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Investigation of Classroom Teachers' Technostress Levels in Terms of ICT Competence Perceptions and Various Variables

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Article Info	ABSTRACT
	Technostress refers to the negative psychological and physical effects of technology use (Brod, 1984; Shu, Tu, & Wang ,2011). The reasons for this include factors such as information overload and inability to cope with the pressure to stay up to date with technology. Undoubtedly, there is a strong relationship between technostress and technology use (Brod, 1984). This study aims to reveal the relationship between the levels of technostress that classroom teachers may have experienced and their perceptions of competence towards Information Communication Technologies (ICT). In addition, teachers' technostress levels and ICT efficacy perceptions were examined in terms of various descriptive variables. The study was conducted with the relational survey model, one of the quantitative research methods, and two scales and various descriptive questions were used. In the study, independent sample t-test, Mann-Whitney U test and one sample ANOVA were used to determine the difference between multi-group variables. Bivariate Pearson correlation analysis was applied to test the relationship. The results of the analysis showed that there was a statistically significant relationship between teachers' technostress levels and their perceptions of ICT efficacy (r= 0.343; p<0.01). Accordingly, it was determined that as teachers' perceptions of ICT competence increased, their technostress levels decreased significantly. In addition, it was shown that ICT efficacy perceptions did not create a statistically significant difference in terms of gender, grade taught, place of teaching and social media use. On the other hand, the analysis revealed that teachers' professional experience made a difference in terms of ICT perceptions.

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INTRODUCTION

In this period, which is also called the age of technology, it is generally accepted that technology has significant effects on human behavior in many fields. Technology offers many determinants that affect the way individuals approach their work (Yu & Yu, 2010). Technostress refers to the negative psychological and physical effects resulting from the use of technology (Brod, 1984; Shu, Tu & Wang ,2011). Among the reasons for this are factors such as information overload and inability to cope with the pressure to stay up to date with technology. Technostress can manifest itself with symptoms such as anxiety, frustration, fatigue, and decreased productivity based on psychological pressure (Chiappetta, 2017; Nelson & Kletke, 1990). It can also lead to more serious problems such as burnout and digital addiction (Califf & Brooks, 2020). Managing technostress involves setting boundaries for technology use, practicing digital detox, and finding ways to reduce the impact of technology on daily life. Undoubtedly, there is a strong relationship between technostress and technology use (Brod, 1984). Over time, the concept of technostress has become more comprehensive and has been used to describe the psychological and emotional reasons for learning or using ICT technologies, which may prevent one from further learning or using the relevant technologies.

It has gained a broader meaning as a reflection of the individual's anxiety, fear, worry and distress that prevents him/her from using technology (Kıncı & Özgür, 2022). Technology use plays an important role in people's daily lives, including learning, and factors such as dependence on technology, constant connection, and information overload can lead to technostress (Hayta, 2007). With the use of technology, behaviors such as constantly checking e-mails, updating social media accounts, and constantly checking mobile applications may occur. For many people, this can create a sense of being constantly busy, feeling stressed and emotionally exhausted. In addition, the use of technology can also lead to information overload for many people. It increases the risk of experiencing information overload and the need to constantly keep up with incoming information such as emails, news, social media updates, etc. in order to learn new information. For these very reasons, there is a close relationship between technology use and technostress. Using technology correctly is important to reduce technostress (Califf & Brooks, 2020). In addition, it is important to individually set limits on technology use, take technological breaks from time to time, and implement strategies to reduce the negative effects of technology use.

Today, technostress has become a common problem among teachers (Madigan & Kim, 2021). Since teachers have to use technology in educational processes, they may be exposed to technostress intensively with the use of technology (Gökbulut & Dindaş, 2022). Factors such as being busy with technological devices, being exposed to information bombardment and the necessity to follow up continuously brought about by the use of technology wear teachers out in their professional lives (Burke, Greenglass & Schwarzer, 1996). This constant preoccupation can increase teachers' feelings of stress and burnout. Teachers can also deal with information overload resulting from the use of technology. As teachers take on the responsibility of providing information and content to their students, they may have to be constantly updated with new information and resources. This puts teachers under constant pressure to access and evaluate information. As a result, teachers can be considered as a group exposed to technostress. In order to reduce technostress, it is important for teachers to manage technology use properly, set limits on technology use, and implement strategies to reduce the negative effects of technology use (Çalışkan, 2022). In addition, it is emphasized that it is useful to provide in-service trainings for teachers on technology integration in online and distance education fields (Kıncı & Özgür, 2022).

Information and communication technologies (ICT) play a very important role in education. The use of ICT in education enables students to learn more effectively and teachers to teach and monitor students more efficiently. There are many different ways of using ICT in education. Although future teachers have many skills in these areas, it is a fact that they do not have enough comfort in using ICT

(Martinovic & Zhang, 2012). On the other hand, students can access information, study online resources and conduct research using technological tools such as the Internet, computer programs and digital devices. This makes it easier for students to access learning materials and helps them acquire knowledge from authentic sources. At the same time, educators can increase student engagement by using technology effectively in their classrooms. In this way, students can participate with more interest and motivation.

The use of technology in education is the use of technological tools and resources to improve the learning process and teaching methods. Nowadays, the importance of using technology in the field of education together with pedagogy and qualified up-to-date knowledge has increased (Saltan & Arslan, 2017). Understanding learners' behaviors, perceptions and their impact on learner performance is crucial for predicting their use of technological systems in education (Yu & Yu, 2010).

The use of online learning platforms comes in many different forms. Teachers can use tools such as presentation software, digital whiteboards, interactive games and online learning platforms to make lessons more effective and engaging. In this way, students can better understand the course material and participate with more motivation. Technology also offers students the opportunity for individualized learning in education. Using the Internet, students can access online resources, conduct research and learn from authentic sources. In addition, students can communicate and share ideas with other students on platforms such as online discussion forums or student communities. The benefits of using technology in education include a more interactive and collaborative learning environment. As a result, the use of technology in education improves the learning process, encourages students to actively participate and allows instructors to provide training more effectively. Technology expands the boundaries of education and enhances its lifelong dimensions. On the other hand, as technostress affects individuals working in many different sectors, it also negatively affects teachers working at all levels of the education sector (Chen, 2012; Effiyanti & Sagala, 2018). In his study, Gökbulut (2021) revealed a negative relationship between technostress and teaching profession field competencies. It is important to investigate the relationship between classroom teachers, who lay the most important foundations of formal education, and their perceptions of ICT competencies that they should use while performing their profession and their technostress levels in terms of other characteristics that define them. With this research, it is aimed to reveal the relationship between the technostress levels that classroom teachers may have experienced and their perceptions of competence towards Information and Communication Technologies. In addition, teachers' technostress levels and ICT efficacy perceptions were examined in terms of various descriptive variables. In line with this objective, answers to the following questions were sought in the study;

1. Classroom Teachers' Perceptions of ICT Competence; Differences in terms of gender, place of teaching, professional seniority, grade taught, age and social media and internet use does it show?

2. Technostress Levels of Classroom Teachers; Gender, place of teaching, professional seniority, grade taught, age and social media and internet usage does it show?

3. Is there a relationship between classroom teachers' technostress levels and their perceptions of ICT competence?

METHOD

The study employed a relational survey model, which is a quantitative research method. Relational survey models are methodologies for research that try to assess the existence and/or degree of change among two or more variables. Although correlational survey models do not provide a true cause-and-effect relationship, they allow for the prediction of the other variable if the situation in one variable is known. (Karasar, 2006)

Research Sample

In the study in which convenience sampling method was used, data were collected online from 190 teachers in the 2023-2024 academic year using Google Forms. Of the teachers participating in the study, 169 (52.3%) were male and 154 (47.7%) were female. Of the teachers who participated in the study, 201 (62.2%) were working in the center and 122 (37.8%) in the village.

Research Instruments and Processes

Two measurement tools and various descriptive questions were used in the study. The first scale is the "Scale for Determining Teachers' Technostress Levels" developed by Çoklar, Efilti, and Şahin (2017). The scale consists of 28 items of 5-point Likert-type questions and the internal consistency Cronbach's alpha coefficient for the scale was calculated as .917. The second scale is "Information and Communication Technologies (ICT) Competence Perception Scale" developed by Şad and Nalçacı (2015). The scale consists of 30 items of 5-point Likert-type questions and the internal consistency Cronbach's alpha coefficient for the scale was calculated as .960. In addition to these two scales, information on gender, place of teaching, professional seniority, grade, age and social media usage were collected through a form.

Data Analysis

The data were analyzed in two ways: descriptive and interpretive. SPSS 22.00 package program was used to analyze the data. Before analyzing the data, the assumptions necessary for conducting parametric tests were checked. To test the normality of the data, histograms and standardized Skewness and kurtosus values, as well as Kolmogorov-Smirnov tests were used. As a result of normality analyses, variables with normal distribution were reported as mean and standard deviation and variables without normal distribution were reported as median and IQR (inter Quartile range) in cases where serious violations were observed, taking into account the sample numbers in the groups. For two-group variables, differences between groups were investigated using the Independent sample t-test or Mann-Whitney U test, depending on normality. Differences between multigroup variables were tested with one-sample ANOVA. The significance value was set as $p < 0.05$ in statistical analyses. Bivariate Pearson correlation analysis was applied to test the relationship.

FINDINGS

The findings from the analysis of the data obtained are explained below depending on the research problems. But first, demographic information is summarised in Table 1. As can be seen, 47.7 per cent of the participants were female and 52.3 per cent were male teachers. The distribution according to working years is as follows: 22.9 percent for 0-5 years, 24.5 percent for 6-10 years, 25.1 percent for 11-20 years and 27.6 percent for more than 20 years. The classes taught by the primary school teachers participating in the study are distributed in similar proportions. 62.2 percent of the participants work in the city centre and 37.8 percent work in villages. All but 7.1 per cent of the participants use social media. The ICT competence perceptions of the participants were calculated as 3.9 out of 5. On the other hand, the average technostress levels were calculated as 2.37 out of 5.

Table 1. *Demographic data of the study*

Variables	N(%)
Gender	
Female	154 (47,7)
Male	169 (52,3)
Active classroom teaching	
0-5 years	74 (22,9)
6-10 years	79 (24,5)
11-20 years	81 (25,1)
20 years	89 (27,6)
Grade He/She teach	
1st grade	82 (25,4)

2nd grade	91 (28,2)
3rd grade	74 (22,9)
4th grade	76 (23,5)
Place of duty	
City Center	201 (62,2)
Village	122 (37,8)
Social media usage	
Use	300 (92,9)
Not use	23 (7,1)
ICT competence perceptions	3,90
Technostress Levels	2,37

How do ICT competence perceptions change according to independent variables?

In the study, it was examined how teachers' ICT competence perceptions were affected according to certain variables. Table 2 presents descriptive data and interpretation statistical findings for variables based on ICT proficiency.

Table 2. *Teachers' ICT competence perceptions*

Variables	N(%)	X	Sd	P	Post-hoc
Gender[1]				0,64 (-,46)	
Female	154 (47,7)	3,79	,67		
Male	169 (52,3)	3,75	,62		
Active classroom teaching[3]				**0,04 (4,51)***	**1>4**
					2>4
0-5 years	74 (22,9)	3,91	,47		
6-10 years	79 (24,5)	3,87	,63		
11-20 years	81 (25,1)	3,76	,66		
20 years	89 (27,6)	3,58	,72		
Grade He/She teach[3]				0,36 (1,06)	
1st grade	82 (25,4)	3,74	,59		
2nd grade	91 (28,2)	3,77	,68		
3rd grade	74 (22,9)	3,88	,56		
4th grade	76 (23,5)	3,70	,72		
Place of duty[4]				0,53 (-0,61)	
City Center	201 (62,2)	3,75	,67		
Village	122 (37,8)	3,80	,61		
Social media usage[1]				0,18 (1,38)	
Use	300 (92,9)	3,79	,61		
Not use	23 (7,1)	3,52	,92		
Daily Internet Usage[2]				**0,03 (2,84)***	**3>4**
Less than 1 hour	92(28,5)	3,69	,69		
v1-3 hours	162 (50,2)	3,80	,61		
3-5 hours	51 (15,8)	3,93	,58		
More than 5 hours	18 (5,6)	3,48	,78		
Age[2]	323 (100)	37,65	9,28	**0,01 (-0,18)***	

1, Man Whitney U-Test with Z Value; 2, Bivariate correlation with Perason Correlation value; 3, One-Way ANOVA with F Value; 4, Independent sample t-test with t value

As a result of the analyses, it was shown that ICT efficacy perceptions did not show a statistically significant difference in terms of gender, grade taught, place of teaching and social media use. On the other hand, the ANOVA analysis revealed that teachers' professional experience made a difference in terms of ICT perceptions. Accordingly, the duration of active classroom teaching is a determinant in

terms of ICT competency levels. Post-hoc analysis with Bonferoni correction was conducted to determine in which groups this significant difference occurred. The findings revealed that teachers with 20 or more years of experience (x=3.58; ss=0.72) had lower ICT averages than both teachers with 0-5 years of experience (x=3.91; ss=0.47) and teachers with 6-10 years of experience and this difference was statistically significant (p<0.05). Teachers' daily internet use was found to be a determinant of their perceptions of ICT competence. As a result of the ANOVA analysis, it was concluded that the hours of daily internet use had a significant effect on ICT levels, with a difference in at least one group F(3,319)= 2.84). Post-hoc analysis results with Bonferoni correction to determine in which groups the difference occurred, the mean values of the group that used the Internet between 3 and 5 hours (x=3.93 SD=0.58) were significantly higher than the group that used it for more than 5 hours (x=3.48 SD=0.78).

In the study, the relationship between age and ICT competence perception levels was analyzed by Bivariate correlation analysis and the results of the analysis revealed a statistically significant relationship (r=0.18; p<0.01). This finding indicated that there was a decrease in ICT efficacy perception levels with increasing age. However, depending on the Pearson correlation value obtained, the relationship between the two variables is at a low level.

How do teachers' technostress levels change according to independent variables?

It was also examined how teachers' technostress levels were affected according to certain variables. Table 3 summarizes the findings based on technostress levels.

Table 3. *Teachers' technostress levels and analysis*

Variables	N(%)	X	Sd	P	Post-hoc
Gender[1]				0,26 (-1,11)	
Female	154 (47,7)	2,33	,65		
Male	169 (52,3)	2,42	,71		
Active classroom teaching[2]				0,59 (0,64)	
0-5 years	74 (22,9)	2,46	,69		
6-10 years	79 (24,5)	2,32	,68		
11-20 years	81 (25,1)	2,36	,69		
20 years	89 (27,6)	2,36	,66		
Grade He/She teach[2]				**0,00 (5,52)***	**1>3**
1st grade	82 (25,4)	2,55	,71		**4>3**
2nd grade	91 (28,2)	2,32	,61		
3rd grade	74 (22,9)	2,15	,63		
4th grade	76 (23,5)	2,45	,71		
Place of duty[1]				0,86 (0,17)	
City Center	201 (62,2)	2,38	,63		
Village	122 (37,8)	2,36	,75		
Social media usage[1]				0,94 (-0,07)	
Use	300 (92,9)	2,37	,67		
Not use	23 (7,1)	2,38	,75		
Daily Internet Usage[2]				0,87 (2,21)	
Less than 1 hour	92(28,5)	2,38	,69		
v1-3 hours	162 (50,2)	2,38	,61		
3-5 hours	51 (15,8)	2,23	,58		
More than 5 hours	18 (5,6)	2,70	,78		
Age[3]	323 (100)	37,65	9,28	0,87 (0,00)	

1, Independent sample t-test with t value; 2, One-way ANOVA with F value; 3, Bivariate correlation with

Perason Correlation Value

Once different variables were considered in the analysis of the instructors' technostress levels, it was determined that there were no significant differences in technostress levels in terms of gender, duration of active classroom teaching, place of teaching, social media use and daily internet use. On the other hand, the differences in terms of the grade level are statistically significant (p<0.05). ANOVA analysis findings showed that technostress levels differed significantly in at least one of the 4 groups $F(3,319)=5.25$ p=0.002. Post-hoc analysis with Bonferonni correction was conducted to determine in which groups the difference occurred. The results showed that the technostaress levels of the teachers teaching 1st grade (x=2,55 SD=0,71) were higher and statistically significant (p<0,05) than those teaching 3rd grade (x=2,15 SD=0,63). Similarly, the technostress levels of the 4th grade teachers (x=2,45 SD=0,71) were higher and statistically significant than the 3rd grade teachers (p<0,05).

Is there a relationship between classroom teachers' technostress levels and their perceptions of ICT competence?

Bivariate Pearson correlation analysis was applied to determine the relationship between teachers' technostress levels and ICT competency perception levels. The results of the analysis showed that there was a negative and statistically significant relationship between the two variables below 0.01 significance level (r= 0.343; p<0.01). Accordingly, it was determined that technostress levels decreased significantly as teachers' ICT competency perception levels increased. The results are shown in table 4.

Table 4. *Descriptive data and correlation values for Technostress Levels and ICT levels*

Variables	X	Sd	1
Teknostress levels	2,77	,68	-
ICT competence perceptions	3,90	,64	-0,343(0,00)*

* p<0,01

DISCUSSION and CONCLUSION

Technostress experienced by teachers is a new concept that emerges as stress and burnout caused by the use of technology. However, the use of ICT in education has long been an issue that teachers have been encouraged to use, even as a government policy. With the increased use of ICT in education, the learning experience is expected to become more effective and efficient. On the other hand, this raises the question of how this affects the technostress experienced by teachers. In this study, the relationship between the levels of technostress that classroom teachers may have experienced and their perceptions of ICT competence was revealed, and teachers' technostress levels and ICT competence perceptions were examined in terms of various descriptive variables. It was shown that ICT efficacy perceptions did not show a statistically significant difference in terms of gender, grade taught, place of teaching and social media use. On the other hand, teachers' professional experience made a difference in terms of ICT perceptions, and it was found that teachers with 20 years of experience or more had lower ICT averages than both teachers with 0-5 years of experience and teachers with 6-10 years of experience, and this difference was statistically significant. In the study conducted by Dikmen, Akyıl, and Akçay (2021) with classroom teachers, it was found that while there was no significant difference in teachers' perceptions of ICT competence according to the gender variable; it was found that there was a significant difference according to the grade level taught, years of professional seniority, age variable, educational status and willingness to use technology in lessons. Similarly, in the study conducted by Akgün (2013) on internet technologies, it was found that the gender variable did not create a significant difference, while there was a significant difference between the variables of branch and frequency of internet use. On the contrary, Topal and Akgün (2013) show that male pre-service teachers have significantly higher selfefficacy perceptions of Internet use for educational purposes than female pre-service teachers. In the current study, the relationship between age variable and ICT efficacy perception levels was examined by correlation analysis and the results of the analysis revealed a statistically significant but low level relationship. As expected, a decrease in ICT efficacy perception levels was

observed with increasing age. Eryılmaz, Sarıçayır, and Yıldız (2020) found that there was no significant difference between ICT competence perception and gender, but there is a moderate relationship between internet addiction and internet addiction and the age variable also creates a significant difference. It was seen that there were no significant differences in the technostress levels of teachers in terms of gender, duration of active classroom teaching, place of teaching, social media use and daily internet use. It is seen that there are studies supporting these findings in the literature. When we consider gender, it is seen that technostress levels do not show a significant difference (Gökbulut, 2021). Similarly, Çoklar, Efilti, and Şahin (2019) determined that there was no significant difference between branch and technostress in their study. In the study conducted by Kıncı and Özgür (2022), the relationship between teachers' technostress levels and their education levels was examined and similarly, no significant difference was observed according to the education level. Akman and Durgun (2022) revealed the following results in their study; Accordingly, teachers' professional motivation levels do not differ according to gender and graduation field. However, it was determined that there is a relationship between teachers' professional motivation and technostress levels. On the other hand, the differences in terms of the class taught are statistically significant. The grade level of the teachers at the time of data collection is a determinant of their technostress levels. The 1st grade teachers' technostress levels were significantly higher and statistically significant than the 3rd grade teachers. Similarly, the technostress levels of teachers teaching 4th grade were higher and statistically significant than those teaching 3rd grade. The literature cites daily stress as the most important explanatory factor of technostress (Brod, 1984; Chiappetta, 2017; Shu, Tu, & Wang ,2011; Nelson & Kletke, 1990). In the context in which the study was conducted, classroom teachers work very hard to provide 1st grade students with very important skills such as reading-writing and school adaptation. In Grade 4, they make a similar effort to place them in qualified secondary schools where they will be placed according to their achievement status, and they have more difficulties and work result-oriented compared to other levels. Correlation analysis was performed to determine the relationship between teachers' technostress levels and ICT competence perception levels and a negative, statistically significant relationship was found at a moderate level. Accordingly, it was determined that as the ICT competence perception levels of teachers increased, their technostress levels decreased significantly.

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