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Emotional exhaustion faced by Italian female teaching staff during COVID-19 pandemic: A sequential mediation model applying coping strategies, self-efficacy for online teaching, and technostress

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ABSTRACT

The study examines coping, tech attitudes, and burnout in 388 Italian female teachers during COVID-19. Results show coping predicts lower burnout via higher online teaching self-efficacy and lower technostress. Primary teachers report higher emotional exhaustion; older teachers experience more technostress. Findings emphasise the importance of coping strategies in reducing burnout, highlighting the need to enhance online teaching self-efficacy and address technostress. Training focusing on these aspects could effectively support teachers amid the pandemic and regular job stressors.

1. Introduction

Teaching is a stressful profession, given the high emotional stress teachers experience (Liljestrom et al., 2007; McCarthy et al., 2009; Richardson & Watt, 2007; Rumschlag, 2017; Skaalvik & Skaalvik, 2018). During the health pandemic period for COVID-19 infection, the daily job activities and demands for the teaching staff have been multiplied all at once (Chen et al., 2020; Ingusci et al., 2021; Panisoara et al., 2020; Silva et al., 2021). The pandemic context heightened the job stressors that caused teachers' emotional burden (Brunier & Drysdale, 2020). This scenario may be detected as the potential cause of languishing (Keyes, 2005), which is a state of mental distress in which mental illness and low well-being may occur.

Moreover, during the pandemic, the demands to use Information and Communication Technologies (henceforth ICTs), represented one of the main job stressors associated with the burnout experienced by teachers (Malik & Javed, 2021; Pozo-Rico et al., 2020; Upadyaya et al., 2021). The Job Demands-Resources (henceforth JD-R) model by Bakker and Demerouti (Bakker & Demerouti, 2007, 2024) is a robust theoretical framework whose pivotal assumption is that each job consists of demands and resources. Demands are (physical, psychological, or organisational) aspects of the job that require physical and/or psychological efforts, which, in turn, are associated with physiological and/or psychological costs; resources refer to (physical, psychological, or organisational) aspects of the job that are required to achieve job goals, to reduce demands-related costs, and/or to promote personal growth. Evidence showed that the JD–R model can predict burnout (e.g. Demerouti, Bakker, Nachreiner & Schaufeli, 2001; Schaufeli & Bakker, 2004). On teacher population, evidence (Gustems-Carnicer and Calderón, 2013) highlighted that teachers' resources used to respond to job demands served as protective factors against their job burnout. Therefore, according to the JD-R model, the current study conceptualised the use of ICTs as one of the main demands for teachers during the COVID-19 pandemic, which, in turn, would predict teachers' burnout in terms of emotional exhaustion. The job burnout and the link between it and ICTs will be deepened afterward. Coping has been conceived as a personal

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resource that teachers may use to reduce their emotional exhaustion. The association between these two constructs will be also described in detail later.

In addition, the 3-factor categorisation model developed by Chang (2009) supported our investigation. The author stated that individual, organisational, and transactional factors affect burnout. Based on this, the female gender is the individual factor considered because of its vulnerability to burnout (especially emotional exhaustion) during the pandemic (Agyapong et al., 2022; Santiago et al., 2023) and before it (Katsantonis, 2020; Sari, 2010; Steinhardt et al., 2011; Zhang et al., 2014). Moreover, considering the high prevalence of females working as teachers in Italian schools[1], gender is an essential individual factor to consider. The overwhelming job demands to use ICTs during the COVID-19 pandemic is the organisational factor (Malik & Javed, 2021; Pozo-Rico et al., 2020; Upadyaya et al., 2021) impacting the teachers' well-being. The transactional factor includes interactions between the individual and organisational factors: These aspects have been operationalised as self-efficacy (Ma et al., 2021) and technostress (Arlsan et al., 2022).

In sum, the literature review on the hypothesized relationships is structured as follows: To begin with, the burnout syndrome is described as focusing on the emotional exhaustion component (section 1.1). Afterward, each path is deepened: The relationship between coping and emotional exhaustion (section 1.2); the effect of using ICTs on emotional exhaustion (section 1.3) resuming the detailed path between the teachers' online teaching self-efficacy and emotional exhaustion (section 1.3.1), and technostress and emotional exhaustion (section 1.3.2).

1.1. Burnout syndrome: the emotional exhaustion component

Maslach and Jackson's three-component model (Maslach & Jackson, 1986) which describes job burnout is widely sustained. In this model, burnout syndrome is conceptualised as "an erosion of engagement that what started as important, meaningful, and challenging work becomes unpleasant, unfulfilling, and meaningless" (Maslach & Leiter, 1997; see Maslach et al., 2001, p. 416). Overall, burnout happens when the individual's feeling of exhaustion replaces energy, cynical attitude toward work activities, and ineffectiveness replaces the feeling of being efficacious (Chang, 2009; Llorens-Gumbau & Salanova-Soria, 2014). The model, therefore, consists of three components. The first one is called emotional exhaustion, which happens when the employers feel tiredness and fatigue, resulting in emotional energies being drained and depleted. The second component is called depersonalization, which occurs when the employers do not have positive feelings toward their clients or colleagues. The reduced personal accomplishment – i.e., the third component – refers to the employers' dissatisfaction with their jobs. Among these three components, emotional exhaustion (henceforth EE) is considered the core element of burnout and the primary manifestation of this syndrome (Brotheridge & Lee, 2002; Grandey, 2003; Maslach & Leiter, 2016; Maslach, Schaufeli, & Leiter, 2001), including the teachers' staff population (Chang, 2009). Indeed, the teachers' EE represented the fundamental experience of individual job stress often supporting intentions to leave work, as measured both before (Champion & Westbrook, 1984; Hakanen et al., 2006) and during the COVID-19 pandemic (Amri et al., 2020; Chen et al., 2020; Cormier et al., 2022; Kotowski et al., 2022; Liu et al., 2021; Nabe-Nielsen et al., 2022; Panisoara et al., 2020; Santiago et al., 2023; Solís García et al., 2021).

The scoping review by Agyapong et al. (Agyapong et al., 2022), which covered literature published before and during the three years of the COVID-19 pandemic with studies carried out on five continents, reported that the prevalence of job burnout in the teaching population ranged from 25.12% to 74%. In particular, the prevalence of teachers' EE ranged from 11% to 40%. In addition, a review (Zhang et al., 2014) and other empirical studies (Katsantonis, 2020; Santiago et al., 2023; Zhang et al., 2014) found that female teachers were more emotionally exhausted than male counterparts.

With this in mind, we conceived and tested a sequential mediation model on Italian female teachers (individual factor) in which coping (individual and protective factor) was considered the predictor source (job resource) for their EE via the sequential mediation effect of two transactional factors related to ICT use (job demands): Teachers' online teaching self-efficacy (protective factor) and technostress (risk factor).

Fig. 1 shows the hypothesised model.

1.2. The path between coping on emotional exhaustion component

Coping is a psychological mechanism that allows people to apply one or more strategies to adequately respond to stressor(s) (MacIntyre et al., 2020). Coping consists of adapting responses to an environmental stressor via cognitive appraisal and behaviours that may reduce, mitigate, and control it (Gustems-Carnicer & Calderón, 2013; Khorasani & Ghanizadeh, 2017). Furthermore, according to the transactional stress-coping appraisal model (Lazarus & Folkman, 1984), people can use strategies aimed at regulating their negative emotions toward stressors (i.e., emotion-focused coping strategies) and strategies to evaluate stressful situations and find how to manage problems from a more positive perspective to deal with the stress (problem-focused coping strategies).

In the educational scenario, the teachers' ability to perceive the potential of coping strategies against job stressors seems to affect the intensity of their emotional reactions (Pogere et al., 2019). Namely, the higher the perception of the coping potential, the lower the unpleasant emotions experienced (Chang, 2009), and the more the teachers were protected from experiencing emotional exhaustion (Carmona et al., 2006; Keller-Schneider, 2018). Furthermore, other studies (Antoniou et al., 2013; Lazarus, 2006; MacIntyre et al., 2020) outlined that teachers with well-developed coping strategies were able to ensure well-being and adjustment by overcoming job stressors and, thus, avoiding burnout. In contrast, high levels of burnout were experienced by teachers with no or less coping strategies (Mearns & Cain, 2010).

Collectively, the findings of the few studies conducted during the COVID-19 pandemic (Ma et al., 2021; Nazari et al., 2023; Ozoemena et al., 2021; Wang et al., 2022) revealed that teachers with well-developed coping strategies showed high levels of engagement in teaching and low emotional exhaustion.

According to this evidence, we expected that coping strategies would predict low levels of teachers' EE during the COVID-19 pandemic.

1.3. The path between using ICTs and the emotional exhaustion component

The use of technological devices and digital platforms has been detected as a risk factor for job burnout before (Chesley, 2014; Salo et al., 2017; Stadin et al., 2016; Yun et al., 2014) and during the COVID-19 pandemic (Brooks et al., 2020; Padmashali, 2023). Albeit e-learning is not a novel phenomenon, the specific characteristics of the emergency in which teachers found themselves working during the pandemic represented an unprecedented situation (Bartsch et al., 2021; Montano, 2021), which heavily affected and hampered their mental health (Loades et al., 2020).

To be accurate, during the pandemic, one of the main demands faced by the teaching staff was related to the use of ICTs and the quick and unpredictable switch from an in-presence to a remote teaching format (Johnson et al., 2020; Nang et al., 2022). The teaching staff perceived this forced transition as an overwhelming job demand (Johnson et al., 2020). Consequently, teachers perceived themselves as unfit to use technological devices and digital platforms flexibly (Verma et al., 2020)

[1] https://ec.europa.eu/eurostat/databrowser/view/educ_uoe_perd03/default/table?lang=en, accessed on May 30th 2023.

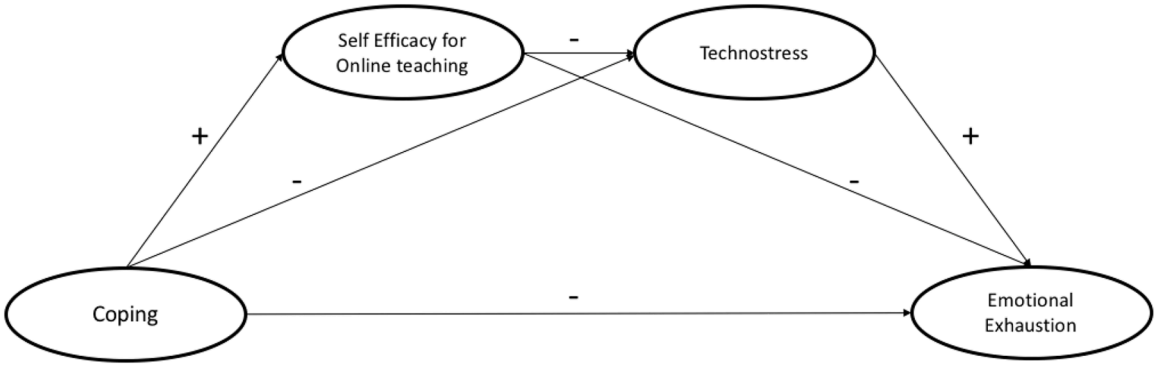

Fig. 1. Hypothesised serial mediation model.

and incompetent in interactive sessions with students and organising learning activities/materials on digital platforms (Cavanaugh & DeWeese, 2020). As suggested by scholars (Malik & Javed, 2021; Pfefferbaum & North, 2020; Pozo-Rico et al., 2020; Upadyaya et al., 2021) this may determine great efforts for the teaching staff and the urged request to develop skills for using ICTs contributing to teachers' job burnout during the pandemic (Malik & Javed, 2021; Pozo-Rico et al., 2020; Upadyaya et al., 2021). Indeed, as argued by authors (Arslan et al., 2022; Castiblanco Jimenez et al., 2020), when the ICTs were introduced in educational settings because of the COVID-19 pandemic, teachers perceived themselves as no efficient and stressed: learning quickly and friendly technological devices and digital platforms lead teachers to perceive this job demand as unmountable and the source of their stress. If teachers perceived low self-efficacy, technostress increased hyperbolically, generating job burnout (Arslan et al., 2022; Jimenez et al., 2020). In this vein, the study by Rastegar and Rahimi (Rastegar & Rahimi, 2023) investigated the role played by teachers' knowledge and awareness of their competence in using ICTs on the relationship between coping and 3-components burnout (i.e., emotional exhaustion, depersonalisation, and reduced personal accomplishment). Findings revealed a direct path between problem-focused coping strategies and emotional exhaustion; that is, highly problem-focused copers were less emotionally exhausted. On the role served by the teachers' ICTs competence, the study (Rastegar & Rahimi, 2023) revealed its mediation role: in other words, teachers with well-developed coping strategies felt more competent in using ICTs and experienced less emotional exhaustion. Nevertheless, authors (Stang-Rabrig et al., 2022) found a positive relationship between teachers' previous ICTs usage and perceived emotional exhaustion: This means that emotional exhaustion may occur despite good teachers' ICTs competence. Thus, there are still several open questions related to this issue requiring more investigation.

Based on this background, the present study aimed at expanding the study by Rastegar and Rahimi (2023) on the target of the female teachers' population. We expected that high levels of self-efficacy for online teaching and low levels of technostress would be indirectly related to low levels of emotional exhaustion in teachers during the COVID-19 pandemic. In the following two sub-sections, we resumed the relationships between these sources and emotional exhaustion.

1.3.1. Teachers' online teaching self-efficacy and emotional exhaustion component

Self-efficacy has been conceptualised by Bandura (Bandura, 2006, 2018) and described as the ability to perceive themselves as efficient in a specific context. Individuals who perceive themselves as effective are more likely to set up tasks and experience fewer negative emotions related to achieving them. In the educational scenario, high self-efficacy teachers are willing to work hard to be problem solvers in their job tasks, while those with low self-efficacy spend their energy mitigating fatigue and exhaustion (Brown, 2012; Glackin & Hohenstein, 2017; Han & Wang, 2021; Morris et al., 2017; Shoji et al., 2015; Uzuntiryaki-Kondakci et al., 2021; Van Acker et al., 2013; Yang & Du, 2024). A systematic review (Zee & Koomen, 2016) and a meta-analysis (Shoji et al., 2015) emphasised the negative correlation between teachers' self-efficacy and emotional exhaustion.

For the current study's specific purpose, we referred to a particular form of self-efficacy: That is online teaching self-efficacy. We focused on this variable because, before the pandemic, e-learning in Italy was provided only for undergraduate or postgraduate students. The outbreak of the COVID-19 pandemic, however, forced teachers of all grades to use online teaching, technological devices, and digital platforms.

Online teaching self-efficacy consists of teachers' beliefs and knowledge of their competence and skills in using ICTs (Yang, Manchanda, & Greenstein, 2021; Vesely et al., 2013). During the pandemic, teachers' self-efficacy was widely explored (Cataudella et al., 2021; Pressley & Ha, 2021; Rabaglietti et al., 2021; Sokal et al., 2020; Weißenfels et al., 2022). The study by Sokal et al. (2020) revealed a positive association between teachers' efficacy (albeit not closely related to online teaching) and their attitude toward technology, which, in turn, is negatively associated with each burnout component. Whereas, in other studies (Cataudella et al., 2021; Pressley & Ha, 2021; Rabaglietti et al., 2021; Weißenfels et al., 2022), the teachers' self-efficacy was primarily explored in association with teachers' perception of e-learning. The study by Ma et al. (2021) devoted attention to this form of teachers' self-efficacy and examined its association with burnout. Findings revealed that teachers who perceived themselves as less competent and not knowledgeable in online teaching were more emotionally exhausted. Considering this and the existing link between coping and self-efficacy (Allouh et al., 2021), we expected that high levels of online teaching self-efficacy would predict less EE.

1.3.2. Technostress and emotional exhaustion component

Technostress arises from self-inadequacy, low competence, and poor knowledge to adapt to and cope with ICTs (Brod, 1984). According to Tarafdar and colleagues (2014) and Hwang and Cha (2018), technostress comprises five dimensions of working with technologies. Briefly, this ICT source leads employers to feel as if they are working faster than usual (techno-overload), as the job life interferes with personal one (techno-invasion), and they feel incompetent in using ICTs because of their complexity (techno-complexity). Again, employers are afraid to lose their jobs because of the massive development of technology (techno-insecurity), and they are stressed because of the constant upgrades in technological devices (techno-uncertainty).

Overall, research on technostress has produced several investigations in the field of education. Muirhead (2000) emphasised that teachers have perceived online teaching as extra work because it enables people to work at any moment of day or/and night, including weekends. Other evidence (Ayyagari et al., 2011; Brooks et al., 2020; Jena, 2015; Salanova et al., 2000, 2013; Tarafdar et al., 2011, 2020; Tarafdar, Tu, & Ragu-Nathan, 2014; Tarafdar, Tu, Ragu-Nathan, et al., 2014) studied the sequelae of the technostress considering teachers' exhaustion and

increasing in fatigue. Arlsan and colleagues (2022) found that during the COVID-19 pandemic, the large amount of time spent by teachers on screen confirmed this overwhelming scenario, generating and increasing their technostress.

Research exploring the link between teachers' technostress and their burnout during the pandemic is scant. The study by Sulla and colleagues (2022) on Italian teachers reported that the teachers' sense of inefficacy was the main factor associated with technostress, which, in turn, increased their risk of burnout. Moreover, Panisoara and colleagues (2020) study revealed a weak direct relationship between burnout and technostress in the Romanian teaching staff. Considering this and the existing relationship between coping and technostress (Pirkkalainen et al., 2019; Al-Fudail & Mellar, 2008), we expected that low technostress would predict less EE. In addition, it was also hypothesised that a path between teachers' self-efficacy for online teaching and technostress is supported by evidence reporting that the lower self-efficacy, the higher technostress (Arslan et al., 2022; Sulla et al., 2022).

2. Method

2.1. Procedure

Data were collected cross-sectionally between September 2021 and January 2022 in Italy. This time range was characterised by a hybrid teaching approach, i.e., in-presence activities and remote ones, according to the number of positive tested students for COVID-19 infection. The link to an e-questionnaire was spread via the main social platforms (i.e., WhatsApp and Facebook) and internal communication provided by the local school office. Only one inclusion criterion was predefined, i.e., being a primary or middle school female Italian teacher. Because of privacy issues, participants did not register to the digital platform (Google Forms) and gave their informed e-consent before filling out the e-questionnaire. An information sheet informed teachers of the study's purposes and rights. No compensation for participation was provided. The University of Salento's Ethical Committee approved the study (71084/2021).

2.2. Participants

Three hundred eighty-eight female teachers [*M*(*SD*) = 46.33(10.3) years; age range = 22-68 years] of primary (n = 196) and middle (n = 192) Italian schools filled out the e-questionnaire. Most reported having a partner (n = 263) and children (n = 250). They declared an intermediate educational level (i.e., high school) in 23.8% of the cases (n = 106) and a high level (i.e., bachelor's or master's degree) for 76.2% of them (n = 340). The year range of experience in school teaching varied from 1 to 41 years [*M*(*SD*) = 16.45(11.7) years].

2.3. Measures

Coping Strategies. The 13-item Coping Scale (Hamby et al., 2015) was administered to evaluate how teachers appraise and behave in dealing with problems. The response options varied from 1 (Not true about me) to 4 (Mostly true about me). Two examples are: "*When dealing with a problem, I try to see the positive side of the situation*" and "*When dealing with a problem, I often try to remember that the problem is not as serious as it seems*". The final score has been calculated as the average of all the items, with higher scores indicating higher levels of coping (α = 88; rs > .456).

Job Burnout - Emotional Exhaustion component. The 22-item Maslach's Burnout Inventory (Maslach & Jackson, 1986; [It. Ad. Sirigatti et al., 1993]) was administered. Considering emotional exhaustion the core element of burnout syndrome and the most obvious manifestation of the syndrome (Maslach, Schaufeli, & Leiter, 2001) and following the theoretical background of the present study, the 9-item Emotional Exhaustion component has been considered for the model. The response options ranged from 0 (never) to 6 (every day). Two examples are: "*I feel emotionally exhausted because of my work*" and "*I feel tired when I get up in the morning and have to face another day of work*". The total score of the subscale was calculated as the average of their nine items, with higher scores indicating higher levels of emotional exhaustion (α = .85; rs > .589).

Teacher Self-Efficacy for Online Teaching. The 10-item questionnaire measuring the Teacher's Self-Efficacy for Online Teaching (Ma et al., 2021) was administered. The response options varied from 1 (I feel myself being "slightly effective") to 7 (I feel myself being "extremely effective"). Two example items are: "*Motivate students who show low interest in online work*" and "*Gauge student comprehension of what you have taught in the online course*". The final score was calculated as the average of all the items, with higher scores indicating higher levels of self-efficacy for online teaching (α = .91; rs > .514).

Technostress. The 9-item Person-Technology-Enhanced Learning Misfit (P-TEL) Scale (Wang et al., 2020) was administered to investigate the teachers' technostress in terms of self-adequacy, competence and knowledge to adapt to and cope with the technological devices. The response options varied from 1 (strongly disagree) to 7 (strongly agree). Two examples are: "*I feel stressed to adapt to technology-enhanced learning*" and "*I am irritated by the wide varieties of technology-enhanced learning*". The final score was calculated as the average of all the items, with higher scores indicating higher levels of technostress (α = .94; rs > .692).

Covariates. The sequential mediation model included the school grades (primary vs. middle) and the teachers' age as covariates.

2.4. Statistical analysis

The statistical analyses were performed using SPSS version 25. Because of the mandatory answers, no missing data imputation techniques were performed. Pearson's *Rho* correlations were computed to evaluate the associations between variables. The sequential mediation model was computed using Process v3.0, applying Model 6 and 5000 bootstraps inference for model coefficients. The coping served as a predictor (X), the emotional exhaustion as the outcome (Y), and the teachers' online teaching self-efficacy (M1) and the technostress (M2) served as mediators. In addition, primary *vs*. middle school grades and the teachers' age were included as covariates.

3. Findings

3.1. Correlation analyses

Table 1 shows the correlations between the variables. Results showed that coping was negatively associated with emotional exhaustion and technostress. Meanwhile, coping was positively related to teachers' online teaching self-efficacy.

Teachers' age was negatively associated with teachers' online teaching self-efficacy and positively with technostress. In other words, the older teachers, the less online teaching self-efficacy and the more

Table 1
Correlations between study variables.

	(1)	(2)	(3)	(4)
Coping	-.197***	.205***	-.139**	.088
Emotional Exhaustion (1)		-.111*	.255***	.045
Teachers' online teaching self-efficacy (2)			-.423***	-.143***
Technostress (3)				.216***
Teachers' age (4)				-

Note:
* p < .05
** p < .01
*** p < .001.

technostress.

3.2. Main hypothesised sequential mediation model

The results of the hypothesised sequential mediation model were graphically reported (Fig. 2) and tabulated (Table 2).

The model is significant [$F_{(5,293)} = 12.990$, $p < .001$]. The total (β = -2.813; p = .021) and the direct (β = -2.858; p = .020) paths between teachers' coping ability and emotional exhaustion were significant. The path between coping and teachers' online teaching self-efficacy (M1) (β = .450; p = .002) was significant. The effect between predictor and technostress (M2) (β = -.278; p = .149) was not. In addition, the path between teachers' online teaching self-efficacy and technostress (β = -.437; $p < .001$) and emotional exhaustion (β = 1.336; p = .010) were significant. Finally, the path between technostress and emotional exhaustion (β = 1.172; p = 002) was significant.

The three mediating effects were tabulated (Table 2). The first one was regarding the mediating role of teachers' online teaching self-efficacy: the teachers' coping was significantly associated with their self-efficacy in e-learning, which, in turn, was significantly associated with their emotional exhaustion. The second indirect effect related to the mediation of the technostress on the relationship between coping and emotional exhaustion was insignificant. Finally, the third indirect effect was related to the sequential mediating role served by the teachers' online teaching self-efficacy and technostress on the path between coping and emotional exhaustion.

Finally, findings outlined that teachers working at primary schools were more emotionally exhausted than teachers working at middle schools. Furthermore, older teachers reported more technostress than the younger ones.

4. Discussion

The Job Demands-Resources model (Bakker and Demerouti (Bakker & Demerouti, 2007, 2024) and the 3-factor categorisation model (Chang, 2009) guided the current study. In brief, the use of ICTs, in terms of self-efficacy in online teaching and technostress, would mediate the relationship between coping strategies and emotional exhaustion as a burnout component. Female gender and coping strategies, the overwhelming demands to use ICTs, and self-efficacy are the individual, organisational, and transactional factors considered respectively (Chang, 2009). Results corroborated the hypothesised model, and the main results are discussed in the following sub-sections.

4.1. Coping strategies as a protective source of emotional exhaustion component

The findings underlined a negative direct path between teachers' coping and emotional exhaustion, consistent with previous studies (Foley & Murphy, 2015; Parker et al., 2012) and during (Rastegar & Rahimi, 2023) the COVID-19 pandemic. Our study showed that when teachers were high copers, they were prone to experience fewer feelings of depletion of their emotional resources and low fatigue. Thus, our results emphasised and corroborated the protective role of proactive coping strategies against emotional exhaustion (Birsen Bağçeci & Hamamci, 2012). Conversely, the helpless coping associated with high levels of emotional exhaustion may reflect both the fair and poor ability of people to objectively appraise the stressful situation and behave adequately, as well as the individuals' low ability to self-regulate their negative emotions resulting from stressful situations (Rastegar & Rahimi, 2023). Indeed, as found by others (Eddy et al., 2019), the use of proactive coping strategies, such as planning and positive reframing of stressful situations, may lead people to experience a state of flourishing (Keyes, 2002) with high levels of well-being and the absence of mental illness. While low coping strategies predict prolonged burnout (Eddy et al., 2019).

This result suggests a reflection on the predictive role played by teachers in coping with emotional exhaustion. If, on one side, the pandemic heavily swayed our lives, on the other one, it brought out personal resources to which people refer when they cope with stressful situations (Lazarus & Folkman, 1984). During the pandemic period, coping has been the personal resource most used by teachers (Nazari et al., 2023; Rajesh et al., 2022). Hence, our model strengthened the potential of this source as a personal resource in reducing and preventing teachers' emotional exhaustion (Mearns & Cain, 2010).

4.2. Online teaching self-efficacy and technostress as mediators on the relationship between coping and emotional exhaustion component

The sequential mediation model demonstrated an indirect path between coping strategies and emotional exhaustion via teachers' online teaching of self-efficacy and technostress.

Our results showed an indirect positive effect of the teachers' online teaching self-efficacy on the relationship between coping and emotional exhaustion. The teacher's propensity to cope adequately with stressful situations predicted greater self-efficacy related to online teaching, which, in turn, decreased their emotional exhaustion and fatigue. Although other research suggested the relationship between coping and

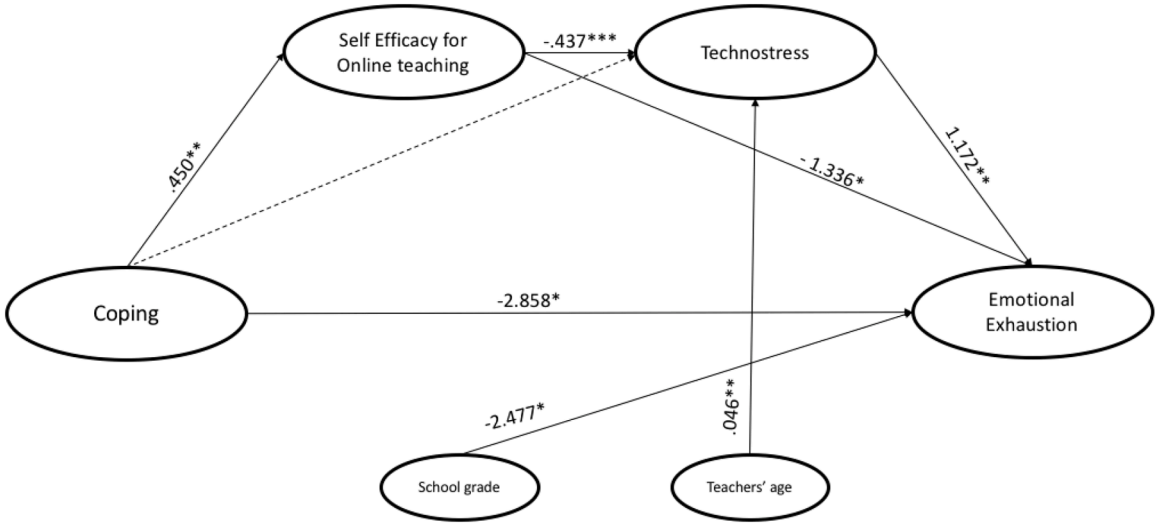

Fig. 2. Results of the mediation model. Note: * p < .05; ** p < .01; *** p < .001.

Table 2
Betas coefficients, standard errors, p-values, and bootstrap confidence intervals of the serial mediation model.

Path		Beta	SE	*p-value*	95% Bootstrap CI	
					BootLLCI	BootULCI
Coping →	Teachers' online teaching self-efficacy	.450	.148	.002	.153	.738
	Technostress	-.278	.203	.149	-.674	.121
	Emotional Exhaustion	-2.858	1.274	.020	-5.333	-.353
Teachers' online teaching self-efficacy →	Technostress	-.437	.076	< .001	-.586	-.287
	Emotional Exhaustion	- 1.336	.537	.010	.317	2.406
Technostress →	Emotional Exhaustion	1.172	.396	.002	.439	1.960
Indirect paths						
Coping → Teachers' online teaching self-efficacy → Emotional Exhaustion		.027	.014	-	.004	.059
Coping → Technostress → Emotional Exhaustion		-.015	.012	-	-.042	.006
Coping → Teachers' online teaching self-efficacy → Technostress → Emotional Exhaustion		-.010	.005	-	-.023	-.002

self-efficacy (Mailizar et al., 2020), this previous study focused on the more general concept of teachers' self-efficacy. Our results suggested a path between coping strategies and the specific ability to perceive themselves as effective in online teaching. This means that being proactive copers helps people to be energetic problem solvers, to see the positive side of (even stressful) situations, and to consider several alternatives for handling the problem. This may result in low fatigue in teaching. In addition, these cognitive and behavioural strategies to cope with problems applied by teachers may stimulate their creativity and curiosity in search of non-conventional methods for teaching to inspire and engage their students (e.g., use of software and apps to compute math formulae and explain history). Hence, proactive coping strategies may motivate teachers to get involved in using technological devices during ordinary school lessons, considering them as resources for their teaching and not as a stress booster. Thus, proactive coping may support teachers in approaching technology more closely, promoting their self-efficacy and positively impacting teachers' performance/well-being and (probable) students' engagement.

Secondly, our findings revealed that the relationship between coping and emotional exhaustion via the mediation of technostress did not reach significance. Although such a path was expected, it is crucial to notice that the effect of coping on technostress was mediated by online teaching self-efficacy. In this vein, results showed that surveyed teachers applied coping strategies (in terms of cognitive and behavioural strategies) to deal with problems perceived as low technostress via the mediation of high levels of teachers' online teaching self-efficacy. Hence, findings highlighted that these coping strategies may impact the competence and knowledge in using technology quickly and flexibly, resulting in low technostress. In this vein, the teachers-technology environment interaction model suggested by Al-Fudail and Mellar (2008) could provide a valuable framework for teachers. The authors argued that teachers should be trained in ICT use and online classroom management to reduce their technostress.

Finally, on the sequential mediation model, findings revealed that coping strategies affected emotional exhaustion via the positive indirect effect of teachers' self-efficacy for online teaching and the negative one of technostress. In other words, high copers felt themselves more effective in online teaching, and, in turn, they were less stressed because of using ICTs and less emotionally exhausted because of their work duties. This finding supported other ones (Davaasuren et al., 2021), revealing that the higher teachers' self-efficacy for e-teaching and online environment, the less technostress, and the more energy and job engagement perceived by teachers. An additional reflection should be made on the relationship between the two mediators in our sequential model: the higher teachers' self-efficacy for online teaching, the lower technostress. According to Day and colleagues (2019) and following Bakker and Demerouti's (2007, 2024) model, these two sources may be placed on the job demand-resource continuum and may affect job well-being differently. To be accurate, if teachers perceived themselves as unskilled for online teaching and as inadequate to manage the online environment, the technological devices and digital platforms would be perceived as stress boosters.

Consequently, frustration and exhaustion increased, as well as stress related to using ICTs (Arslan et al., 2022; Tarafdar, Tu, Ragu-Nathan et al., 2014). This nest of paths may produce a vicious cycle, which, in turn, encourages the onset and the worsening of teachers' emotional exhaustion (Dahabiyeh et al., 2022). Vice versa, teachers with high self-efficacy were more confident in online teaching and experienced less stress and emotional drain (Stan, 2022).

5. Conclusion and limitations of the study

During the COVID-19 pandemic, the restrictive measures as well as the growing number of infected people and deaths (Melguizo-Ibáñez et al., 2022), increased the deterioration of mental health in the general (Bianco et al., 2021; Levante et al., 2021, 2022, 2023a; Petrocchi et al., 2020; Santomauro et al., 2021), and clinical population (Levante et al., 2021, 2022), health care workers (Sun et al., 2021), as well as teachers staff (Chirico et al., 2022; Levante et al., 2023b).

Our study outlined the role played by coping, teachers' self-efficacy for online teaching, and technostress on Italian female teachers' emotional exhaustion during the pandemic. A large number of studies pointed out that teachers' emotional exhaustion negatively affects the quality of teaching (Arvidsson et al., 2019; Pellerone et al., 2020), students' learning (Klusmann et al., 2016; Madigan & Kim, 2021), and the classroom climate (Jennings & Greenberg, 2009), preventing this burnout component is not crucial only for teachers' well-being, but also for their students, colleagues, and the overall school climate (Braun et al., 2020; Kang, 2020; Pozo-Rico et al., 2020). A pivotal reflection on teachers arose. Studies carried out during the pandemic did not compute or did not find gender differences in coping, teachers' self-efficacy for online teaching, technostress, and emotional exhaustion because of the unbalanced sample recruited. Thus, this issue is worthy of being taken into account. According to female teachers' vulnerability to emotional exhaustion (Agyapong et al., 2022; Santiago et al., 2023), we believe that devoting attention to this population can be considered one of the main strengths of the present paper.

In conclusion, two critical considerations regarding the covariates' role arose: teachers' school grades and age. Firstly, results highlighted that those teachers working in primary schools reported higher levels of emotional exhaustion (the outcome of our model) than those working in middle schools. A probable explanation of this result may be related to the low self-control (Vazsonyi & Cho, 2022) of children in primary school. When they are at home, they may be easily distracted by adults, siblings, or environmental conditions, and this results in teachers' efforts to engage their attention repeatedly, increasing their exhaustion and fatigue.

On teachers' age, results revealed that there is a positively impacted technostress. Consistently with other studies on adults (Chong, 2013; Coleman et al., 2010; Escobar-Rodriguez & Bartual-Sopena, 2013; Hauk et al., 2018, 2019), we found that technostress increased with age. Thus, assessing the teachers' ICTs competence (both old and young teachers)

and helping to develop them to "catch up" with innovative teaching approaches is essential. The baseline assessment of these competencies may help school principals schedule ICTs competence-specific training which, in turn, may promote teachers' acceptance of technology improving their competencies and self-efficacy in managing technological devices and digital platforms.

The study presents some limitations. The hypothesised model should be retested in a broader sample of female teachers to understand better the interplays between the sources of our mediation model. Moreover, caution is warranted as the data collection occurred in a specific period in Italy in which a hybrid teaching approach (between in-person and online lectures) was mandatory. For this reason, results should be replicated beyond this scenario to gather generalizability. Participants were recruited according to a non-random strategy (i.e., snowballing) and may not represent the target population. Hence, generalisation of results should be made with caution. In addition, although research in the literature suggested the study of the hypothesised signs and directions of the relationships, inverse or reciprocal relationships between the variables cannot be excluded. Finally, the study examined only one component of burnout (i.e., emotional exhaustion) and only several possible sources influencing emotional exhaustion. Future studies should assess the impact of different types of coping (e.g., emotion-focused *vs*. problem-focused coping strategies) on the other components of job burnout (i.e., depersonalisation and personal accomplishment).

6. Implications of the study

The present study informed future avenues for policymakers to prevent teachers' burnout. Our model suggested the significant and pivotal role served by several sources that safeguard teachers from generating and worsening their emotional exhaustion. Because evidence (Maslach et al., 2001; Melamed et al., 2006) asserted that burnout symptoms have short- and long-term detrimental effects on mental and physical health, professional career, and work performance, design pieces of training for teaching staff population is a priority. Our findings showed that, during the COVID-19 pandemic, coping and self-efficacy for online teaching have been protective sources against emotional exhaustion. At the same time, technostress acted as a risk one. Therefore, these sources may be the primary concerns for education research and intervention programs in educational settings (Ansley et al., 2021; Eddy et al., 2022; Ghasemi, 2021; Ghasemi et al., 2022) aimed at promoting stress management training via these sources in mitigating teachers' emotional exhaustion and turnover.

Although the emergency period because of the pandemic is over, several technological devices and digital platforms are currently used in schools (e.g., digital platforms for meetings). Hence, given the technological era in which ICTs improve teaching and learning (Panisoara et al., 2020), educational organisations could draw training for teachers to develop their skills. Consequently, they may increase their self-efficacy toward online teaching and reduce their stress about using technological devices and digital platforms, accepting and perceiving their usefulness.

Patient consent statement

The participants provided their written informed e-consent to participate in this study.

Permission to reproduce material from other sources

No materials from other sources is reported in the paper.

Ethics approval statement

The studies involving human participants were reviewed and approved (no. 71084/2021) by the Ethical Committee of the Department of Human and Social Science, University of Salento, Via di Valesio, 73100 Lecce, Italy.

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Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

CRediT authorship contribution statement

Annalisa Levante: Writing – review & editing, Writing – original draft, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Serena Petrocchi:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Federica Bianco:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Ilaria Castelli:** Writing – review & editing, Methodology, Investigation, Conceptualization. **Flavia Lecciso:** Writing – review & editing, Supervision, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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