	
3. Stress caused by COVID-19	4.00	1.60	4.25	−0.07	0.435	**0.23**	**0.014**

TABLE 4 Teaching quality: distributions and pairwise comparisons.

Dimensions (on a scale from 1 to 6)	Before COVID-19 (bef)		During COVID-19, remote (rem)		During COVID-19, restricted in-person (f2f)		Pairwise comparisons
	M	*SD*	*M*	*SD*	*M*	*SD*	
Cognitive activation	4.78	0.8	4.16	1.15	4.56	1.04	bef > rem > f2f
Classroom management	4.37	0.85	3.6	1.03	3.79	0.78	bef > rem = f2f
Learning support	5.63	0.53	5.31	0.7	5.56	0.53	bef = f2f > rem

Finally, results also show that learning support differed from before to during the pandemic—$F(1.672, 148.797) = 16.230$, $p < 0.0001$; $\eta^2 = 0.154$. Pairwise comparisons show that teachers reported almost the same levels for the time before the pandemic and the in-person settings, but that it was lower in remote settings.

4.3. Association between teaching quality and teachers' well-being

Spearman's correlations for teaching quality dimensions and teachers' well-being are presented in Table 5. Cognitive activation, classroom management, and learning support are not correlated with any of the aspects of teachers' well-being, neither in remote settings nor in restricted in-person settings.

Although the correlation matrix indicated that well-being and teaching quality were not directly related, we performed multiple regression analyses to determine the possible predictive value of teachers' well-being on teaching quality. The regression models allowed us to include age, gender, and years of experience as control variables.

We tested the predictive value of emotional exhaustion, job satisfaction, and stress caused by the COVID-19 pandemic on each teaching quality dimension—cognitive activation, classroom management, and learning support—in both remote and restricted in-person settings. The Variance influence Factor (VIF) was computed to check for multicollinearity between variables. No VIF indicated a multicollinearity issue. The VIF of gender, emotional exhaustion, job satisfaction, and stress are situated between 1.11 and 1.68, indicating low multicollinearity and the VIF of age and years of experiences are situated between 2.65 and 3.13, because older teachers tend to have more years of teaching experience.

Analyses of variance results and regression coefficients are presented in Table 6 for remote settings and in Table 7 for in-person settings.

The model predicting cognitive activation in remote settings is statistically significant. Results show that online cognitive activation is negatively related to teachers' emotional exhaustion: the more exhausted they feel, the less their activities include cognitive activation. On the other hand, stress is positively related to cognitive activation: the more stress teachers feel, the more their activities include cognitive activation.

The other five models were not significant, meaning that, in our sample, teaching quality during the pandemic could not be predicted by teacher well-being, either in remote and restricted in-person settings.

5. Discussion

School closures and restricted classroom time brought by the COVID-19 pandemic influenced teaching practices at all education levels and led to a decrease of teachers' well-being. Given the possible effects of these changes, it is necessary to document them for future consideration.

The present study first addressed the state of teachers' well-being (RQ1). During the pandemic, about 60% of teachers surveyed felt emotionally exhausted and that most of them felt stressed by the situation. This suggests that planning challenging activities for students is a demanding task, and exhausted or overworked teachers might put less effort into it. This result is in line with our hypothesis and with previous research that showed that job engagement and performance is related to perceived availability of resources (Bakker and Bal, 2010). One resource that teachers particularly lacked during the pandemic was the feeling of autonomy, which includes control over the future of events (Kim et al., 2021b). The pandemic has caused many uncertainties regarding the health of students and teachers, as well teaching modalities. From 1 day to the next, these conditions could change, reducing teachers' sense of autonomy (Kim et al., 2021b). At the time, the survey took place, teaching modalities had returned to face-to-face teaching but the data show that teachers still experienced strain. It is worthwhile mentioning that, despite the exhaustion, job satisfaction has stayed high. Teachers reported being tired and stressed, but, consistent with previous research, they also remain satisfied with their jobs (Klassen and Chiu, 2010). This result suggests that reports about decreased teacher well-being should not

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TABLE 5 Intercorrelations between well-being aspects and teaching quality dimensions during the COVID-19-pandemic in remote and in restricted in-person settings.

		1	*p*	2	*p*	3	*p*	4	*p*	5	*p*	6	*p*	7	*p*	8	*p*
Well-being	1. Job satisfaction	—															
	2. Emotional exhaustion	**−0.53**	**0.000**	—													
	3. Stress	−0.07	0.435	**0.23**	**0.014**	—											
Remote settings	4. Cognitive activation	0.07	0.543	−0.17	0.124	0.19	0.085	—									
	5. Classroom management	0.1	0.353	−0.15	0.16	0.03	0.756	0.09	0.427	—							
	6. Learning support	−0.02	0.83	−0.02	0.855	0.13	0.223	**0.47**	**0.000**	**0.27**	**0.01**	—					
Restricted in-person settings	7. Cognitive activation	0	0.992	0.01	0.946	0.05	0.604	**0.75**	**0.000**	−0.01	0.908	**0.21**	**0.05**	—			
	8. Classroom management	0.12	0.217	−0.08	0.388	−0.15	0.124	0.04	0.675	**0.38**	**0.000**	0.13	0.226	**0.21**	**0.027**	—	
	9. Learning support	0.05	0.624	0.01	0.891	−0.06	0.55	**0.3**	**0.004**	0.09	0.383	**0.6**	**0.000**	**0.36**	**0.000**	**0.23**	**0.011**

Significant values are in bold.

only look at exhaustion: one can be exhausted and satisfied at the same time.

The main objective of this study was to investigate relationships between teachers' well-being and teaching quality. Changes in teaching quality during the COVID-19 pandemic, in terms of cognitive activation, classroom management, and learning support were then documented (RQ2). The results showed that all three dimensions were reportedly shifted in the pandemic context: teachers generally reported lower teaching quality in remote settings and in restricted in-person settings during the pandemic than before the pandemic. However, teachers reported some differences between remote settings and in-person settings.

First, and in line with our hypothesis, teachers reported lower cognitive activation in remote settings than in restricted in-person settings. This decrease suggests that the remote settings might have had an impact on how well teachers were able to teach in a cognitively activating way. Cognitive activation requires providing challenging activities and tasks that build on students' prior knowledge, to ensure that they engage in (co-)constructive higher order thinking situations (Klieme et al., 2009). As modalities deeply changed between before and during the pandemic, it is likely that teachers did not have the resources—material and training—to work on these skills and did not know how to engage students in higher-order thinking processes in remote settings. When returning to classroom, in restricted setting, teachers reported an increase in cognitive activation, but its score does not reach again that of before the pandemic.

Second, teachers reported that classroom management decreased during the pandemic, both in remote settings and in restricted in-person settings, partially in line with our hypotheses. According to our results, this might indicate that teachers had difficulties not wasting time and, more importantly, noticing when students would do something else during class. The loss of time may have occurred because instructors and students did not always know how to set up and use the systems intended to deliver the courses, or that some students did not have the correct materials to participate in the courses (van de Werfhorst et al., 2020). In addition, it could be inferred that teachers were not able to ensure that each student was focused on the lesson, even with their cameras on (Yarmand et al., 2021). An interesting result is that upon returning to the classroom, classroom management did not increase, but remained at the same level as in the remote settings, suggesting that the restrictions would not allow for optimal time and student management. The pandemic-related adjustments, including the return to in-person instruction, were challenging to manage; new rules and routines had to be learned. Moreover, requirements and policies put in place were likely to disrupt the flow of lessons, classroom management, and to shorten teaching time.

Finally, as hypothesized, teachers reported similar levels of learning support in-person settings before and during the COVID-19 pandemic, but lower support during school closures. This result does not indicate that teachers care less about their students in remote settings but would reflect the idea that they had more difficulty supporting their students and to be considerate of their mistakes. This finding is similar to other dimensions of teaching quality: the lack of face-to-face interaction makes many aspects of teaching difficult, especially with the lack of resources resulting from the immediacy of the situation. However, as soon as students returned to the classroom, teachers ensured that student

TABLE 6 Predicting TQ during COVID-19 in *remote settings* with teachers' well-being: regression coefficients standardized.

	Cognitive activation		Classroom management		Learning support	
F	2.903		0.560		0.424	
p	**0.013**		0.761		0.861	
R^2	**0.181**		0.041		0.031	
	β	*p*	*β*	*p*	*β*	*p*
Age	0.001	0.995	−0.027	0.884	0.007	0.969
Gender	0.072	0.515	−0.052	0.662	0.055	0.639
Years of experience	−0.325	0.075	0.104	0.585	0.037	0.852
Emotional exhaustion	**−0.307**	**0.021**	−0.171	0.234	−0.123	0.385
Job satisfaction	−0.067	0.576	−0.024	0.851	−0.089	0.493
Stress caused by COVID-19	**0.279**	**0.011**	0.058	0.621	0.134	0.250

Significant values are in bold.

TABLE 7 Predicting TQ during COVID-19 in *restricted in-person settings* with teachers' well-being: regression coefficients standardized.

	Cognitive activation		Classroom management		Learning support	
F	1.199		1.768		0.132	
p	0.313		0.113		0.992	
R^2	0.064		0.091		0.007	
	β	*p*	*β*	*p*	*β*	*p*
Age	−0.215	0.165	−0.347	0.026	0.018	0.913
Gender	0.072	0.473	0.087	0.375	−0.006	0.950
Years of experience	−0.020	0.900	0.420	0.009	0.029	0.862
Emotional exhaustion	0.041	0.734	0.049	0.675	0.049	0.691
Job satisfaction	0.016	0.885	0.056	0.613	−0.024	0.832
Stress caused by COVID-19	0.049	0.625	−0.153	0.125	−0.067	0.511

support was addressed as it was before school closures. As it is the only dimension that has returned to the same level as before the COVID-19 pandemic, results suggest that teachers emphasized this dimension after students went back to school. In addition, from the higher reported levels of learning support than cognitive activation and classroom management, it can be assumed that teachers focused more on this dimension than on the others. Supporting their students was a concern for teachers during the pandemic (Moss et al., 2020), and may even contributed to their job satisfaction.

The examination of relationships between teachers' well-being and teaching quality (RQ3) revealed that even though teachers felt exhausted and stressed by the COVID-19 situation, this state of mind did not predict teaching quality. In other words, contrary to our hypothesis, teachers who reported feeling exhausted and stressed were not necessarily providing lower quality teaching compared to those who did not report such feelings. This result is inconsistent with previous research, as job performance is generally related to well-being. Indeed, when teachers are exhausted, they are less available to meet students' needs (Aldrup et al., 2022), and this would result in a decrease in the quality of teacher-student interactions. Hence, we expected at least a high effect of teachers' well-being on learning support. Other factors may be at play that influence the relationship between teacher well-being and teaching quality. The pandemic has significantly transformed the educational landscape, and it is probable that the external circumstances resulting from it hold more influence on the teaching quality than individual factors. The current challenging environment has presented a myriad of difficulties for teachers, such as reduced teaching time, which have limited their ability to perform effectively (Teig et al., 2019). Consequently, it is reasonable to assume that external factors and constraints have a more substantial impact on teaching quality than individual teacher-related factors. Furthermore, the present study measured short-term effects on teaching quality, while well-being consequences on job performance may be reflected in the long term (Maslach, 2003; Klassen et al., 2013).

This research presents some limitations. First, the sample size and composition do not allow for generalization of the results beyond the German-speaking context in which the study was conducted; using a stratified random sampling technique in future research to would help ensure the representativeness of the sample. Second, the retrospective nature of this study is as a limitation, as the information provided on teaching quality comes from a cross-sectional survey in which teachers were asked to recall their experience at three different points in time. It is probable that teachers did not accurately remember the specifics of their teaching at the different time points. A longitudinal study that tracks

teaching quality over time would provide more accurate and reliable data, but to our knowledge, this has not yet been published. Moreover, as the data used for the present study was cross-sectional, no causal inferences can be made. Third, only self-reported data were used, both for measures of teaching quality and of well-being. This limitation may be the source of a social desirability bias and the cause of the lack of observed effects between both constructs. Direct and indirect observations could be used as alternative methodologies to reduce the influence of self-report bias. Fourth, teachers self-selected to participate in the study; hence, it is possible that exhausted teachers are overrepresented because they need to talk about their situation or, conversely, that they are underrepresented because they are too exhausted to participate.

6. Reflections for research

Ensuring teaching quality is crucial for predicting students' learning outcomes, as its effect surpasses the ones of environmental and student factors (Hattie, 2009). In the post-COVID era, it is even more important to prioritize teaching quality to help students catch up with the loss of learning time. Given the shift toward digitalization in education, it may be important to consider how teaching quality can be improved in these modes of instruction (Sonnenburg et al., 2022). Future research could explore strategies to help cognitively engage students and support them in distance and blended learning environments.

Our study found that teaching quality decreased during school closures and when returning to classrooms with restricted settings, indicating that the return to in-person instruction did not necessarily help teachers increase their quality of instruction. However, our findings suggest that this decrease was not due to teachers' well-being. Although the evolution of teachers' well-being during and after the pandemic is still unclear, our results suggest that it was not the main reason for the reported decrease in teaching quality. A comprehensive census of these factors would improve our understanding of these processes but given the amount of research conducted in the education field, this calls for a collaborative and community effort.

The potential decline in teachers' well-being during and following the pandemic is a significant concern, as it may have implications for their self-efficacy and commitment (Bardach et al., 2019), which in turn can affect students' learning outcomes. As also stated by Bleck and Lipowsky (2022), research efforts should prioritize examining this matter. In that sense, well-being interventions for teachers have been proposed, but empirical evidence of their effectiveness is still scarce (Dreer and Gouasé, 2022).

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding authors.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MS, NR, KW, and MK contributed to conception and design of the study. MS organized the database, performed the statistical analysis, and wrote the first draft of the manuscript. NR wrote the sections of the manuscript. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

Aldrup, K., Carstensen, B., and Klusmann, U. (2022). Is empathy the key to effective teaching? A systematic review of its association with teacher-student interactions and student outcomes. *Educ. Psychol. Rev.* 34, 1177–1216. doi: 10.1007/s10648-021-09649-y

Allen, R., Jerrim, J., and Sims, S. (2020). How did the early stages of the COVID-19 pandemic affect teacher wellbeing. *Cent. Educ. Policy Equal. Oppor.*, 20–15.

Almazova, N., Krylova, E., Rubtsova, A., and Odinokaya, M. (2020). Challenges and opportunities for Russian higher education amid COVID-19: teachers' perspective. *Educ. Sci.* 10:368. doi: 10.3390/educsci10120368

Alves, R., Lopes, T., and Precioso, J. (2021). Teachers' well-being in times of Covid-19 pandemic: factors that explain professional well-being. *Int. J. Educ. Res. Innov.* 15, 203–217. doi: 10.46661/ijeri.5120

Ansari, A., Pianta, R. C., Whittaker, J. V., Vitiello, V. E., and Ruzek, E. A. (2022). Preschool teachers' emotional exhaustion in relation to classroom instruction and teacher-child interactions. *Early Educ. Dev.* 33, 107–120. doi: 10.1080/10409289.2020.1848301

Arens, A. K., and Morin, A. J. S. (2016). Relations between teachers' emotional exhaustion and students' educational outcomes. *J. Educ. Psychol.* 108, 800–813. doi: 10.1037/edu0000105

Bakker, A. B., and Bal, M. P. (2010). Weekly work engagement and performance: a study among starting teachers. *J. Occup. Organ. Psychol.* 83, 189–206. doi: 10.1348/096317909X402596

Bardach, L., Popper, V., Hochfellner, E., and Lüftenegger, M. (2019). Associations between vocational students' perceptions of goal structures, mastery goals, and self-efficacy in five subjects—practical relevance as a potential mediator. *Empir. Res. Vocat. Educ. Train.* 11:9. doi: 10.1186/s40461-019-0084-0

Basu, M. (2021). *The Influence of Digital Platforms on Motivation and Job Satisfaction of Teachers During the COVID-19 Pandemic*. Rochester, NY: Social Science Research Network.

Baumert, J., Blum, W., Brunner, M., Dubberke, T., Jordan, A., Klusmann, U., et al. (2009). Professionswissen von Lehrkräften, kognitiv aktivierender Mathematikunterricht und die Entwicklung von mathematischer Kompetenz (COACTIV): Dokumentation der Erhebungsinstrumente. Max-Planck-Institut für Bildungsforschung.

Baumert, J., Gruehn, S., Heyn, S., Köller, O., Schnabel, K.-U., Leven, I., et al. (1997). Bildungsverläufe und psychosoziale Entwicklung im Jugendalter (BIJU): Dokumentation-Band 1. Skalen Längsschnitt I, Wellen 1–4.

Béland, S., Cousineau, D., and Loye, N. (2018). Utiliser le coefficient oméga de McDonald à la place de l'alpha de Cronbach. *McGill J. Educ.* 52, 791–804. doi: 10.7202/1050915ar

Bleck, V., and Lipowsky, F. (2022). Teachers' emotional exhaustion before and during the COVID-19 pandemic: neither emotional exertion nor vacation feeling. *Front. Psychol.* 13:887494. doi: 10.3389/fpsyg.2022.887494

Chan, M., Sharkey, J. D., Lawrie, S. I., Arch, D. A. N., and Nylund-Gibson, K. (2021). Elementary school teacher well-being and supportive measures amid COVID-19: an exploratory study. *Sch. Psychol. Forum* 36, 533–545. doi: 10.1037/spq0000441

Decristan, J., Klieme, E., Kunter, M., Hochweber, J., Büttner, G., Fauth, B., et al. (2015). Embedded formative assessment and classroom process quality: how do they interact in promoting science understanding? *Am. Educ. Res. J.* 52, 1133–1159. doi: 10.3102/0002831215596412

Dreer, B., and Gouasé, N. (2022). Interventions fostering well-being of schoolteachers: a review of research. *Oxf. Rev. Educ.* 48, 587–605. doi: 10.1080/03054985.2021.2002290

Dreer, B., and Kracke, B. (2021). "Lehrer*innen im Corona-Lockdown 2020—Umgang mit der Distanzbetreuung im Spannungsfeld von Anforderungen und Ressourcen. *Bildung und Corona* 22:118.

Eickelmann, B., and Drossel, K. (2020). SCHULE AUF DISTANZ: Perspektiven und Empfehlungen für den neuen Schulalltag Eine repräsentative Befragung von Lehrkräften in Deutschland. Available at: https://www.vodafone-stiftung.de/umfrage-coronakrise-lehrer/

Emmer, E. T., and Stough, L. M. (2001). Classroom management: a critical part of Educational Psychology, with implications for teacher education. *Educ. Psychol.* 36, 103–112. doi: 10.1207/S15326985EP3602_5

Enzmann, D., and Kleiber, D. (1989). *Helfer-Leiden: Stress und Burnout in Psychosozialen Berufen*. Heidelberg: Asanger.

Fauth, B., Atlay, C., Dumont, H., and Decristan, J. (2021). Does what you get depend on who you are with? Effects of student composition on teaching quality. *Learn. Instr.* 71:101355. doi: 10.1016/j.learninstruc.2020.101355

Fauth, B., Decristan, J., Rieser, S., Klieme, E., and Büttner, G. (2014). Student ratings of teaching quality in primary school: dimensions and prediction of student outcomes. *Learn. Instr.* 29, 1–9. doi: 10.1016/j.learninstruc.2013.07.001

Federkeil, L., Heinschke, F., Jungmann, T., and Klapproth, F. (2020). Teachers experiences of stress and their coping strategies during COVID-19 induced distance teaching. *J. Pedagog. Res.* 4, 444–452. doi: 10.33902/JPR.2020062805

Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics: And Sex and Drugs and Rock "n" Roll. 4th Edn*. Los Angeles London New Delhi Singapore Washington DC: Sage

Hackman, J. R., and Oldham, G. R. (1975). Development of the job diagnostic survey. *J. Appl. Psychol.* 60, 159–170. doi: 10.1037/h0076546

Hammerstein, S., König, C., Dreisörner, T., and Frey, A. (2021). Effects of COVID-19-related school closures on student achievement-a systematic review. *Front. Psychol.* 12:746289. doi: 10.3389/fpsyg.2021.746289

Hampton, D., Culp-Roche, A., Hensley, A., Wilson, J., Otts, J. A., Thaxton-Wiggins, A., et al. (2020). Self-efficacy and satisfaction with teaching in online courses. *Nurse Educ.* 45, 302–306. doi: 10.1097/NNE.0000000000000805

Hascher, T., Beltman, S., and Mansfield, C. (2021). Swiss primary teachers' professional well-being during school closure due to the COVID-19 pandemic. *Front. Psychol.* 12:687512. doi: 10.3389/fpsyg.2021.687512

Hattie, J. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. London, UK: Routledge.

Hong, X., Liu, Q., and Zhang, M. (2021). Dual stressors and female pre-school teachers' job satisfaction during the COVID-19: the mediation of work-family conflict. *Front. Psychol.* 12:691498. doi: 10.3389/fpsyg.2021.691498

Jaekel, A.-K., Scheiter, K., and Göllner, R. (2021). Distance teaching during the COVID-19 crisis: social connectedness matters most for teaching quality and students' learning. *AERA Open* 7:233285842110520. doi: 10.1177/23328584211052050

Katebi, A., HajiZadeh, M. H., Bordbar, A., and Salehi, A. M. (2022). The relationship between "job satisfaction" and "job performance": a Meta-analysis. *Glob. J. Flex. Syst. Manag.* 23, 21–42. doi: 10.1007/s40171-021-00280-y

Kim, L. E., Dundas, S., and Asbury, K. (2021a). 'I think it's been difficult for the ones that haven't got as many resources in their homes': teacher concerns about the impact of COVID-19 on pupil learning and wellbeing. *Teach. Teach.* 1–16, 1–16. doi: 10.1080/13540602.2021.1982690

Kim, L. E., Leary, R., and Asbury, K. (2021b). Teachers' narratives during COVID-19 partial school reopenings: an exploratory study. *Educ. Res.* 63, 244–260. doi: 10.1080/00131881.2021.1918014

Klassen, R. M., and Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: teacher gender, years of experience, and job stress. *J. Educ. Psychol.* 102, 741–756. doi: 10.1037/a0019237

Klassen, R., Wilson, E., Siu, A. F. Y., Hannok, W., Wong, M. W., Wongsri, N., et al. (2013). Preservice teachers' work stress, self-efficacy, and occupational commitment in four countries. *Eur. J. Psychol. Educ.* 28, 1289–1309. doi: 10.1007/s10212-012-0166-x

Klieme, E., Pauli, C., and Reusser, K. (2009). "The Pythagoras study. Investigating effects of teaching and learning in Swiss and German mathematics classrooms" in *The Power of Video Studies in Investigating Teaching and Learning in the Classroom*. ed. T. Janik (Münster: Waxmann), 137–160.

Klusmann, U., Aldrup, K., Roloff, J., Lüdtke, O., and Hamre, B. K. (2022). Does instructional quality mediate the link between teachers' emotional exhaustion and student outcomes? A large-scale study using teacher and student reports. *J. Educ. Psychol.* 114, 1442–1460. doi: 10.1037/edu0000703

Klusmann, U., Kunter, M., Trautwein, U., Lüdtke, O., and Baumert, J. (2008). Teachers' occupational well-being and quality of instruction: the important role of self-regulatory patterns. *J. Educ. Psychol.* 100, 702–715. doi: 10.1037/0022-0663.100.3.702

Klusmann, U., Richter, D., and Lüdtke, O. (2016). Teachers' emotional exhaustion is negatively related to students' achievement: evidence from a large-scale assessment study. *J. Educ. Psychol.* 108, 1193–1203. doi: 10.1037/edu0000125

König, J., Jäger-Biela, D. J., and Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *Eur. J. Teach. Educ.* 43, 608–622. doi: 10.1080/02619768.2020.1809650

Korpershoek, H., Harms, T., de Boer, H., van Kuijk, M., and Doolaard, S. (2016). A Meta-analysis of the effects of classroom management strategies and classroom management programs on students' academic, behavioral, emotional, and motivational outcomes. *Rev. Educ. Res.* 86, 643–680. doi: 10.3102/0034654315626799

KULTUSMINISTERKONFERENZ (2020). Corona-Pandemie. Rahmen für aktualisierte Infektionsschutz- und Hygienemaßnahmen. Berlin, Germany. Available at: https://www.bildungsserver.de/onlineressource.html?onlineressourcen_id=61778

Kunter, M., Baumert, J., and Köller, O. (2007). Effective classroom management and the development of subject-related interest. *Learn. Instr.* 17, 494–509. doi: 10.1016/j.learninstruc.2007.09.002

Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., Hachfeld, A., et al. (2017). Dokumentation der Erhebungsinstrumente der Projektphasen des BilWiss-Forschungsprogramms von 2009 bis 2016. Bildungswissenschaftliches Wissen und der Erwerb professioneller Kompetenz in der Lehramtsausbildung (BilWiss). Die Bedeutung des bildungswissenschaftlichen Hochschulwissens für den Berufseinstieg von Lehrkräften (BilWiss-Beruf). Available at: https://nbnresolving.org/urn:nbn:de:hebis:30:3-428005

Kunter, M., and Trautwein, U. (2013). *Psychologie des Unterrichts*. Paderborn: Germany.

Kunter, M., and Voss, T. (2011). Das Modell der Unterrichtsqualität in COACTIV: Eine multikriteriale Analyse Prof. Kompet. Von Lehrkräften Ergeb. Forschungsprogramms COACTIV, 85–113.

Lipowsky, F., Rakoczy, K., Pauli, C., Drollinger-Vetter, B., Klieme, E., and Reusser, K. (2009). Quality of geometry instruction and its short-term impact on students' understanding of the Pythagorean theorem. *Learn. Instr.* 19, 527–537. doi: 10.1016/j.learninstruc.2008.11.001

Mahmood, F., Ariza-Montes, A., Saleem, M., and Han, H. (2021). Teachers' teleworking job satisfaction during the COVID-19 pandemic in Europe. *Curr. Psychol.* 42, 8540–8553. doi: 10.1007/s12144-021-02355-6

Maslach, C. (2003). Job burnout: new directions in research and intervention. *Curr. Dir. Psychol. Sci.* 12, 189–192. doi: 10.1111/1467-8721.01258

Maslach, C., Jackson, S. E., and Leiter, M. P. (1996). *MBI: Maslach Burnout Inventory*. Palo Alto, CA: Consulting Psychologists Press

Meyer, B., Zill, A., Dilba, D., Gerlach, R., and Schumann, S. (2021). Employee psychological well-being during the COVID-19 pandemic in Germany: a longitudinal study of demands, resources, and exhaustion. *Int. J. Psychol.* 56, 532–550. doi: 10.1002/ijop.12743

Moorhouse, B. L., and Kohnke, L. (2021). Thriving or surviving emergency remote teaching necessitated by COVID-19: university teachers' perspectives. *Asia-Pac. Educ. Res.* 30, 279–287. doi: 10.1007/s40299-021-00567-9

Moss, G., Allen, R., Bradbury, A., Duncan, S., Harmey, S., and Levy, R. (2020). Primary teachers' experience of the COVID-19 lockdown – Eight key messages for policymakers going forward. UCL Institute of Education Available at: https://discovery.ucl.ac.uk/id/eprint/10103669/1/Moss_DCDT%20Report%201%20Final.pdf (Accessed June 1, 2022).

OECD (2020). "Strengthening online learning when schools are closed—OECD," in OECD policy responses to coronavirus (COVID-19) (OECD). Available at: https://read.oecd-ilibrary.org/view/?ref=136_136615-o13x4bkowa&title=Strengthening-online-learning-when-schools-are-closed (Accessed June 24, 2021).

Praetorius, A.-K., Klieme, E., Herbert, B., and Pinger, P. (2018). Generic dimensions of teaching quality: the German framework of three basic dimensions. *ZDM* 50, 407–426. doi: 10.1007/s11858-018-0918-4

Pressley, T., Ha, C., and Learn, E. (2021). Teacher stress and anxiety during COVID-19: an empirical study. *Sch. Psychol. Forum* 36, 367–376. doi: 10.1037/spq0000468

Prime, H., Wade, M., and Browne, D. T. (2020). Risk and resilience in family well-being during the COVID-19 pandemic. *Am. Psychol.* 75, 631–643. doi: 10.1037/amp0000660

Reusser, K. (2022). Lernen konstruktiv unterstützen und begleiten: zur fachpädagogischen Rolle von Lehrpersonen. In: Herrmann, Ulrich; Müller, Kathrin. Lernlabor Schule: der Perspektivwechsel vom Unterrichten zum Lernen. (Weinheim: Beltz), 331–350.

Seidel, T., and Shavelson, R. (2007). Teaching effectiveness research in the past decade: the role of theory and research Design in Disentangling Meta-Analysis Results. *Rev. Educ. Res.* 77, 454–499. doi: 10.3102/0034654307310317

Shabbir, M., Jalal, H., and Naoreen, B. (2021). Online teaching, psychological state, and job satisfaction: teachers perspective during COVID-19 pandemic. *Turk. Online J. Dist. Educ.* 20, 358–364. doi: 10.17051/ilkonline.2021.02.37

Shoulders, C. W., Estepp, C. M., and Johnson, D. M. (2021). Teachers' stress, coping strategies, and job satisfaction in COVID-induced teaching environments. *J. Agric. Educ.* 62, 67–80. doi: 10.5032/jae.2021.04067

Sokal, L., Trudel, L. E., and Babb, J. (2020). Canadian teachers' attitudes toward change, efficacy, and burnout during the COVID-19 pandemic. *Int. J. Educ. Res. Open* 1:100016. doi: 10.1016/j.ijedro.2020.100016

Sonnenburg, N., Buddeberg, M., and Hornberg, S. (2022). The German school system in the COVID-19 pandemic era. *Tertium Comp.* 2022, 332–355. doi: 10.31244/tc.2022.03.05

Stachteas, P., and Stachteas, C. (2020). The psychological impact of the COVID-19 pandemic on secondary school teachers. *Psychiatr. Psychiatr.* 31, 293–301. doi: 10.22365/jpsych.2020.314.293

Steinmayr, R., Lazarides, R., Weidinger, A. F., and Christiansen, H. (2021). Teaching and learning during the first COVID-19 school lockdown: realization and associations with parent-perceived students' academic outcomes. *Z. Für Pädagog. Psychol.* 35, 85–106. doi: 10.1024/1010-0652/a000306

Stickney, L. T., Bento, R. F., Aggarwal, A., and Adlakha, V. (2019). Online higher education: faculty satisfaction and its antecedents. *J. Manag. Educ.* 43, 509–542. doi: 10.1177/1052562919845022

Teig, N., Scherer, R., and Nilsen, T. (2019). I know I can, but do I have the time? The role of teachers' self-efficacy and perceived time constraints in implementing cognitive-activation strategies in science. *Front. Psychol.* 10:1697. doi: 10.3389/fpsyg.2019.01697

Trauernicht, M., Oppermann, E., Klusmann, U., and Anders, Y. (2021). Burnout undermines empathising: do induced burnout symptoms impair cognitive and affective empathy? *Cognit. Emot.* 35, 185–192. doi: 10.1080/02699931.2020.1806041

Trinidad, J. E. (2021). Teacher satisfaction and burnout during COVID-19: what organizational factors help? *Int. J. Leadersh. Educ.* 0, 1–19. doi: 10.1080/13603124.2021.2006795

van de Werfhorst, H., Kessenich, E., and Geven, S. (2020). The digital divide in online education. Inequality in digital preparedness of students and schools before the start of the COVID-19 pandemic. SocArXiv [Preprint]. doi: 10.31235/osf.io/58d6p

van der Spoel, I., Noroozi, O., Schuurink, E., and van Ginkel, S. (2020). Teachers' online teaching expectations and experiences during the Covid19-pandemic in the Netherlands. *Eur. J. Teach. Educ.* 43, 623–638. doi: 10.1080/02619768.2020.1821185

van Horn, J. E., Taris, T. W., Schaufeli, W. B., and Schreurs, P. J. G. (2004). The structure of occupational well-being: a study among Dutch teachers. *J. Occup. Organ. Psychol.* 77, 365–375. doi: 10.1348/0963179041752718

Walker, M., Sharp, C., and Sims, D. (2020). Schools' responses to COVID-19: Job satisfaction and workload of teachers and senior leaders. National Foundation for Educational Research. Available at: https://eric.ed.gov/?id=ED608585 (Accessed March 22, 2022).

Weißenfels, M., Klopp, E., and Perels, F. (2022). Changes in teacher burnout and self-efficacy during the COVID-19 pandemic: interrelations and e-learning variables related to change. *Front. Educ.* 6:736992. doi: 10.3389/feduc.2021.736992

World Health Organization (2021). Considerations for school-related public health measures in the context of COVID-19. Available at: https://www.who.int/publications-detail-redirect/considerations-for-school-related-public-health-measures-in-the-context-of-covid-19 (Accessed September 18, 2022).

Yarmand, M., Solyst, J., Klemmer, S., and Weibel, N. (2021). "It feels like I am talking into a void": Understanding interaction gaps in synchronous online classrooms. in Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems CHI 21. (New York, NY, USA: Association for Computing Machinery), 1–9