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The relative effect of job demands, resources, and personal resources on teaching quality and students' engagement during the COVID-19 pandemic

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During the COVID-19 pandemic's school closures and the distance education that resulted from it, teachers were faced with an increasing workload and significant changes in their working environment. Because increased workload can result not only in worsened mental health and lower work motivation, but also in worsened learning outcomes, this article explores how teacher-perceived job demands, job resources, and personal resources are related to teachers' assessment of teaching quality and student engagement during the pandemic. Using the data of 1,422 8th grade teachers in Slovenia from the IEA Responses to Educational Disruptions Survey (REDS) survey, this study also explores the perceived level of support from different institutional actors and the utility of Job demands-resources model for this specific group of workers in a specific work setting. The results show that the teachers of 8th graders in Slovenia perceived a higher level of support from their closest working environment compared to the national bureaucracy. In terms of job demands, the increased workload in preparing the lessons had negative effect on both teaching quality and student engagement, while the reported increase in time spent on direct work with students and social support received (a job resource) contributed positively to both outcome variables. In line with theoretical expectations, personal resources were positive predictors of teaching quality and student engagement in our model. Compared with the initial expectations this study had based on the underlying theoretical model, the results paint a complex relationship between job characteristics and learning outcomes during distance learning. Thus, some of the challenges both teachers and policy-makers face and will continue to face in possible similar situations are discussed.

KEYWORDS

job demands, job resources, teachers, teaching quality, student engagement, job demands-resources model, COVID-19

1 Introduction

It is well established that work-related stress impacts job performance, motivation, and psychological well-being. In school settings specifically, worse performance that is related to a higher prevalence of teacher's work-related stress does not just impact the teacher (which is undesirable in itself), but it can also result in lower academic achievement of the students

(Madigan and Kim, 2021). The impact of teacher stress on student outcomes needs to be considered especially during social crises such as the recent pandemic. COVID-19-related public health measures have led to notable changes in both the workplace and in personal life, specifically increasing work-related and general stress (Jakubowski and Sitko-Dominik, 2021; Robinson et al., 2023). However, the experience of stress can be mitigated by physical, psychological, social, and/or organisational support. According to the job demand-resource model (Bakker and Demerouti, 2007), which serves as the theoretical foundation of the present study, different types of support can, in turn, be beneficial for achieving work-related goals, lowering job demands, supporting personal growth, learning, and development.

While many researchers focused on the students, research into teachers' work-related well-being during the pandemic is scarce (Pressley and Rangel, 2023). Thus, this study has two goals. First, it explores, using a high-quality representative sample, what support teachers received during the pandemic, how they perceived their work efficiency, and how these constructs are related. Second, this study tests the plausibility of an adapted job demands–job and personal resources model (adapted for the present study and available data) during the normative stress period in an "overlooked" (Fray et al., 2023) group of strained workers at the time of the pandemic. Finally, we explore whether different types of resources during distance learning are predictive of better teaching outcomes.

1.1 The impact of COVID-19 on the work of teachers

As the spread of COVID-19 reached a pandemic level, most countries introduced preventive measures in educational settings (UNESCO, 2020; UNESCO, UNICEF, and World Bank, 2020). In practice, these often meant swift and all-encompassing moves to distance learning with ill-defined timelines. In Slovenia, for example, the school closures were comparably long-lasting and happened with little-to-no preparation for either students, teachers, or schools (Ermenc et al., 2021; Klemenčič et al., 2022). Consequently, teachers faced challenges as they had to adapt to working from home, change their instructional methods and/or materials to fit remote learning, and deal with problems their students faced in terms of access and use of ICT – or learn how to use these tools themselves (Kasprzak and Mudło-Głagolska, 2022). All of this went over and above the stress teachers already experienced in their personal lives: for example, fear of infection, adverse psychological effects of social isolation, intensified care for their relatives, etc. (Ozamiz-Etxebarria et al., 2021). It is thus unsurprising that many teachers reported decreases in their occupational (Westphal et al., 2022) and psychological well-being (García-Álvarez et al., 2021).

While psychological well-being was important for teachers' functioning during the pandemic, the change in their work demands and tasks resulting in decreased occupational well-being is also detrimental to students' learning outcomes as it affects teachers' work performance (Skaalvik and Skaalvik, 2010; Wong et al., 2022). These findings are important for practitioners and policy-makers alike insofar as they are adapting the workplace to foster higher-occupational well-being. The empirical support for the links between teacher performance and student outcomes is well established (Darling-Hammond, 2000; Braun et al., 2019; Suhaini, 2020), but the findings are not readily generalisable to the pandemic disruptions – making the studies on teachers and their resources during the pandemic distance learning all the more pertinent.

In Slovenia specifically, teaching and learning took place remotely by using online instruction during the COVID-19 lockdowns. The expected decrease in learning outcomes due to the changed conditions of teaching and learning was also supported by the findings of the Responses to Educational Disruptions Survey (REDS), conducted in 2021 by the International Association for the Evaluation of Educational Achievement (IEA). That study showed that teachers in Slovenia are of the opinion that eighth-grade students they teach did not progress to the extent they would otherwise expect (Mirazchiyski and Klemenčič Mirazchiyski, 2023). Moreover, a vast majority of school principals in Slovenia (85%) are of the opinion that outcomes for all students have decreased to some degree or substantially decreased during COVID-19 lockdowns, and that this will have a lasting effect.

This lasting effect is not perceived equally for all students, however, as 89% of the school principals perceive that for low-achieving students, the outcomes have decreased even more than generally, and a total of 66% of the principals are of the opinion that the lasting effect (decrease in learning outcomes to some degree or substantially decreased) is prevalent for students from low-income families (Mirazchiyski and Klemenčič Mirazchiyski, 2023). These findings from the principal questionnaire are supported by school principals in most countries participating in REDS (Meinck et al., 2022). Although more optimistic than their teachers or administrators, eighth-grade students in Slovenia also tend not to perceive their learning outcomes favourably: close to four out of ten tend to disagree or strongly disagree they learned as much during the lockdown compared to the period before, even though over half of students (and close to half of the teachers) agree that during the lockdown, students' knowledge was graded higher than usual (Mirazchiyski and Klemenčič Mirazchiyski, 2023).

1.2 Distance teaching within the framework of job demands-resources model

Extant literature has already explored teachers' occupational well-being during the pandemic (Sokal et al., 2020; Karatuna et al., 2022; Manuti et al., 2022; Stang-Rabrig et al., 2022; Martí-González et al., 2023), but it did not explore the pandemic's potentially detrimental effects on the learning outcomes of students. This study focuses on how the changed job demands and resources of teachers during pandemic-related school closures were linked with self-perceived teaching quality and student engagement.

The exploration of these links stemmed from the job demands-resources model (JDR) (Bakker and Demerouti, 2007), which is used often in occupational research to describe the characteristics of the work environment that affect workers' physical and psychological health (occupational well-being), and work engagement that, in turn, lead to better working outcomes. The JDR classifies the working conditions as either demands or resources (Bakker and Demerouti, 2007, 2017). Job demands comprise physical, psychological, social, and organisational factors that may strain the individual and might result in negative outcomes. Job resources, on

the other hand, represent the characteristics of the job that facilitate and improve workers' performance and lead to positive outcomes such as higher commitment, motivation, and improved work performance (Schaufeli and Taris, 2014). Even though the resources can mitigate the negative effects of job demands, they are not necessarily directly linked to specific demands and include personal, psychological, social (e.g., social support; Kerksieck et al., 2019), and job-related resources (e.g., job autonomy; Bakker and Demerouti, 2007).

In terms of teaching during the pandemic and for the purposes of this study, job demands include adapting the existing teaching methods, tools, and the content of the lessons to distance learning, improvement of ICT skills of teachers, increased time load in responding to students and assisting them, a greater need to balance work and personal time, potentially suboptimal working conditions, and an increased need for various types of support to students and their parents (either instrumental or social). In extant studies, there job demands were found as leading to unfavourable outcomes for teachers and other workers such as increased efforts, cognitive irritation, informational overload, negative emotions, psychological distress, a lack of motivation, and work effectiveness decline (Day et al., 2010, 2012; Almpanis and Joseph-Richard, 2022; Kasprzak and Mudło-Głagolska, 2022; Gualano et al., 2023; Scheel et al., 2023). Meanwhile, research shows that job resources include pre-existing ICT skills and self-efficacy in distant teaching that facilitate the move to distance learning and prevent burnout (Westphal et al., 2022), previous experience with distance learning (van der Spoel et al., 2020; Pozo et al., 2022) and with teaching in general (Cheptea et al., 2021), support received by the colleagues and school management (either material, organisational, or emotional; Prado-Gascó et al., 2020; Awada et al., 2021; Khan et al., 2022; Ong and Sulaiman Khan, 2022; Stang-Rabrig et al., 2022; Sudibjo and Manihuruk, 2022), and psychological characteristics such as resilience, positive self-perceptions (e.g., competence), and emotional regulation (Restubog et al., 2020; Manuti et al., 2022; Pečjak and Pirc, 2022; Scheibe et al., 2022).

Researchers using the JDR model have repeatedly noted its validity in explaining the influences of the pandemic on the well-being of the workforce in general (Scheel et al., 2023), and teachers' (occupational) well-being before (Granziera et al., 2021) and during the pandemic (Sokal et al., 2020; Karatuna et al., 2022; Manuti et al., 2022; Stang-Rabrig et al., 2022; Martí-González et al., 2023). In Italy for example, job resources fostered teachers' personal resources (self-efficacy and resilience), and teachers' personal responses contributed to lower emotional exhaustion (Manuti et al., 2022). Similarly, various job resources such as support from colleagues and previous ICT usage contributed to lower stress and less exhaustion, while improving job satisfaction in teachers in Germany (Stang-Rabrig et al., 2022).

Conversely, job demands had a varying relationship with the observed outcomes in this sample: if the challenges were perceived as positive, this improved job satisfaction and lowered exhaustion, but hindrances had negative effects (Stang-Rabrig et al., 2022). Although some studies showed a positive impact of the length of previous teaching experience (which is strongly correlated with teacher age) on psychological well-being during the pandemic (Cheptea et al., 2021), findings on the effects of age on stress levels related to working from home during the pandemic are not consistent as work motivation, position in the organisational hierarchy, and other personal and demographic characteristics also vary with workers' age (Seva et al., 2021) and with workers' reactions to the transition to working from home (De Andres-Sanchez et al., 2023). Research in the general population has shown that older workers perceive lower stress levels and more productive stress coping strategies (Hertel et al., 2013), which could lead to higher productivity of older workers under the changing working conditions during the pandemic (Awada et al., 2021). On the other hand, the complexity of individuals' changing factors during their lifespan development and, at the same time, working conditions (demands and resources) might be more likely to lead to a non-linear relationship between age and work-related outcomes, as is confirmed in a large sample of workers for the relationship between age and total burnout score (Marchand et al., 2018).

1.3 The present study

The aim of the present study is to describe and explain in detail the factors that played an important role in the quality of teaching as a key work outcome on the part of teachers and in student engagement as a key factor in the interactive teaching process on the part of students during the COVID-19 pandemic and the associated transition to work at home and distance learning. The simultaneous study of student and teacher outcomes within the framework of REDS is the aspect that can contribute significantly to the current understanding of the work and learning process during distance education. Although many studies confirm the role of perceived support in pandemic-related distance-learning situations (Prado-Gascó et al., 2020; Khan et al., 2022; Ong and Sulaiman Khan, 2022; Stang-Rabrig et al., 2022; Sudibjo and Manihuruk, 2022), these studies have focused on the role of social and organisational support. The present study, however, analyses the concept of support in more detail, thus also enabling important concrete information needed for the development of policies and practices of teaching and supporting teachers in situations that require an entirely new way of teaching and engaging students. The research model used in this study is based on a simplified JDR model (Bakker and Demerouti, 2007, 2017) and previous studies on work motivation and work stress on general population and of teachers during COVID-19 pandemic; this model is presented in Figure 1.

In terms of the variables we included in the model, workload is one of the most commonly identified job stressors (Colligan and Higgins, 2006). This represents a job demand because it requires workers to exert extra effort that interferes with the ability to recover from job demands, especially in the long term (Rodriguez-Muñoz et al., 2012). During the COVID-19 pandemic, workload was one of the most important job demands for teachers (Kim et al., 2022). This resulted from several sources: frequent changes in authority decisions, rules, and regulations, additional tasks, and intensification of ordinary tasks (Fray et al., 2023). In the present study, we operationalise teachers' workload by the amount of time they spend on each of the main tasks they perform in relation to their students. We anticipated that higher workload, which translates into more time spent on tasks, would be negatively related to the quality of teaching and student engagement. Indeed, previous studies confirmed that teacher stress has a negative impact on student engagement and performance (Madigan and Kim, 2021). Therefore, we expected that:

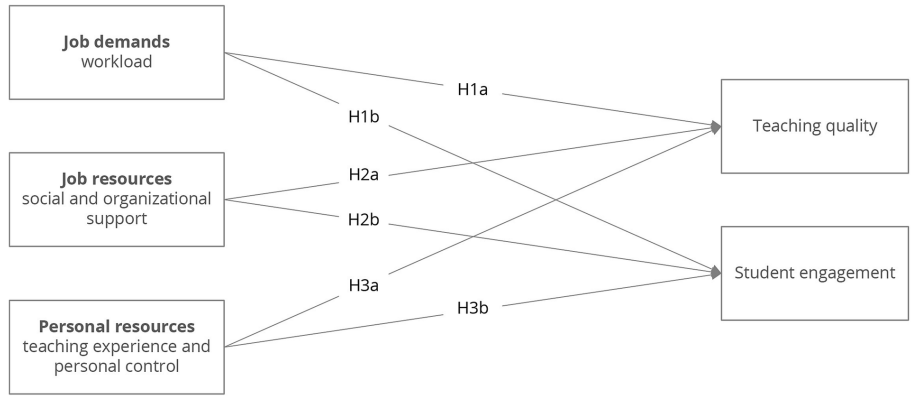

FIGURE 1
The proposed research model with hypotheses.

> *H1*a: Job demands (perceived teachers' workload) are negatively related to perceived teaching quality.

> *H1*b: Job demands (perceived teachers' workload) are negatively related to teachers' perceptions of students' engagement.

Job resources, on the other hand, are "physical, psychological, social or organisational aspects of the job" (Demerouti and Bakker, 2011, p. 2) that support employees in work performance, reduce job demands, and promote individual development (Bakker et al., 2014). The various forms of social support promote motivation and job performance as they impact the satisfaction of the individual's needs, such as the need for belonging, relationships, and acceptance in the work environment (Bakker and Demerouti, 2007). In addition, social support also buffers the negative effects of job demands; it moderates the relationship between stressors and well-being, and other work-related outcomes (Bakker and Demerouti, 2007). In the work and organisational psychology literature, the positive impact of organisational support and general social support in the work environment on workers' well-being, motivation, and performance is well established (Latham and Pinder, 2005; Ciobanu et al., 2019), including for the teacher population during the COVID-19 pandemic (Prado-Gascó et al., 2020; Khan et al., 2022; Ong and Sulaiman Khan, 2022; Stang-Rabrig et al., 2022; Sudibjo and Manihuruk, 2022). We thus also expected that:

> *H2*a: Job resources (socio-emotional support and organisational support) are positively related to perceived teaching quality.

Next, different forms of social support (instrumental, informational, emotional, companionship, and validation; Lakey and Cohen, 2000) empower people in their daily lives and work. Several studies confirmed this role of social support in teachers' work and its benefits for students (Cheon et al., 2020; Kwon et al., 2022; Sjöblom et al., 2023). Therefore, we expected that:

> *H2*b: Job resources (socio-emotional support and organisational support) are positively related to teachers' perceptions of students' engagement.

Finally, personal resources are individual characteristics that, much like job resources, partially buffer or mediate the negative effects of job demands on work stress (Bakker and De Vries, 2021), although their role in relation to job resources is complex and there may be reciprocal causal relationships (Demerouti and Bakker, 2011). In this study, we operationalised personal resources as general individual characteristics that could be identified and influenced by interventions in the general teacher population: teaching experience and perceived control. Both characteristics can be improved through tailored interventions at the individual, school, and education system level, for example, a mentoring system for beginners (Evertson and Smithey, 2000). Teachers' experience with teaching and distance learning were found to be an important predictor of teachers' work efficiency during the pandemic (Cheptea et al., 2021; Pozo et al., 2022). Especially in times of crisis, uncertainty and risk, perceived control over the situation is one of the constructs that has an important role of buffering the effects of negative situational elements and individual's behaviour (Brown et al., 2020). Therefore, we expected that both variables representing personal resources are positively related to teaching quality and students' engagement:

> *H3*a: Personal resources (teaching experience and perceived control) are positively related to perceived teaching quality.

> *H3*b: Personal resources (teaching experience and perceived control) are positively related to teachers' perceptions of students' engagement.

2 Materials and methods

2.1 Data

This study uses data from the IEA REDS study. As of April 2020, about 90% of the schools worldwide were closed and remote learning, where possible, was implemented. By August 2020 and across 108 countries, students had missed about 10 weeks of face-to-face instruction. Remote learning was not implemented flawlessly due to

the unequal availability of the Internet at student homes, learning resources, as well as digital devices, home support, and familiarity with remote teaching among the teachers, etc., (Meinck and Fraillon, 2022). Given these challenges, there was not a comprehensive and representative cross-national study to investigate the variation in national policies, implementation, and consequences of the rapid changes imposed by the pandemic. REDS fills this research gap by investigating how teaching and learning were affected by the school disruptions imposed by the COVID-19 pandemic and by the mitigation measures that took place in different countries and regions around the world. REDS also investigates students' opportunities to learn in the pandemic conditions. REDS' data collection took place between December 2020 to July 2021.

A total of 11 countries participated: Burkina Faso, Denmark, Ethiopia, India, Kenya, the Russian Federation, Rwanda, Slovenia, the United Arab Emirates, Uruguay, and Uzbekistan (Meinck and Fraillon, 2022). Due to the different timing when the school closures took place, REDS had to define a period to which the study refers to; this is defined as the "period of time in a country after the beginning of the pandemic, during which most schools were closed for the majority of students, and teaching and learning took place mostly outside of school buildings" (Fraillon and Stancel-Piątak, 2022, p. 10). For Slovenia, the reference period is defined as between March 16 and June 3, 2020 (Meinck et al., 2022), and this period is further defined as the "first wave of school closures due to COVID-19" (Klemenčič et al., 2022), while schools were closed and distance teaching and learning occurred several times over the duration of the pandemic, including the following school year (albeit for shorter periods of time).

REDS had eight research themes (Fraillon and Stancel-Piątak, 2022). Due to the focus of the present study, the analyses employ data from three themes: teacher background (Theme 2), impact on classroom teaching and learning (Theme 3), and well-being (Theme 7). REDS instruments include student questionnaire, teacher questionnaire, and school questionnaire (normally filled in by the school principal). Each of these questionnaire collects data on all eight themes according to the research questions of the study. There is one additional questionnaire (school system questionnaire) which is completed under the oversight of the country's national research centre (Meyer et al., 2022).

REDS uses a two-stage stratified random sampling with probability proportional to the size (PPS) of the primary sampling units (schools). Schools were sampled at the first sampling stage with PPS. A minimum of 150 schools per country were sampled. Students and teachers were sampled at the second sampling stage. In Slovenia, a whole class of students was sampled in each sampled school from all available grade 8 classes. The sampled teachers are not necessarily the teachers of the sampled students and, thus, constitute a representative sample of grade 8 teachers across Slovenia. In each school, 20 teachers teaching grade 8 students were sampled and, in the case there were fewer than 20 teachers teaching grade 8 students, all of them were selected (Meyer et al., 2022).

Due to the complex sampling design of REDS (unequal sampling probability, cluster sampling), the usual statistical procedures do not apply when computing estimates and standard errors. The provided sampling weights must be used to obtain population estimates and replication techniques are needed to obtain correct standard errors for these estimates. REDS uses Jackknife Repeated Replication (JRR) where all schools are sorted by their measure of size (MoS) and pairs of schools are assigned to jackknifing zones. In an analysis, the weight of one of the schools in the first zone is doubled and the weight of the other school is set to zero, then the estimate is computed. The weights in the first zone are then recovered and the procedure is repeated with the second zone. This iterative procedure is repeated as many times as the number of the available zones. After that, the estimates from all zones are aggregated to compute the standard errors (Meyer et al., 2022). All estimates in the present study are computed using the teacher total weights (see also statistical analyses).

2.2 Procedure

After finalizing the sample (1st stage), the sampled schools were contacted at the end of 2020 to select school coordinators (one per school) who would work with the REDS National Research Center (Educational Research Institute, Ljubljana) on various administrative tasks, including defining the testing date. The school coordinators prepared anonymized teachers' listing forms, which were then sent back to the national center for the purpose of teachers sampling (2nd level sampling). Data from teachers were collected via IEA's OSS online system, beginning on February 26, 2021. Due to technical issues, however, data collection was temporarily halted twice for a few days.

Teachers were given 1 week to complete the questionnaire, typically starting from the day the survey was conducted in their school for their students. Subsequently, the national center sent reminders to the coordinators since there was no access to teachers' details and e-mail addresses due to anonymization. The coordinators were responsible for reminding teachers who had not yet filled in the questionnaire, using codes (sent to them from the national research center which had an oversight over data collection) from the teachers' listing forms. The final date for data collection was April 9, 2021.

While it typically took approximately 30 min to complete the questionnaire, there was no strict time limit imposed on teachers. All schools and respondents had access to the REDS Data Protection and Anonymization Statement (GDPR-compliant), which provided detailed information on data collection, storage, processing procedures, the possibility of deleting data from the database, etc.

2.3 Participants

The Slovenian teacher sample in REDS comprises 1,422 teachers of Grade 8 students. As the sample is representative for the population of teachers teaching grade 8 students, the population estimate is 5,868 teachers in the target grade. Of these 1,113 (population estimate of 4,548) were female (77.5%) and 309 (population estimate of 1,320) were male (22.5%). Most of them were between 40 and 49 years old (37.8%), 27.1% were 50–59, 22.6% were 30–39, 10.0% were over 60, and 2.47% were 25–29 years old. Almost a half of them had over 20 years of teaching experience (45.5%), followed by 35.22% who had between 11 and 20 years of teaching experience. Most were employed full time (95.9%), and they taught a range of subjects, which were roughly equally distributed between the different areas (see Supplementary material for detailed information).

2.4 Measures

Because REDS data do not provide "traditional" (validated) psychological scales from the administered questionnaires, the items that correspond to each of the constructs of interest were selected first, and second, the psychometric properties of these *ad-hoc* scales were tested (see the Statistical Analyses section for detailed description of the analysis process). The description of the scales' construction for this study in testing the proposed model can be found below and the full item wordings are available in the supplementary material.

2.4.1 Job demands

The job demands scale was constructed using first exploratory (EFA) and then confirmatory factor analyses (CFA). The participants rated, for eight work tasks (see Table 1), the change in time they spent on each of the tasks (workload) during the school closures compared to the pre-pandemic time using a 5-point rating scale (1 – *substantially increased*, 3 – *did not change*, 5 – *substantially decreased*). The EFA suggested that the items group into two factors, which was then supported using CFA (see Supplementary material for more details on EFA). The final scale thus comprises two factors (subscales): the first subscale ("Preparing the lessons") relates to the changes in time spent on various tasks related to preparing the lessons (4 items, e.g., "*Modifying work to suit the needs of individual students*") and the second subscale ("*Executing the lessons*") to the changes in time spent on executing the lessons (4 items, e.g., "*Assisting students on a one-on-one basis*"). The two-factor solution of the job demands scale fit the data well ($\chi^2 = 64.14$, $df = 17$, $p < 0.001$, CFI = 0.97, TLI = 0.94,

TABLE 1 Descriptive statistics for the items used in computing the scale results.

	M	SE_M	*SD*	Min.	Max.	% Missing
Teaching quality						
Curriculum content with no change	2.17	0.02	0.66	1	4	5.54
Curriculum content at the same pace	1.85	0.02	0.65	1	4	5.79
Curriculum content relating to practical skills	2.25	0.02	0.72	1	4	6.12
Enough content to meet Curriculum requirements	3.06	0.02	0.59	1	4	5.54
Student engagement						
Attendance	2.50	0.03	0.76	1	5	6.43
Engagement	1.98	0.03	0.83	1	5	6.28
Motivation	2.10	0.03	0.81	1	5	6.49
Amount of work produced	2.04	0.03	0.84	1	5	6.11
Preparing the lessons (JD)						
Preparing lessons for the whole class	4.58	0.02	0.65	1	5	5.84
Modifying work for individual students	4.25	0.03	0.78	1	5	6.13
Modifying teaching activities	4.19	0.02	0.77	1	5	6.14
Looking for new teaching materials/activities	4.63	0.02	0.64	1	5	6.08
Executing the lessons (JD)						
Using school-provided materials	2.76	0.04	1.15	1	5	6.84
Assisting students on a one-on-one basis	3.83	0.04	1.06	1	5	6.21
Assessing student learning	3.68	0.03	1.17	1	5	6.19
Grading student work	2.62	0.05	1.45	1	5	6.23
Social and emotional support (JR)						
Finding assistance to support my well-being	3.01	0.03	0.72	1	4	7.71
Needed assistance to support my well-being	2.59	0.03	0.84	1	4	7.79
Had time to interact socially with colleagues	2.54	0.03	0.82	1	4	7.80
I felt isolated whilst working at home	2.72	0.03	0.87	1	4	7.89
Organizational support (JR)						
School leadership	3.21	0.04	0.75	1	4	5.58
Colleagues	3.38	0.02	0.57	1	4	5.68
Ministry of Education, Science, and Sport	2.06	0.04	0.85	1	4	5.94
Sufficient support mechanisms offered the school	2.85	0.03	0.69	1	4	5.68
Perceived control (PR)	2.17	0.02	0.70	1	5	7.74

Teacher total weights were used (see Data section for a detailed explanation) and some scores were reversed so higher mean score always represents higher agreement with the item. JD, job demands; JR, job resources; PR, personal resources.

RMSEA = 0.058, 90% CI [0.044, 0.074], SRMR = 0.039), and both factors had sufficient internal reliability (ω = 0.76 and 0.75 for planning and executing, respectively).

2.4.2 Social and emotional support

The participants reported their agreement to four items related to social and emotional support they received during the school closures (e.g., *"I felt isolated whilst working at home"*) using a 4-point rating scale (1 – *strongly agree*, 4 – *strongly disagree*). Two of the items were reverse-coded, and the resulting scale had satisfactory fit to the data ($\chi^2 = 0.82$, $df = 1$, $p = 0.365$, CFI = 0.99, TLI = 0.99, RMSEA = 0.000, 90% CI [0.000, 0.102], SRMR = 0.008) and internal reliability (ω = 0.55) given the relative diversity of the surveyed items.

2.4.3 Organisational support

As a measure of organisational support, four items were used where participants reported the support they were offered or received by the school leadership, colleagues, the state educational system, and the sufficiency of the support mechanisms offered by the school. The participants rated the items using a 4-point rating scale (1 – *strongly agree*, 4 – *strongly disagree*). The scale had a good fit to the data ($\chi^2 = 2.85$, $df = 1$, $p = 0.091$, CFI = 0.99, TLI = 0.99, RMSEA = 0.044, 90% CI [0.000, 0.107], SRMR = 0.012), but the items measuring support by colleagues and school leadership were significantly correlated and this covariance was estimated in the CFA model. The internal reliability of the scale was also satisfactory (ω = 0.80).

2.4.4 Perceived control

To measure perceived control, the participants rated their agreement to the item "*I felt in control of my working environment when I was working from home*" using a 4-point scale (1 – *strongly agree*, 4 – *strongly disagree*). While this measure was rather crude as it comprises a single item, it can be assumed to have good face validity in the present study.

2.4.5 Teaching experience

For the lack of more appropriate items, we used the duration of participants' teaching experience as a proxy for their overall experiences with different situations that one may encounter during work. Their teaching experience was rated on a six-point scale (less than 1 year, 1–2 years, 3–5 years, 6–10 years, 11–20 years, more than 20 years).

2.4.6 Teaching quality

To assess teaching quality, participating teachers reported whether they were able to follow the curriculum content without change as compared to the pre-pandemic times, whether they delivered it at the same pace, whether they met the curriculum requirements, and whether they delivered the content related to practical skills and activities. The responses were given along a 4-point scale (1 – *strongly agree*, 4 – *strongly disagree*). The scale had an adequate fit to the data after estimating the covariance between the first two items ($\chi^2 = 4.13$, $df = 1$, $p = 0.042$, CFI = 0.99, TLI = 0.97, RMSEA = 0.061, 90% CI [0.009, 0.127], SRMR = 0.012), and was sufficiently reliable (ω = 0.76).

2.4.7 Student engagement

Teachers' assessment of student engagement was measured using four items regarding the change in attendance, learning, engagement during lessons, and the amount of work students produced during distance learning compared to the time before the onset of the pandemic. The participating teachers rated each item on a 5-point scale (1 – *substantially increased*, 3 – *did not change*, 5 – *substantially decreased*). The responses were reverse coded to aid the interpretation. The scale had a good reliability (ω = 0.86) and adequate fit to the data ($\chi^2 = 19.66$, $df = 2$, $p < 0.001$, CFI = 0.99, TLI = 0.96, RMSEA = 0.103, 90% CI [0.065, 0.146], SRMR = 0.020).

2.5 Statistical analyses

To test the structure validity of the constructed scales, confirmatory factor analysis with robust maximum likelihood estimator was used; we imputed missing values using full information maximum likelihood (FIML) method. To assess the model fit, we used various fit-indices: χ^2, root-mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI), and standardized root mean squared residual (SRMR). After testing the quality of the scales, a measurement model to account for potential cross-loading of items on different scales was tested as well. In estimating the measurement model, the jack-knifed replicated total teacher sampling weights (TOTWGTT) was used. The measurement model had an adequate fit to the data ($\chi^2 = 913.29$, $df = 269$, $p < 0.001$, CFI = 0.91, TLI = 0.90, RMSEA = 0.044, 90% CI [0.041, 0.047], SRMR = 0.046), and latent scores from this model were used in the estimation of the structural model.

The psychometric analyses of the scales were followed by descriptive and correlational analyses of the selected measures. Finally, the proposed path model (Figure 1), based on a simplified Job Resources-Demands Model, was tested using a maximum likelihood (ML) estimator. The proposed path model included three groups of predictors (job demands, job resources, and personal resources) that predicted two outcome variables (teaching quality and student engagement). The analyses were conducted in R (R Core Team, 2022) using RALSA (Mirazchiyski, 2021), lavaan (Rosseel, 2012) and psych (Revelle, 2023) packages. Weighted model estimates using Jackknife Repeated Replication and teacher total weights were obtained using survey (Lumley, 2023) and survey.lavaan (Oberski, 2014) packages.

3 Results

3.1 Teachers' assessment of their job characteristics and the relationships between the constructs

To provide an overview of the situation in which the proposed model will be explored, first some descriptive statistics for the constructs under study are provided in Table 1, and second their pairwise correlations are discussed (see Table 2). As the aggregate scale scores (averages) tend to be less interpretable than item-level frequencies, the focus here is on the specific items, while frequencies are reported elsewhere (Klemenčič et al., 2022; Meinck et al., 2022).

On average, teachers reported spending more time on all four preparation activities (preparing lessons for the whole class, modifying the work to suit the needs of individual students, modifying teaching activities used before the onset of COVID-19, and looking for new

TABLE 2 Pairwise correlations between the constructs included in the study.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Preparing lessons	–						
(2) Executing lessons	0.76***	–					
(3) Social and emotional support	−0.27***	−0.06*	–				
(4) Organizational support	−0.13***	0.06*	0.60***	–			
(5) Teaching quality	−0.24***	0.11***	0.40***	0.28***	–		
(6) Student engagement	−0.09**	0.11***	0.22***	0.10***	0.61***	–	
(7) Teaching experience	−0.03	−0.07*	0.03	0.00	−0.04	0.09**	–
(8) Perceived control	−0.10***	−0.01	0.72***	0.29***	0.32***	0.19***	0.05

Pearson correlation coefficients between standardised factor scores are presented. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

teaching materials and activities). They also reported spending more time on providing individual help and assessing student learning on average but spending around the same amount of time on using the materials provided by the school and assessing students as before the pandemic (average scores close to the midpoint of the rating scale).

The teachers tended to agree with the statements regarding the receipt of support from the school management and colleagues (Table 1) but were neutral about the support received by the Ministry of Education, Science, and Sport and the sufficiency of the support mechanisms offered by the school. The participants also reported knowing where to seek help and support regarding their well-being but were more or less divided in their assessment of the other three well-being indicators (needing assistance, having time to interact socially with colleagues, and feeling isolated whilst working from home), wherein average scores were close to midpoint of the rating scale: in other words, between the options of agree and disagree.

In terms of their teaching quality, the participants tended to agree with the statement that they taught enough content to allow the students to reach the goals outlined in the curriculum, but the mean scores on the other three items were lower – especially for the item regarding the pace of teaching, wherein the participants tended to disagree. For student engagement, the mean scores were slightly below the centre point of the scale, suggesting that teachers tended to agree that attendance, motivation, enthusiasm, and class participation were all worse than before the pandemic.

Teachers who reported a rise in the time spent in preparation for the classes as compared to the time before the pandemic also tended to report more time spent in executing the lessons (Table 2). A rise in the workload (more time spent in preparing and/or executing the lessons) was related to lower socio-emotional and organisational support, and higher workload in preparing the lessons was also linked to worse teaching outcomes (curricular goal realisation and student engagement). On the other hand, more time spent executing the lessons was linked to slightly better outcomes.

Both types of support – socio-emotional and organisational – were related with better teaching outcomes. Teaching experience (considered a proxy for teachers' perceived competence), however, was unrelated to all the other constructs except for student engagement and social and emotional support. Those who taught for a longer time reported slightly higher student engagement but slightly lower socio-emotional support. Higher perception of control over the work environment was linked with slightly less intense experience of job demand in preparing the lessons but correlated positively with perceived socio-emotional and organizational support, teaching quality, and student engagement.

3.2 Testing the proposed model of teaching quality and student engagement

The model for predicting teaching quality and student engagement from job demands and resources is presented in Figure 2. It had good fit to the data ($\chi^2 = 12.15$, $df = 3$, $p = 0.007$, CFI = 0.99, TLI = 0.97, RMSEA = 0.050, 90% CI [0.023, 0.080], SRMR = 0.013). However, not all coefficients for the specified paths are statistically significant (organisational support and teaching experience to teaching quality and perceived control to student engagement). In estimating the overall fit of the model, these paths were removed to increase the number of degrees of freedom (the initial model was just-identified).

As expected, job demands and job resources contributed to both self-assessed teaching quality and student engagement, but the direction of the coefficients in each of the two groups of predictors varied. The increased workload in preparing for lessons – a job demand – contributed to worsened teaching quality ($\beta = -0.64$, $p < 0.001$) and lower student engagement ($\beta = -0.35$, $p < 0.001$), while increased workload in terms of executing the lessons had an inverse relationship with the outcome variables.

In terms of job resources, higher socio-emotional support was predictive of better teaching quality ($\beta = 0.19$, $p < 0.001$) and student engagement ($\beta = 0.23$, $p < 0.001$), while more organizational support was predictive of slightly worse student engagement ($\beta = -0.13$, $p < 0.001$). Perceived control over the working environment contributed to better teaching quality and more extensive teaching experience was predictive of better student engagement ($\beta = 0.13$, $p < 0.001$). The model explained around a third of the variance in teaching quality scores, while the share of variance explained for student engagement was modest ($R^2 = 0.14$).

4 Discussion

This study had two main objectives: first, to determine the perceived level of support from different institutional actors and second, to explore how different characteristics of work and personal resources of teachers have impacted their self-perceived teaching quality and engagement of students during pandemic-related distance

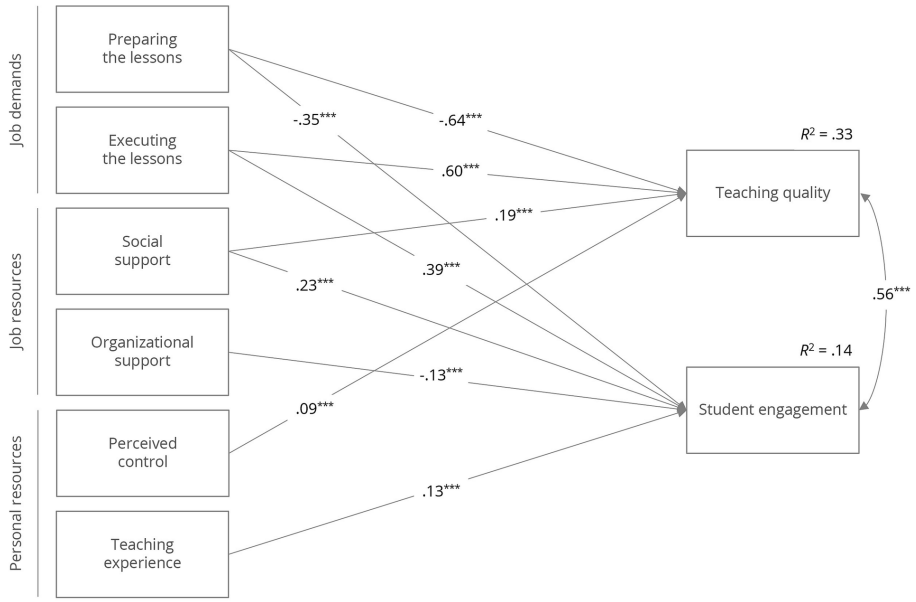

FIGURE 2
Path model of job demands and resources predicting teaching quality and student engagement. Only statistically significant paths are presented. All coefficients are standardized and significant at ***$p < 0.001$.

learning. Specifically, we stemmed our study from a simplified Job demands-resources model (Bakker and Demerouti, 2007) and proposed that job demands (the change in working conditions) would affect both outcome variables negatively, while job and personal resources would contribute favourably to teaching quality and student engagement.

Perceptions of support from key institutional actors are an important indicator of attitudes towards an individual actor and are the result of direct experiences with an individual actor – either in person or through the media, as well as indirectly through stories or attitudes people share in mutual relationships (Babnik et al., 2022). Especially in times of crisis, such as the COVID-19 pandemic, attitudes towards key institutional actors are an important predictor of emotional responses to the situation, as well as respect and compliance with behavioural instructions (Lep et al., 2020). The results of our study show that teachers at grade 8 In Slovenia perceived the highest level of support from the closest working environment – school colleagues and school management – but a lower level of support from the public institution: the (former) Ministry of Education, Science, and Sport (now the Ministry of Education).

Congruently, trust in political and professional institutions operating under the umbrella of ministries was lowest compared to less politically engaged actors in Slovenia during the pandemic (e.g., GPs; Lep et al., 2020). In contrast, school management and colleagues represent the closest, most direct working environment from which teachers received information, instructions, and sharing of experiences in this novel situation. Indeed, during the lockdown, teachers expressed the need for formal and informal support from colleagues and school management (Klusmann et al., 2022). Colleagues and school management were previously identified as the most important source of support teachers received (Hatzichristou et al., 2021) and colleague support was the most important buffering factor for teacher stress during the COVID-19 pandemic (Ong and Sulaiman Khan, 2022), although management support also played an important role in the work from home arrangements and work performance (Khan et al., 2022).

The results of this study regarding the perceived support from the Ministry of Education, Science, and Sport align with the generally less positive attitude of the population towards political institutions during the COVID-19 pandemic (Lep et al., 2020) and the conclusions of previous studies about the perceived supportive role of immediate institutional actors (colleagues and school management) in adapting to the new teaching and working situation (Khan et al., 2022; Ong and Sulaiman Khan, 2022).

Regarding the proposed model, however, the results of this study suggest that the relationships might be more complex than were expected. In constructing our work demands variable, the data suggested two distinct factors relating to the increased workload in preparing for the lessons and working directly with students, respectively. Both constructs show a qualitatively different relationship with teaching quality and student engagement. The increase in time spent preparing the lessons contributed both to lower perceived teaching quality and lower student engagement, while the increase in time spent executing the lessons had a positive relationship with both outcome variables, suggesting this increase acted as a resource (Demerouti and Bakker, 2011) contributing to teaching quality and student engagement. Perhaps commitment of time to teaching represented a personal and professional resource for teachers more broadly (e.g., having enough time to devote to the delivery of instruction) that strengthened them in their professional role during the time of crisis and a completely new work situation.

The findings, therefore, go against our expectations (*H1*a and *H1*b were thus not supported). In both cases, the absolute contribution to teaching quality was nearly doubled as compared to student engagement, which could suggest a stronger impact on this outcome variable. On the other hand, however, we must note that in case of

self-assessed teaching quality, both scores are within-person assessments (teachers were rating their workload and their work quality), while for student engagement, the teachers were assessing student behaviour, which could lower the correlation. Moreover, in assessing student engagement, teachers were asked to provide an overall assessment for all the students they taught, which likely increased the variability of their assessments and could further lower the correlation.

Next, it is important to consider the cross-sectional research design of REDS and, subsequently, this study, which does not allow any causal inferences. Thus, the increase in the workload in preparing the lessons – a situation increasing stress in teachers and leading to unfavourable outcomes – cannot be assigned as a (sole) cause of lower teaching quality and student engagement beyond the theoretical expectations stemming from the model. Alternatively, teachers who perceived their teaching and student engagement worsened during distance learning could try to mitigate these changes by spending more time thinking about how to work with students, seeking advice, and adapting the lessons.

Like with job demands, the results do not entirely support our expectations regarding the positive contribution of job resources to teaching quality (*H2*a) and student engagement (*H2*b). While socio-emotional support contributed positively to both outcomes, organisational support was linked negatively with student engagement and unrelated to the perception of teaching quality. Regarding socio-emotional support, our finding corroborates extant literature suggesting that positive interactions with colleagues (and the emotional and instrumental support workers receive) might ameliorate the impact of negative job characteristics (Kerksieck et al., 2019) and thus contribute to favourable outcomes.

In practical terms, teachers who were able to find support for their well-being and were feeling less isolated were likely less stressed and overwhelmed which allowed them to be more efficient in delivering the curriculum content and engaging the students during lessons, perhaps also because they had a more positive approach as a result of their higher well-being. As one of the items measuring socio-emotional support also pertained to socializing with colleagues, it is not unreasonable to expect that teachers who perceived higher socio-emotional support were also able to seek work-related advice more often (e.g., sharing good teaching practices, exchanging learning materials). Advice-seeking, in turn, could further improve both the teaching quality and student engagement. Indeed, teachers who reported receiving more socio-emotional support were also reporting lower increases in time spent preparing the lessons ($r = -0.27$, $p < 0.001$), which might suggest they took advantage of crowd-sourced learning resources instead of preparing the lessons entirely by themselves.

Conversely, the teachers who reported receiving more support from their colleagues and school leadership, for example, reported lower student engagement, which goes against our (theoretical) expectations (*H2*b) regarding the positive impact of this type of resource (Klusmann et al., 2022). Here, the research design of this study needs to be considered again. In practice, it might be that the teachers who had more trouble engaging their students were more likely to seek (and receive) organizational support from their colleagues while those perceiving adequate student engagement were not. These unexpected findings are not new in cross-national large-scale assessments and surveys. Another example is the negative relationship between homework and student achievement (i.e., students receiving more homework tend to perform poorer).

Besides the hierarchical level of the data and the presence of confounding variables which affect this relationship (see Dettmers et al., 2009), it could be that the students receiving more homework are lower achievers and are assigned homework to raise their outcomes, i.e., the homework is "reactive" on achievement. On the other hand, the pairwise correlations between the variables under study – the teachers who received more organizational support were spending less time preparing the lessons but perceived their teaching quality and personal control as higher – might suggest teachers in fact perceived they had lower work demands and were less anxious about their teaching. Our model, however, accounted for shared variance between predictors, and might thus point out the negative contribution to student engagement just for those who had more problems, while the positive and negative contributions to the teaching quality resulted in an insignificant regression path.

Another thing to consider is the quality of the (organisational) support received. While the assessment of quality was not part of the study (REDS was merely asking about its presence), it is possible that the teacher might be dissatisfied with the support, which could contribute to its varying relationship with the outcome variables, and it is conceivable that the support offered might be suboptimal given that the educational system as a whole was ill-prepared for the significant changes to distance learning (Ermenc et al., 2021). Indeed, the insignificant contribution of organisational support to outcome variables within the JDR model during the pandemic is not unprecedented (Karaca et al., 2022), making it an interesting avenue for future research.

Finally, personal resources, as defined by Bakker and Demerouti (2007, 2017), are an important factor in buffering occupational stress and improving work performance. In line with the initial expectations in this study, personal resources contributed positively to both outcome variables. Although the contribution was modest, perceived control over the working environment contributed to better perceived teaching quality and more extensive teaching experience was linked to higher student engagement (*H3*a was supported). Concurrently, teaching experience was not linked to teaching quality, which might be at least partially attributed to a non-linear relationship between the two constructs also resulting in insignificant pairwise correlation ($r = -0.04$, $p = 0.183$).

It can be speculated that more experienced teachers (who had more years of teaching experience) were likely older and might experience more challenges in using ICT and might find it harder to adapt their well-engrained teaching methods, which could contribute to lower teaching quality. If we observe pairwise correlations, teaching experience was not related to a perceived increase in job demands. From this data point, however, it is impossible to disentangle whether more experienced teachers did not perceive a higher workload because the workload increased equally across the board or because their experiences moderated an increase caused by the change to distance learning. Conversely, experienced teachers have more experience with engaging students and were previously found more likely to maintain in-class discipline (Martin and Shoho, 2000), corroborating the observed positive relationship with this outcome variable.

Moreover, extant studies confirm that prior experience with teaching and distance learning is indeed an important predictor of teacher performance during the COVID-19 pandemic (Cheptea

et al., 2021; Pozo et al., 2022). Situational control is a common psychological resource that prevents or mitigates the role of stressors on individuals' reactions and well-being (Brown et al., 2020). Perceptions of control also include a realistic perception of what individuals can and cannot control in each situation. Because distance education was introduced during the pandemic as a public health measure, acknowledging that motivation of students may vary more intensively during distance education was probably a source of teachers' situation-specific occupational trade-offs; that is, the acknowledgment that the teaching process and its effects cannot be identical to traditional education.

In regard to the insignificant relationship between perceived control and student engagement (refuting *H3*b), it must be noted that the item used to measure perceived control was related to the working environment and not about working with students *per se*. In practice, a teacher who felt in control of their own working expectations (and felt they were able to deliver the curriculum) might not feel the same level of control regarding their ability to control student engagement. To explore this association, though, we would need to use more nuanced measures. If we again point to the pairwise correlations, we can observe that the teachers who felt less in control spent more time preparing for lessons ($r = -0.12$, $p < 0.001$) but did not spend more time working with students.

Thus, it is more likely that more anxious teachers prepared more extensively for the lessons, which would have increased their workload, and, in turn their teaching quality or perception of their teaching quality. This mediational path, however, is speculative and should be tested in the future. On the other hand, an increase in time working with students was independent of perceived control, especially considering that the increase in time spent executing the lessons contributed positively to both outcome variables, and this points to the importance of also considering the possible interactions between job demands, job resources, and personal resources when evaluating teaching outcomes during distance learning, which is a central tenet of JDR model (Bakker and Demerouti, 2007, 2017).

Taken together, our findings offer some support for the premise that the Job demands-resources model can be applied beyond the occupational well-being of teachers during the pandemic to predict job outcomes. The tested model accounted for a significant portion of the variance in the teaching quality assessments ($R^2 = 0.33$), but contributed less to the reports of student engagement, which could partially be attributed to the different reference points in assessment and difficulty of retaining high levels of engagement in the pandemic conditions, even if teaching quality is high. That being said, the results also paint a more nuanced picture, suggesting that the contribution of either job demands or resources might not be uniform.

Indeed, this is in line with recent theoretical advances suggesting that during crises, the JDR model should be expanded (e.g., by considering the interplay of demands, resources, and strategies on different levels and how they interact with each other) as the situation is more complex as compared to the "normal" (i.e., pre-pandemic) working environment (Demerouti and Bakker, 2023). While REDS' data did not allow to test more complex model specifications due to the selection of variables, this might be an insightful direction for future research and (secondary) analyses of extant databases.

While greater effort put into teaching obligations can lead to better teaching, it could also be detrimental as the additional strain affects teachers' psychological and occupational well-being. At first glance, the results suggest that an increase in time teachers spend in direct work with students (executing the lessons) contributed more to teachers' self-perceived quality of teaching and student engagement, while the time spent on preparing the lessons was perceived as a strain. This finding might not be surprising as direct work with the students is perhaps more salient in teachers' assessments of the outcome variables; however, the execution of lessons is not possible without enough preparation. Because the job demands are diverse and not all contribute equally to adverse outcomes, the focus for policy-makers ought to be to direct support to teachers as it pertains to more challenging aspects of work demands, which would lead to better teaching outcomes and teacher well-being. In practice, however, it is hard to disentangle which job tasks are more important in terms of improving the teaching quality (this is further supported by the insignificant correlations between the two job demands variables in our study, $r = 0.76$, $p < 0.001$). Regardless, considering the support for the negative relationship between teachers' workload and worse psychological well-being (e.g., Almpanis and Joseph-Richard, 2022), it is important to balance job-related outcomes such as teaching quality and personal outcomes such as work-related stress and motivation.

4.1 Limitations and future research directions

This study has several strengths. Most importantly, it uses a nationally representative sample which offers robust and reliable results. Moreover, the study contributes to the literature by exploring the "behavioural" teaching outcomes. To the best of our knowledge, previous studies using the same theoretical foundations, sample of teachers, and COVID-19 induced changes in learning environment only focused on psychological impacts such as work motivation and stress. Thus, this study provides further support for the JDR model in various and diversely disrupted work settings.

Some of this study's limitations must be noted as well. This study is based on a secondary analysis of data collected previously, which presented some challenges. The original JDR model was not possible to test, but it had to be simplified and some of the variables had to be substituted. Similarly, REDS did not use predefined scales measuring the variables of interest, and these had to be constructed for the present study, which hinders comparability across studies and across countries – as the scales might not be equally valid and reliable in other countries included in the study. Still, the scales constructed for this study have good psychometric properties and offer sufficiently reliable estimates for the population in question, even if generalisation to teachers in other educational systems, or to all teachers in Slovenia (as they were not the target population), is not warranted.

This study also relied on subjective assessments of all the variables. For example, REDS data contains self-reported measures of teaching quality (subjective) and not directly observed (objective) behaviours. While this single-informant approach might result in higher reliability and ecological validity in assessments of predictor variables (the perception of control, for example, is inherently subjective), it might be less objective in the assessment of outcome variables. Thus, some of the relationships might be over-estimated due to the data collection approach, and future studies could benefit by collecting more reliable and objective measures of teaching outcomes. On the other hand,

however, the extant literature suggests that regardless of its objectivity, perception of self-efficacy is linked to better work outcomes (Heng and Chu, 2023).

In future studies, it would be informative to use the full JDR model and its modifications proposed for the pandemic setting (Demerouti and Bakker, 2023), and also to consider both personal and work outcomes within the same model (i.e., teaching outcomes, motivation, well-being). Furthermore, it would be interesting to observe how the three groups of predictors (namely job demands, job resources, and personal resources) are related to one another and how they interact in terms of moderation and mediation in more complex structural models. While the analytical approach in this study offers richer data than observing the pairwise correlations because our model accounts for shared variance between variables, the results paint a complex picture as is discussed in the previous section. For example, it is likely, based on the findings from this study, that both types of support contribute to higher perceived control of the working environment, which, in turn, contributes to better teaching outcomes, but this cannot be inferred empirically from the model we tested. Finally, from a scientific point of view, it would be interesting to apply a longitudinal approach to enable some (pseudo)causal relationships to emerge between observed variables – also in post-pandemic times.

Data availability statement

Publicly available datasets were analyzed in this study. This data can be found here: https://www.iea.nl/data-tools/repository/reds (IEA Data Repository).

Ethics statement

Ethical approval was not required for the study involving humans in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and the institutional requirements.

Author contributions

ŽL: Conceptualization, Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing. EK: Writing – review & editing. PM: Funding acquisition, Writing – review & editing.

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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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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1282775/full#supplementary-material

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