DIGITAL STRESS AND TEACHERS' PSYCHOSOMATIC HEALTH

SANJA TATKOVIĆ[1], SANJA SMOJVER-AŽIĆ[2] & MARTINA MAVRINAC[1]

[1]Juraj Dobrila University of Pula, Faculty of Educational Sciences, Pula, Croatia
[2]University of Rijeka, Facutly of Humanities and Social Sciences, Rijeka, Croatia

CORRESPONDING AUTHOR/KORESPONDENČNI AVTOR/
statkovic@unipu.hr

Abstract/Izvleček
This study validated the Croatian version of the Digital Stress Scale (DSS) and examined its relationship with psychosomatic symptoms, self-efficacy, and ICT use on a sample of 152 Croatian teachers. Confirmatory factor analysis supported a ten-factor structure for the DSS with high internal reliability. All ten dimensions of digital stress as well as the total digital stress score showed significant positive correlation with both the frequency of psychosomatic symptoms and their interference in daily life. Total digital stress significantly predicted both psychosomatic symptom dimensions, while self-efficacy demonstrated a protective role, highlighting the importance of ICT education in preventing digital stress.

Digitalni stres in psihosomatsko zdravje učiteljev
V študiji smo validirali hrvaško različico *lestvice digitalnega stresa* (angl. Digital Stress Scale – DSS) in preučili njen odnos glede na psihosomatske simptome, splošno samoučinkovitost ter uporabo informacijsko-komunikacijske tehnologije na vzorcu 152 hrvaških učiteljev. Potrditvena faktorska analiza je podkrepila desetfaktorsko strukturo DSS z visoko notranjo zanesljivostjo. Vseh deset dimenzij digitalnega stresa ter skupna ocena digitalnega stresa so pokazali pomembno pozitivno korelacijo tako s pogostostjo psihosomatskih simptomov kot tudi z njihovim vplivom na vsakdanje življenje. Skupni digitalni stres je pomembno napovedoval obe dimenziji psihosomatskih simptomov, medtem ko se je samoučinkovitost izkazala kot zaščitni dejavnik, kar poudarja pomen izobraževanja o IKT pri preprečevanju digitalnega stresa.

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Introduction

With the rapid evolution of digital technologies, teachers are increasingly integrating Information and Communication Technology (ICT) into their daily work. While beneficial, this can also provide challenges that can lead to stress. This stress, caused by constant connectivity and pervasive digital device use is known as digital stress and has its conceptual roots in "technostress," a term introduced by clinical psychologist Craig Brod in 1982. Technostress is described as a condition that arises when individuals or organizations find it difficult to adapt to the introduction and use of new technology (Hall, 2020). Given how digital technologies have become part of everyday life and educational practices, the term has evolved into "digital stress," reflecting the specific challenges posed by modern digital environments, such as multitasking, work-life boundaries, and information overload (Fischer et al., 2021). Previous studies (Kader et al., 2020; Ma and Turel, 2019; Nimrod, 2018) have shown that perceived technology induced stress can negatively affect individuals concerning their physical and mental well-being as well as their social interactions. Research by Kush et al. (2022) and Estrada-Muñoz et al. (2021) also assessed teacher mental health during the COVID-19 pandemic and found that teachers reported higher levels of mental health concerns than professionals in other occupations. The study also found that distance learning teachers reported higher levels of stress than those teaching in-person, emphasizing the mental health issues associated with digital teaching environments. These findings underline the importance of addressing digital stress among teachers to increase their well-being and effectiveness in the classroom. Highlighting the need for comprehensive strategies in educational settings, Ayyagari et al. (2011) notes the importance of addressing technological antecedents to mitigate technostress (digital stress). For this purpose, new questionnaires were developed to address digital stress (Nimrod, 2018; Fischer et al., 2021; Pirkkalainen et al., 2019; Ragu-Nathan et al., 2008).

Fischer, Reuter, and Riedl (2021) developed the highly comprehensive Digital Stressors Scale (DSS) to measure perceived stress from digital technology in the workplace. The DSS is a self-assessment tool for measuring the extent of distress related to digital technology in the workplace and helps to further explain how and why information and communications technology can lead to negative outcomes for individuals. It enables researchers to measure digital stress reliably and practitioners to assess it in organizations, aiding effective coping strategies.

Riedl, Fischer, and Reuter (2023) abbreviated the original version which assesses digital stress across 10 categories: complexity, conflicts, insecurity, invasion, overload, safety, social environment, usefulness, technical support and unreliability. In this study, the DSS scale will be utilized, and its validity and reliability will be assessed and verified.

Studies have shown that perceived digital stress depends not only on excessive use of technology but also on a way a person perceives their own abilities at managing ICT (Estrada-Muñoz et al., 2020; Fischer et al., 2021). A systematic review by Estrada-Muñoz et al. (2020) reveals that teachers feel a lot of anxiety and stress when using educational technology in the classroom. The study shows that an increase in the demand for technology usage in the academic environment leads to unpleasant emotions such as anxiety especially when teachers do not receive the right training or are being forced to integrate technology into their teaching. Findings of Fernández-Batanero et al. (2021) also reveal that teachers experience high levels of anxiety or stress when using educational technology in the classroom. Similarly, Gavade et al. (2023) examined how hybrid teaching in low-income schools affected teacher stress, mediated by requirements for skill development and adaptation in remote teaching. The research further reveals that the sudden shift to online teaching during the COVID-19 pandemic increased the pressure on teachers to acquire new skills and adopt remote teaching techniques. For example, research by Estrada-Muñoz et al. (2020) showed that teachers who had higher levels of digital self-efficacy (GDSE) reported lower levels of technostress, which may mean that confidence in using digital tools reduces digital stress. The same research also pointed out techno-fatigue and techno-anxiety among teachers, showing how self-efficacy could reduce the overall impact of digital stress in educational settings. Similarly, findings by García-Martín et. al. (2023) indicate that enhancing GDSE through targeted training programs can reduce digital stressors, such as communication overload and constant availability expectations, among educators. These findings underscore the importance of fostering GDSE among teachers to alleviate digital stress and promote well-being in increasingly technology-driven educational environments. Recent studies emphasize the growing importance of assessing digital competences and self-perceived digital skills, particularly in the context of modern education and the increasing integration of technology, some focusing on students while others concentrate on teachers (Tomaš et al., 2024; Yang, et al., 2024).

There is evidence of the effects of technology-induced stress resulting in psychosomatic symptoms. Constant adjustment to emerging technologies without proper support may lead to chronic stress responses; physical manifestations thereof are also possible. Using a sample of ICT users, Salanova et al. (2007) noted that technostress was associated with higher levels of complaints from the musculoskeletal system. Moreover, studies have found a significant association between long computer work and the appearance of musculoskeletal symptoms (Jensen et al., 2002) and have identified visual discomfort (Das et al., 2022).

Studies have also reported that more time spent on the internet and more screentime exposure are related to somatic symptoms, such as headache, dizziness and migraine (Barbieri et al., 2024; Das et al., 2022; Stiglic et al., 2022).

Also, digital stress resulting from constant connectivity may disrupt sleeping patterns and eventually cause tension headaches, among other stress disorders. Furthermore, research emphasizes that technostress is a multidimensional variable with substantial effects on physical health through its biological mechanisms. By understanding these mechanisms, interventions can be designed that reduce health risks from pervasive technology use (Riedl, 2013).

Understanding digital stress in teachers is critical as educational environments increasingly take on digital aspects. By supporting educators adequately, educational institutions will foster healthier, more sustainable teaching practices for the ultimate benefit of educators and students.

Despite a few studies having been conducted in Croatia in the context of digital stress (Ćuk et al., 2022; Tomaš et al., 2024) most research focuses on employees in sectors outside education. Studies specifically examining digital stress among Croatian teachers remain limited, particularly in the context of integrating digital technology into educational practices.

This study validated the Croatian version of the Digital Stress Scale (DSS) and examined its relationship with psychosomatic symptoms, self-efficacy, and ICT use on a sample of Croatian teachers. Given the objectives described above, the study addresses the following research questions:

RQ1: Is the Croatian version of the Digital Stressors Scale (DSS) a valid and reliable instrument for measuring digital stress among teachers?

RQ2: What is the relationship between teachers perceived digital stress and the frequency and interference of psychosomatic symptoms?

RQ3: To what extent does general digital self-efficacy (GDSE) predict the relationship between digital stress and psychosomatic symptoms?

RQ4: Does the frequency of ICT use (e.g., computers, smartphones) significantly predict levels of digital stress or psychosomatic symptoms among teachers?

The results of this empirical study are part of a broader research project *Digital stress and mental health in relation to different age groups and life roles, (project number: uniri-iskusni-drustv-23-160).*

Research methodology

Sample of participants

A cross-sectional study was conducted with 152 Croatian teachers from elementary, high school, and university levels. The sample included 24 males (16%), 127 females (84%), and 1 undeclared. Ages ranged from 26 to 65 years (M = 46.65, SD = 9.81). Most held a university degree (72%), 19% held a doctorate, 8% a higher professional qualification, and 1% had secondary education. Out of 205 initial respondents, 53 were excluded because of incomplete data, yielding a final sample of 152 complete responses and a 74.1% completion rate. Only complete responses were analysed to ensure data quality.

Instruments

For the purposes of this study, short versions of the Digital Stressors Scale (DSS) (Riedl et al. 2023) and Psychosomatic symptoms questionnaire (PSS) (Vulić-Prtorić, 2019) were used. DSS was primarily translated into Croatian using the back-translation method. A 7-point Likert scale was consistently used ranging from 0 "strongly disagree" to 6 "strongly agree." Hence, the value "3" constitutes the neutral position on the scale for each question. A higher score indicates a higher level of digital stress, with a maximum possible score of 180. According to the authors, all subscales demonstrate satisfactory reliability, with Cronbach's alpha values exceeding .72; in the current study, Cronbach's alpha values ranged from .71 to .89.

The Psychosomatic Symptoms Questionnaire (PSS) (Vulić-Prtorić, 2019) consists of a list of 35 symptoms and sensations, along with three additional questions. For the purposes of this study, the questionnaire was shortened to focus on the most common symptoms associated with ICT use (Barbieri et al., 2024; Das et al., 2022; Salanova et al., 2014). A subset of 10 items was chosen: headache, dizziness, back

pain, lack of energy/fatigue, joint pain, pain in arms/legs, muscle tension, double vision, blurred vision, and chest pain. This instrument assesses the number of somatic symptoms an individual has experienced over the past three months, their frequency during this period, and the extent to which these symptoms interfere with their daily activities (distress). Participants rated the frequency of experiencing these symptoms using a four-point scale (1 = never, 2 = a few times per month, 3 = a few times per week, 4 = almost every day) and then the extent to which each symptom interferes with their daily activities (distress) using a three-point scale (1= does not bother me at all, 2 = it bothers me a little, and 3 = it bothers me a lot). A total score was computed by summing the scores across all items, with higher scores indicating greater symptom intensity (frequency scale) and more interference in everyday life (interference scale), reflecting the severity or distress caused by somatic complaints. Thus, in determining the PSS score, the total score for the frequency subscale ranges from 10 to 40, and the total score for the interference (severity) subscale ranges from 10 to 30. Subscales demonstrate satisfactory reliability, with Cronbach's alpha values exceeding .71; in the current study Cronbach's alpha exceeded .82.

The study also incorporated a scale measuring the frequency of ICT use and assessed how often different digital tools were utilized. Specifically, the frequency of use was examined for various ICT devices, including computers or laptops, tablet computers, mobile phones or smartphones, smartboards, and LCD projectors. This additional measure provided insight into the extent of technology usage among participants and its potential relationship with digital stressors.

In addition, general digital self-efficacy (GDSE) was assessed using a 4-point Likert scale ranging from 1 (no competence at all) to 4 (highly developed competence), evaluating participants' overall confidence in their ability to manage challenges, particularly those related to ICT use.

Data collection

The study was conducted between June and September 2024 on a convenience sample of Croatian teachers from elementary, secondary, and higher education levels, allowing time for responses and ensuring representation. School principals and university deans were contacted via email and asked to distribute the questionnaire to available teachers and professors. The survey was administered online, with participants informed about the study's purpose, confidentiality, and voluntary participation.

The study followed ethical guidelines and received approval from the Ethics Committee of the Faculty of Humanities and Social Sciences, University of Rijeka. Statistical analyses were conducted, including descriptive analysis (digital stress, psychosomatic symptoms, GDSE, and ICT usage patterns), exploratory and confirmatory factor analysis, correlation and regression analysis, using the statistical software JASP 0.19.1.0.

Results

Computers were the most frequently used ICT devices, with 33% using them over five hours daily. Smartphone use was also common, with 38% using them 1–2 hours and 27% over five hours per day. LCD projectors had moderate use (29% several times a week). Smartboards were less used (47% never), while tablets were the least used (61% never).

The factor structure of the DSS, based on previous research by Riedl et al. (2023), was confirmed using a confirmatory factor analysis (CFA) on the Croatian teacher sample.

To determine the factor structure of the DSS, a confirmatory factor analysis (CFA) was performed. The data were suitable for analysis (KMO = .93; Bartlett's test: X^2 = 3038.8, df = 43, p < .001). Model fit indices indicated good adequacy (RMSEA = .06, CFI = .92, SRMR = .05), and the CFA showed acceptable model fit (X^2 = 1257.40, df = 405, p < .001).

Standardized factor loadings ranged from .69 to .94 (p < .001), indicating strong contributions to latent constructs. Table 1 presents the loadings and each factor's reliability (Cronbach's alpha).

Table 1
Factor loadings and reliability coefficients (Cronbach's Alpha - α) of the Digital stressor scale (DSS)

Factors and Items	Factor loadings	α
I—Complexity		.77
I.1 I often find it too complicated to accomplish a task using the ICT that are available to me at work.	.78	
I.2 I feel that the ICT that are available to me at work are too confusing.	.77	
I.3 I often do not find enough time to keep up with new functionalities of ICT at work.	.74	
II—Conflicts		.89

II.1 I feel that my private life suffers due to ICT enabling work-related problems to reach me everywhere.	.86	
II.2 It is too hard for me to keep my private life and work life separated due to ICT.	.86	
II.3 ICT make it harder to create clear boundaries between my private life and work life.	.82	
III—Insecurity		.81
III.1 I fear that I could be replaced at work due to the increasing standardization of work processes, which is enabled by ICT.	.78	
III.2 I fear that I could be replaced by machines.	.73	
III.3 I fear that digitization will cost me my job.	.94	
IV—Invasion		.79
IV.1 I fear that my use of ICT is less confidential than I would like it to be.	.78	
IV.2 I fear that the information that I exchange using ICT is not as protected as I would like it to be.	.86	
IV.3 I fear that malevolent outsiders (e.g., hackers) can easily copy my identity due to ICT.	.79	
V—Overload		.85
V.1 Due to ICT I have too much to do.	.82	
V.2 Due to ICT I have a too large variety of different things to do at work.	.82	
V.3 I never have any spare time because my schedule is too tightly organized by ICT.	.80	
VI—Safety		.86
VI.1 I have to worry too often whether I might receive malicious e-mails.	.78	
VI.2 I feel anxious when I get an e-mail from somebody that I do not know as it could be a malevolent attack.	.85	
VI.3 E-mails whose sender I do not know make me nervous.	.88	
VII—Social Environment		.79
VII.1 Due to ICT I have too much to do with the problems of others.	.80	
VII.2 I think that ICT generate too much of an expectation that I have to be reachable everywhere and at any time.	.83	
VII.3 I feel that ICT create unwanted social norms (e.g., the expectation that e-mails should be answered right away).	.80	
VIII—Usefulness		.71
VIII.1 I think that I do not gain enough benefits from using the ICT that I am provided with at work for my tasks.	.82	
VIII.2 The ICT I use at work are full of too many functionalities that I never need.	.69	
VIII.3 I think that most of the ICT I am supplied with at work is not useful enough and I could work without it.	.71	
IX—Technical Support		.82
IX.1 In the case of ICT-related problems, it happens too often that there is not enough support available at work.	.73	
IX.2 I think that it happens too often that technical support is not available when I need it.	.78	
IX.3 I often have to wait for a long time because technical problems cannot be adequately solved in our organization.	.84	
X—Unreliability		.87
X.1 I think that I lose too much time due to technical malfunctions.	.86	
X.2 I think that I spend too much time trying to fix technical malfunctions.	.88	
X.3 There is just too much of my time at work wasted coping with the unreliability of ICT.	.84	

Internal consistency, assessed via Cronbach's alpha for each of the ten DSS factors, ranged from .71 to .89, demonstrating acceptable to excellent reliability. These results confirm that the Croatian version of the DSS is a reliable and valid tool for assessing digital stress. Reliability across subscales closely matches the original DSS (Riedl et al., 2023).

Furthermore, exploratory factor analysis with oblimin rotation was conducted to explore the Psychosomatic Symptoms Questionnaire (PSS) structure. A predefined two-factor structure, based on previous research (Vulić-Prtorić, 2019) was confirmed: symptom frequency (Factor 1) and interference with daily activities (Factor 2). The first factor includes variables assessing how often psychosomatic symptoms occur (e.g., headaches, dizziness, back pain, muscle tension). Highest loadings were obtained for items such as back pain (.68), fatigue (.52), and joint pain (.77). The second factor, which captures the extent to which psychosomatic symptoms interfere with daily activities (distress), includes variables related to functional impairment. This distinction highlights that while some participants may experience frequent symptoms, they do not necessarily perceive these as highly disruptive. In contrast, others may report lower symptom frequency but significant interference with their daily lives and distress.

The results confirm a meaningful two-factor structure, indicating that symptom occurrence and its impact on daily functioning should be considered separately in psychosomatic research. These findings emphasize the importance of distinguishing perceived symptom burden from its actual impact on quality of life.

Pearson correlation coefficients were calculated to explore relationships among ICT use (computer and smartphone), digital stress (total and subscales), general digital self-efficacy (GDSE), and psychosomatic symptoms of frequency (PSS-F) and interference (PSS-I). The results are presented in Table 2.

Table 2
Descriptive Statistics and Intercorrelations of Study Variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Computer Use	—															
2. Smartphone Use	.24**	—														
3. Complexity	.23**	.10	—													
4. Conflicts	.27***	.12	.51***	—												
5. Insecurity	.09	.12	.47***	.43***	—											
6. Invasion	.25**	.14	.53***	.50***	.39***	—										
7. Overload	.19*	.13	.47***	.47***	.33***	.48***	—									
8. Safety	.21*	.15	.47***	.50***	.33***	.51***	.53***	—								
9. Social Environment	.23**	.13	.48***	.48***	.41***	.52***	.49***	.54***	—							
10. Usefulness	.10	.12	.38***	.40***	.34***	.39***	.34***	.37***	.38***	—						
11. Technical Support	.17*	.13	.41***	.44***	.34***	.46***	.39***	.42***	.45***	.38***	—					
12. Unreliability	.20*	.15	.43***	.49***	.37***	.46***	.40***	.44***	.47***	.40***	.53***	—				
13. DSS Total	.21*	.17	.59***	.63***	.51***	.61***	.59***	.65***	.62***	.47***	.55***	.55***	—			
14. GDSE	.03	-.01	-.28***	-.31***	-.34***	-.30***	-.35***	-.28***	-.22**	-.20*	-.24**	-.30***	-.42***	—		
15. PSS-F	.09	.09	.29***	.31***	.31***	.36***	.36***	.29***	.29***	.23**	.23**	.28***	.45***	-.31***	—	
16. PSS-I	.10	.11	.29***	.32***	.31***	.37***	.37***	.31***	.29***	.24**	.25**	.29***	.47***	-.32***	.87***	—
Mean	4.75	4.78	5.97	8.36	2.74	6.78	7.02	5.03	9.17	6.62	6.52	5.89	63.99	3.26	16.69	14.22
Standard deviation	1.10	0.99	3.87	5.31	3.43	4.27	4.19	4.67	4.86	3.69	4.30	4.19	33.85	0.98	5.71	4.17

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

Legend: DSS Total – Total Digital stress scale; GDSE - general digital self-efficacy; PSS-F – Psychosomatic symptoms questionnaire - frequency; PSS-I – Psychosomatic symptoms questionnaire - interference.

As presented in Table 2, age showed a small but significant positive correlation only with GDSE (r = .31, p < .001), while gender was not significantly correlated with any of the main study variables.

Computer use was significantly associated with eight DSS dimensions excluding Insecurity and Usefulness and with a total DSS score. Smartphone use was not significantly associated with either DSS or PSS scores. This finding was unexpected and inconsistent with prior studies (Winkler et al., 2020) that have reported associations between smartphone-related digital stress and mental health. It can be assumed that teachers use smartphones primarily during leisure time and for entertainment, which may entail lower task demands and perceived stress.

These findings suggest that digital stress is significantly associated with increased psychosomatic burden, while self-efficacy may serve as a protective factor.

A multiple linear regression analysis was conducted to examine whether computer use (CU), GDSE, and total digital stress (DSS) predict the frequency and interference of psychosomatic symptoms in two separate models (PSS-F and PSS-I).

Table 3

Multiple Linear Regression Predicting Psychosomatic Symptom Frequency and Interference

Predictor	Psychosomatic symptoms									
	Frequency (PSS-I)					Interference (PSS-I)				
	B	SE	β	t	p	B	SE	β	t	p
CU	0.57	.35	.12	1.63	.106	0.12	0.24	0.04	0.50	0.616
GDSE	-1.19	.63	-.15	-1.89	.061	-0.87	0.43	-0.15	-2.00	.047
DSS	0.05	.01	.34	4.47	< .001	0.04	0.01	0.35	4.67	< .001

The overall model predicting PSS-F was statistically significant, F(3, 148) = 9.49, p < .001, explaining 16.1% of the variance (R² = .161, Adjusted R² = .144). Similarly, the PSS-I model was also significant, F(3, 148) = 9.84, p < .001, accounting for 16.6% of the variance (R² = .166, Adjusted R² = .149). These findings indicate that the predictors contribute to explaining both symptom frequency and their impact on daily life.

As shown in Table 3, DSS was a significant predictor in both models β = .35, p < .001 for PSS-F and for PSS-I β = .36, p < .001.

These results suggest that higher digital stress is associated with both more frequent psychosomatic symptoms and greater interference with daily functioning.
General digital self-efficacy (GDSE) demonstrated a significant negative association PSS-I, β = −.15, p = .047, suggesting a potential protective effect. However, it did not significantly predict the PSS-F, p = .061. Similarly, computer use did not reach statistical significance in predicting either PSS-F (p = .106) or PSS-I (p = .616).

Discussion

The aim of this manuscript was twofold (validation of the instrument and examining the burden of digital stress in the educational context).
Confirmatory factor analysis (CFA) supported the validity of the Croatian adaptation of the DSS, confirming the original 10-factor structure (Fischer et al., 2021; Riedl et al. 2023). Results showed high internal consistency, indicating that the Croatian DSS is a reliable and valid scale for future research.
The Psychosomatic Symptoms Questionnaire (PSS) confirmed a two-factor structure (symptom frequency and interference) supporting previous findings separating the burden of symptoms from their actual impact (Barbieri et al., 2024; Salanova et al., 2014; Vulić-Prtorić, 2019). Not all frequent symptoms were perceived as disruptive, indicating the importance of addressing both their occurrence and interference.
This study focused on the mental well-being of teachers by examining the burden of digital stress in the educational context, particularly in relation to its impact on physical health. The findings provide valuable insights into the relationship between digital stress and psychosomatic symptoms among Croatian teachers. The aim was to understand how different forms of digital stress, resulting from technological demands such as system unreliability and work-life conflicts, affect teachers' well-being and daily functioning. The roles of general self-efficacy and ICT use were also examined, further contextualizing how personal and technological factors interact with digital stress in impacting psychosomatic outcomes.
Correlation analysis showed strong associations between digital stress and both psychosomatic symptom dimensions, particularly in subscales like overload, invasion, and conflicts highlighting the complex structure and wide-ranging health implications of digital stress (Das et al., 2022; Jensen et al., 2002; Pirkkalainen et al., 2019).

Regression analyses revealed that digital stress was the strongest predictor of both symptom frequency and interference. These findings support earlier studies on the health effects of digital workload (Das et al., 2022; Pirkkalainen et al., 2019; Riedl et al., 2023). The findings highlight the importance of addressing digital work environments to improve teacher well-being, a concern that has been increasingly recognized in educational research (Fernández-Batanero et al., 2021; Gavade, Sidotam and Varanasi, 2023).

The results, reinforce prior research on the negative effects of technology-related stress on well-being (Fischer et al., 2021; Riedl et al., 2023; Nimrod, 2018). These findings align with Ayyagari et al. (2011), who emphasized the role of technological demands and overload in health outcomes. However, reported stress likely reflects multiple stressors. According to Lazarus and Folkman's (1984) transactional model, these perceptions are shaped by personal and contextual factors (personality traits, life circumstances and coping strategies).

General digital self-efficacy (GDSE) had a significant negative association with symptom frequency and interference. This suggests that while higher DSE may serve as a protective factor in mitigating the perceived impact of psychosomatic symptoms, it does not necessarily prevent their occurrence. These findings are in line with recent research on GDSE, which highlights its role in buffering job-related stress (Paredes-Aguirre et al., 2025). Self-directed digital training formats were more effective in enhancing GDSE than structured, directed programs, suggesting that personalized learning may be more beneficial in fostering digital coping skills. Similarly, Estrada-Muñoz et al. (2020) emphasize that technostress influences teacher performance, and that enhancing self-efficacy can reduce its effects. These insights emphasize the importance of investing in digital self-efficacy development, as a strategy to mitigate digital stress and its impact on well-being.

Computer use was not a significant predictor in either model. This finding aligns with research suggesting that stress associated with digital interactions and not mere usage, drives psychosomatic outcomes (Riedl et al., 2023). Age correlated weakly but significantly only with GDSE. Studies (Tekavc and Vončina, 2023) show both early-career and experienced teachers report high levels of work-related stress, indicating that professional experience may not significantly reduce stress exposure. One explanation for this may be the fast-paced and evolving demands of modern teaching environments, which pose challenges for teachers regardless of age or experience. This supports the conclusion that digital stress, rather than exposure to technology alone, is the key determinant of adverse health effects.

Results underscore the strong effects of digital stress on psychosomatic symptoms, highlighting its potential impact on well-being. While self-efficacy may serve a protective role in reducing symptom interference, its effect on symptom frequency was not statistically significant. The lack of significant effects of technology use suggests that digital stress, rather than technology use itself, is the key factor influencing psychosomatic outcomes.

These findings emphasize the argument that continuous professional development in digital literacy and stress management is essential for educators. Targeted interventions should be implemented in educational settings to reduce digital stress and improve teachers' physical and mental health. Results highlight the importance of interventions aimed at mitigating digital stress as a strategy to reduce adverse health effects and improve overall well-being. Schools and policymakers should promote digital well-being by limiting digital overload, improving work-life balance and providing adequate technical support.

Implications for Future Research

The Croatian DSS proved to be a reliable and valid instrument for measuring various dimensions of digital stress and is suitable for future research use. Given self-efficacy's potential protective role in reducing psychosomatic symptoms, teacher training programs should aim to strengthen digital confidence and coping strategies. Future research should also explore potential mediating and moderating variables such as coping mechanisms, sleep quality, or organizational support that may influence the relationship between digital stress and psychosomatic symptoms. Understanding these variables may guide the development of more effective interventions to enhance teacher well-being in digital environments.

Limitations

Despite its contributions, this study has certain limitations. The sample was relatively small and limited to Croatian teachers, limiting generalizability. Future research should replicate these findings in larger, more diverse populations and educational contexts. Given its correlational design, causal conclusions cannot be drawn. Longitudinal studies are needed to explore the long-term effects of digital stress on psychosomatic symptoms and potential mediators, such as coping strategies and workplace support.

As this study focused only on teachers, future research should examine whether similar patterns of digital stress occur across other digitally intensive work environments.

Data Availability Statement

The article is based on data fully presented and discussed within the article itself; therefore, no additional data archiving is required.

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Authors:

Sanja Tatković
University Assistant, Juraj Dobrila University of Pula, Faculty of Educational Sciences, Negrijeva 6, Pula, Croatia, e-mail: sanja.tatkovic@unipu.hr
Asistentka, Univerza Jurja Dobrile v Pulju, Fakulteta za vzgojne in izobraževalne vede, Negrijeva 6, Pulj, Hrvaška, e-pošta: sanja.tatkovic@unipu.hr

Sanja Smojver-Ažić
Full Professor, Faculty of Humanities and Social Studies, University of Rijeka, Sveučilišna avenija 4, Rijeka, Croatia, e-mail: sanja.smojver-azic@ffri.uniri.hr
Redna profesorica, Filozofska fakulteta, Univerza na Reki, Sveučilišna avenija 4, Reka, Hrvaška, e-pošta: sanja.smojver-azic@ffri.uniri.hr

Martina Mavrinac
Associate Professor, Juraj Dobrila University of Pula, Faculty of Educational Sciences, Negrijeva 6, Pula, Croatia, e-mail: martina.mavrinac@unipu.hr
Izredna profesorica, Univerza Jurja Dobrile v Pulju, Fakulteta za vzgojne in izobraževalne vede, Negrijeva 6, Pulj, Hrvaška, e-pošta: martina.mavrinac@unipu.hr