



Do The Digital Competencies of Physical Education and Sports Teachers Affect Their Levels of Technostress?*

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Abstract

This study aims to examine the relationship between the digital literacy and technostress levels of physical education and sports teachers, and to reveal the effect of digital literacy on technostress. The study group consists of 279 volunteer physical education and sports teachers working in various provinces across Türkiye. A correlational survey model was employed, with the Teacher Technostress Level Determination Scale (TTLDS) and the Teacher Digital Competence Scale (TDCS) selected as the data collection tools. The obtained data were analysed using the Jamovi 2.0.0 statistical programme. The analysis revealed that the teachers' proficiency in relation to the TDCS was moderate (66.3 ± 16.4), while their levels in relation to the TTLDS were also moderate (2.66 ± 0.65). Examining the relationship between the TDCS and the TTLDS revealed a weak negative and statistically significant correlation ($r = -0.134$). The results of the simple linear regression analysis showed that the explanatory power of the model was low ($R^2 = 0.017$). In line with these findings, it is recommended that the relationship between digital competence and technostress be examined in terms of factors such as organisational support, individual adaptation and technological equipment in different branches and regions.

Keywords: *Digital Literacy, Technostress and Physical Education and Sports Teaching*

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Beden Eğitimi ve Spor Öğretmenlerinin Dijital Yeterlilikleri Teknostres Düzeylerini Etkiler mi?

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Özet

Bu çalışmanın amacı, beden eğitimi ve spor öğretmenlerinin dijital yeterlilikleri ile teknostres düzeyleri arasındaki ilişkiyi incelemek ve dijital yeterliliğin teknostres üzerindeki etkisini ortaya koymaktır. Çalışma grubu gönüllü 279 beden eğitimi ve spor öğretmeninden oluşmaktadır. İlişkisel tarama modeli kullanılarak gerçekleştirilen çalışmada, veri toplama aracı olarak Öğretmenlerin Teknostres Düzeylerini Belirleme Ölçeği (ÖTDBÖ) ve Öğretmenlerin Dijital Yeterlilik Ölçeği (ÖDYÖ) tercih edilmiştir. Analiz sonuçlarına göre ÖDYÖ'ye ilişkin yeterliliklerinin orta ($66,3 \pm 16,4$), ÖTDBÖ'ye yönelik düzeylerinin ise orta ($2,66 \pm 0,65$) düzeyde olduğu tespit edilmiştir. ÖDYÖ ile ÖTDBÖ arasındaki ilişki incelendiğinde, zayıf negatif yönlü bir korelasyon bulunmuştur ($r = -0,134$). Yapılan basit doğrusal regresyon analizi sonucunda modelin açıklayıcılık gücü oldukça düşük bulunmuştur ($R^2 = 0,017$). Elde edilen bulgular doğrultusunda, dijital yeterlilik ve teknostres ilişkisini örgütsel destek, bireysel adaptasyon ve teknolojik donanım gibi faktörlerle incelemesi ve farklı branşlar ile bölgelerde yapılması önerilmektedir.

Anahtar Kelimeler: Dijital Yeterlilik, Teknostres, Beden Eğitimi ve Spor Öğretmeni

Introduction

Although research on educational technologies has primarily aimed to enhance students' learning processes, the influence of these technologies on teachers has largely been overlooked (Fernández-Batanero et al., 2021). Technologies have brought about fundamental changes in the way people work, and it has been reported that these tools make individuals more effective by simplifying their professional and personal lives (Ayyagari et al., 2011). The digital competencies that teachers require to use educational technologies effectively and efficiently are important for both their professional development and reducing the potential negative effects of technology. In this regard, Fernández and Pérez (2018) emphasise that digital competence is becoming increasingly important in education. Furthermore, digital literacy is considered one of the fundamental skills that teachers require to achieve their teaching objectives (Tomczyk, 2024). This demonstrates that digital literacy supports teachers in their daily teaching processes and plays a fundamental role in equipping future educators. In this context, it is also recognised that digital literacy is a structural as well as an individual need. Indeed, Van Dijk (2020) states that, as digital applications develop, individuals will require greater digital knowledge and skills. Tarus et al. (2015) emphasise that teachers expect timely and effective guidance in developing their technological competencies. Kivinen et al. (2016) state that rapid advances in information technology and the growing importance of information require transformation at all levels of education. However, the use of technology can sometimes have negative effects on teachers' lives. For example, it can weaken personal and social relationships, and constant digital interaction and expectations can put pressure on teachers' mental and physical health. Indeed, Claro et al. (2018) found that teachers lacked the necessary equipment to transfer their digital information and communication skills to their students. Their research revealed that, although some teachers could provide guidance in this area, the majority lacked the skills required to use digital tools effectively or teach using them. This situation demonstrates that teachers' inadequacies in using digital technologies can affect both the teaching process and their psychological well-being. Pressures related to the use of educational technologies most frequently manifest as stress and anxiety among teachers (Pérez, 2003). Over time, this situation can cause teachers to experience stress and anxiety in relation to technology, making their daily lives more difficult (Tarafdar et al., 2015). To evaluate the multifaceted effects of technology in educational environments, it is necessary to focus on the concept of 'technostress', which has become common among teachers in recent years. Technostress involves stress responses such as anxiety, worry, fear, anger and restlessness in situations related to technology (Yener, 2018). Brod (1982), who first introduced the concept of technostress to the literature, defined it as an adaptation problem in the modern age resulting from an inability to adapt to new technologies. As the concept of technostress has gained attention in academic literature, its meaning has expanded. Zhao et al. (2022) assessed this phenomenon as a general form of stress resulting from individuals' difficulty in adapting to new technologies encountered in work. Studies focusing on the effects of technostress on educators have shown that it can lead to negative psychological outcomes such as emotional exhaustion, lack of self-confidence, constant anxiety and feelings of inadequacy (Solís García et al., 2021).

This research is meaningful given the limited number of direct studies in the literature on the relationship between the digital competence levels of physical education and sports teachers and technostress. Examining the effect of digital competence on technostress in this context will contribute to a better understanding of the professional difficulties encountered in digital education processes. This study aims to examine the relationship between the digital literacy and technostress levels of physical education and sports teachers, and to reveal the predictive power of digital literacy on technostress. The main research question of the study is therefore as follows:

Does the digital literacy of physical education and sports teachers significantly predict their technostress levels?

The following hypotheses were tested in the study:

H¹: There is a significant correlation between the digital competence levels of physical education and sports teachers and their technostress levels.

H²: The digital competence levels of physical education and sports teachers significantly predict their technostress levels.

H⁰: Teachers' digital competence levels do not significantly predict their technostress levels.

Methodology

Research Model

A correlational survey model was used to examine the relationship between the digital literacy and technostress levels of physical education and sports teachers. A correlational survey aims to determine the degree to which two or more variables change together (Karasar, 2009). This study evaluates the relationship between participants' technostress levels and their digital literacy, the latter of which may affect the former. Therefore, this research method provides a suitable framework for revealing the relationships between the variables under investigation. The current research was conducted in accordance with the 'Higher Education Institutions Scientific Research and Publication Ethics Guidelines'.

Research Group

The study group consisted of physical education and sports teachers working in various provinces across Türkiye. Participants were selected using convenience sampling and data were collected via Google Forms. Participants had an average age of 37.2 ± 9.20 years and an average length of service of 12.3 ± 9.02 years. When determining the size of the research group, recommendations for sample sizes of 5, 10, or 20 times the number of items were taken into account (Sönmez & Alacapınar, 2016). Accordingly, a sample size of 279 participants was deemed sufficient for statistical analysis. Demographic information about the participants is provided in Table 1.

Table 1. Data on participants' demographic information

Variable		f	%
Gender	Female	80	28.7
	Male	199	71.3
Level	Middle school	147	52.7
	High school	132	47.3
Frequency of Technology Use	Rarely	37	13.3
	Sometimes	113	40.5
	Usually	99	35.5
	Always	30	10.8

Data Collection Tool

This study used two scales to measure the technostress and digital competence of participants: the Teacher Technostress Level Determination Scale and the Teacher Digital Competence Scale.

The Teachers' Technostress Level Determination Scale (TTLDS): Developed by Çoklar and colleagues (2017), this 28-item scale covers five sub-dimensions: Learning–Teaching Process Focused (7 items), Career Focused (6 items), Technical Subject Focused (6 items), Personally Related (5 items) and Socially Focused (4 items). The scale uses a 5-point Likert-type rating system (1 = Strongly Disagree, 5 = Strongly Agree). Evaluation is based on average item scores; scores between 1.00 and 2.33 are classified as 'low level', between 2.34 and 3.67 as 'medium level', and between 3.68 and 5.00 as 'advanced level'. The internal consistency coefficient (Cronbach's alpha) of the scale was calculated as 0.91, indicating that the scale is highly reliable. In this study, Cronbach's alpha was calculated as 0.94.

The Teachers' Digital Competence Scale (TDCS): Developed by Yılmaz Ergül and Taşar (2023), the scale comprises 19 items in total. It is structured according to a 5-point Likert-type rating system (1 = Never; 5 = Always). Participants are evaluated based on their total score, which can range from 19 to 95. Higher scores indicate a higher level of digital literacy. The internal consistency coefficient (Cronbach's alpha) of the scale was calculated as 0.94, indicating that the scale is highly reliable. In this study, Cronbach's alpha was calculated as 0.96.

Data Analysis

The quantitative data were analysed using Jamovi 2.0.0 statistical software, applying a 95% confidence interval and a 5% margin of error. Descriptive analyses were used to determine the basic characteristics of the sample group. To examine the distribution of the data, the skewness and kurtosis coefficients were calculated. It was assumed that the variables were normally distributed, as both coefficients fell within the range of -1.5 to +1.5 (Tabachnick & Fidell, 2013). In this regard, the calculated skewness values in the study were -0.89 and 0.19, while the calculated kurtosis values were 1.24 and 1.21, indicating a normal distribution of the data. Pearson correlation analysis was used to examine the relationships between the scales, and regression analysis was used to evaluate the effects of these relationships. Before regression analysis was performed, the basic assumptions were checked. The normality of the residuals was determined using a Q-Q plot and Cook's distance analysis. As the regression model met

the assumptions, the analysis was continued. Before conducting the regression analysis, the risk of multicollinearity among the independent variables (TDCS) was evaluated. The Pearson correlation coefficients were found to be at a level that did not pose a risk of multicollinearity. According to the literature, values of $r > 0.70$ (Meyers et al., 2006) are considered the warning threshold for multicollinearity.

Research Ethics

Permission to begin the study was obtained from the Social and Human Sciences Research Ethics Committee of Tokat Gaziosmanpaşa University on 10 August 2024 (document no. 469583). The research was conducted in accordance with the Helsinki Declaration and the principle of voluntary participation.

Results

Table 2.

Descriptive statistics and normality test results for TDCS and TTLDS

Factors	Min	Max	$\bar{x}$	Ss
TDCS	6	95	66.3	16,4
TTLDS	1	5	2.66	0,65

TTLDS: The Teachers' Technostress Level Determination Scale, TDCS: The Teachers' Digital Competence Scale

As shown in Table 2, participants' proficiency in TDCS is moderate (66.3 ± 16.4), as is their proficiency in TTLDS (2.66 ± 0.65).

Table 3.

Pearson correlation test results between participants' TDCS and TTLDS scores

	(TDCS)	(LTPF)	(CF)	(TSF)	(PR)	(SF)
(LTPF)	r -0.126*	—				
	p 0.03	—				
(CF)	r -0.172**	0.644***	—			
	p 0.00	0.00	—			
(TSF)	r -0.003	0.606***	0.546***	—		
	p 0.956	0.00	0.00	—		
(PR)	r -0.163**	0.578***	0.690***	0.635***	—	
	p 0.00	0,00	0.00	0.00	—	
(SF)	r -0.110	0.658***	0.587***	0.704***	0.683***	—
	p 0.06	0.00	0.00	0.00	0.00	—
(TTLDS)	r -0.134*	0.840***	0.832***	0.837***	0.844***	0.846***
	p 0.02	0.00	0.00	0.00	0.00	0.00

***= $p < 0.001$, TTLDS: The Teachers' Technostress Level Determination Scale, TDCS: The Teachers' Digital Competence Scale, LTPF: Learning–Teaching Process Focused, CF: Career Focused, TSF: Technical Subject Focused, PR: Personally Related, SF: Socially Focused

According to Table 3, the correlations between the sub-dimensions of LTPF, CF and PR which represent teachers' technostress levels, and TDCS are weak and not statistically significant. This suggests that there is no significant correlation between teachers' digital competencies and technostress sub-dimensions. Examining the relationship between TDCS and TTLDS revealed a negative and very weak correlation ($r = -0.134$, $p = 0.02$).

Table 4.

Results of linear regression analysis on the predictive effect of TDCS on TTLDS

Variable	B Coefficient	SE	t	P
Intercept (Fixed)	3.00845	0.16195	18.58	0.00***
TDCS	-0.00533	0.00237	-2.25	0.02
$R^2 = 0.017$, $F(1, 277) = 5.05$, $p = 0.02$				

TDCS: The Teachers' Digital Competence Scale

The results of the simple linear regression analysis showed that teachers' levels of digital competence significantly predict their levels of technostress ($F(1, 277) = 5.05$, $p = 0.02$). However, the explanatory power of the model is low ($R^2 = 0.017$). A negative relationship was found between digital competence and technostress ($B = -0.00533$, $p = 0.02$). This suggests that teachers with higher digital competence experience lower levels of stress caused by technological applications.

Discussion and Conclusion

This study examined physical education and sports teachers' perceptions of their own digital literacy and technostress levels. According to the findings, teachers' digital literacy levels were moderate. While this suggests that teachers have developed a general awareness of, and proficiency in, digital technologies, these skills have not yet been systematically integrated into all teaching practices. The relatively high standard deviation (16.4) suggests significant individual differences in digital literacy levels among participants. These differences may be attributed to variations in in-service training, access to technological equipment, age, years of experience and working conditions. Similarly, the literature emphasises that the perception of digital competence is closely related to individual teacher characteristics (Bahadır et al., 2024; Martínez Rico et al., 2022). Similarly, teachers' levels of technostress were found to be moderate. While the average value suggests that teachers can generally cope with stress arising from technology use, technical problems, pressure to adapt to digital tools or digital overload can sometimes be a source of stress. The relatively high standard deviation (0.65) indicates inconsistent technostress levels among participants; some teachers can use technology comfortably, while others find it stressful. A study by Gölpek Sarı and colleagues (2024) found that teachers' technostress levels were low. Another study found that teachers' technostress levels were moderate (Gökbulut, 2021). These findings suggest that teachers experience some stress when using technology, but not at a high level. The diversity of findings regarding technostress levels in different studies indicates that the technostress experienced by teachers varies depending on various factors. Indeed, a review of the literature reveals that teachers' technostress levels vary depending on work group, context and individual characteristics (Çelik, 2022; Kıncı & Özgür, 2022). Furthermore, this result is consistent with previous studies which suggest that technostress can vary depending on factors such as perceived personal competence, attitudes towards technology and access to digital support systems (Chou & Chou, 2021; Vázquez-Pajuelo et al., 2024). Indeed, Rohwer et al. (2022) also support this idea of a multidimensional interaction, demonstrating that individuals' subjective perceptions and emotional responses play a decisive role in the intensity and form of technostress. The findings of the current study reveal that digital competence and technostress vary depending on

individual and contextual factors. In particular, they suggest that the ways in which physical education and sports teachers work with digital tools may lead to different experiences compared to teachers in other disciplines. Integrating physical classroom lessons into digital platforms presents these teachers with additional challenges in terms of technical competence and pedagogical adaptation (Saiz-Gonzalez et al., 2025; Konukman & Filiz, 2024), which can directly impact their perceptions of digital literacy and technostress levels. The practical challenges that physical education teachers face when using digital technologies also play an important role. Bodsworth and Goodyear (2017) highlight the following factors as the main limiting factors teachers encounter in adopting digital technology: lack of time, cost, technological pedagogical content knowledge (TPACK), increased workload, and resistance to digital transformation. These factors act as practical barriers that directly impact the process of integrating technology into teaching. Therefore, given the unique professional practices of physical education teachers, it could be argued that this group requires more targeted support in digital transformation processes.

The correlation analysis revealed a weak, negative and statistically significant relationship between digital competence and technostress. This suggests that teachers with more advanced digital skills experience less technostress when using technology. However, the findings also show that this relationship is limited in terms of both effect size and statistical significance. Furthermore, the results of the regression analysis also indicate that the causal and explanatory power of this relationship is low. The explanatory power of the model is low: the digital competence variable only explains 1.7% of the variance in technostress levels. Therefore, although digital competence significantly affects technostress, the effect is limited. The aforementioned contexts may be influenced by factors such as the intensity of digital skill usage, organisational support, the processes through which individuals adapt, and the infrastructure of the educational system. As emphasised in the study by Nisafani et al. (2020), technostress research tends to be concentrated in specific geographical regions and the effects of technostress on individuals are significantly influenced by cultural and contextual factors. As our sample group consisted of physical education and sports teachers, technology integration may not have been directly required in the classroom for this particular subject. This may explain the weak relationship observed in the results. Therefore, it is less likely that a meaningful relationship will be found between digital literacy level and technostress within this group compared to other disciplines. This provides an important basis for explaining why the findings differ from those in other disciplines and why the strength of the relationship remains weak. Saiz-González et al. (2025) conducted a study with physical education and sports teachers and found that, although the teachers were willing to use digital technology in class, they faced obstacles such as insufficient resources, a lack of training in how to use technology effectively, a lack of institutional support and a lack of time. Similarly, Magallanes et al. (2024) found that, even when they had access to technology, the skill levels of physical education and sports teachers varied and were not reflected in classroom applications. Furthermore, Evans and Willis (2024) noted that physical education and sports teachers could only use such tools to a limited extent due to a lack of preparation and confidence in integrating wearable technologies into their lessons. These findings strongly support the explanation that the weak relationship observed between digital competence and technostress in our sample is due to limited

technology integration. Furthermore, the weak relationship between digital competence and technostress may be due to the fact that our sample group consisted of physical education and sports teachers, as technology integration is not directly required in this field in the classroom.

In conclusion, a weak and significant negative relationship was found between digital competence and technostress. However, regression analysis revealed that digital competence has limited predictive power with regard to technostress, explaining only 1.7% of the variance in technostress levels. This suggests that digital competence has a limited explanatory power with regard to technostress and is not a meaningful predictor in its own right. The relationship between the two is also significantly influenced by contextual factors. Therefore, future studies are recommended to examine contextual factors such as organisational support, individual adaptation processes and access to technological equipment, in order to better understand the relationship between digital competence and technostress. Furthermore, the generalisability of the findings should be increased through research conducted in different disciplines and geographical regions.

Information on Ethics Committee Approval

Ethics review board: Tokat Gaziosmanpaşa University Social and Humanities Research Ethics Committee

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Declaration of Researchers' Contributions

The first author was responsible for the processes related to the methods, findings, discussion and conclusions of the study, while the second author was responsible for the processes related to the introduction and data collection.

Statement of Conflict

The authors have no conflicts of interest to declare.

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