Examining the relationship between teachers' self-efficacy on educational technology standards and technostress levels

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Abstract
The aim of the study was to determine the relationship between teachers' educational technology self-efficacy and technostress levels. In order to collect data in the research, two scales were used: "Educational Technologies Standards Self-Efficacy Scale" and "Teachers' Technostress Level Determination Scale". As a result of the research, teachers' educational technology standards self-efficacy was found to be high. While the teachers' self-efficacy did not differ significantly according to the gender variable, a significant difference was found according to the age and school level variables. Teachers' technostress levels were found to be moderate. While the technostress levels of teachers do not differ significantly according to gender and age variables, they differ according to the type of school level. A significant negative relationship was found between teachers' educational technology standards self-efficacy and technostress levels. Teachers' educational technology standards self-efficacy is a significant predictor of their technostress levels.

Keywords: Educational technology, standards self-efficacy, technostress, teacher

Introduction

The fastest social change process seen throughout history has undoubtedly started with the introduction of information and communication technologies into human life. In the information age, where it is aimed to increase the quality of life by facilitating human life, many fields from science to art, from health to education, from communication to transportation have been deeply affected. The usage areas of information technologies, which promise a comfortable future for humanity, are increasing day by day (Göksun, Haseski & Leymun, 2019). Technology, which has become indispensable in all areas of life, has an irreplaceable importance in the field of education. The use of technology in education has brought the concept of educational technology (Güneş, 2019). Educational technologies, which are used to enrich education and facilitate the work of education stakeholders, are a dynamic process that focuses on the planning, implementation, evaluation and restructuring of education in order to enable students to learn at the highest level (Coklar, 2008). Educational stakeholders have important duties to manage this dynamic process effectively and efficiently.

Based on the reflection of the dizzying change and transformation in the technological field in education, the education system and the stakeholders of the system are going to renew themselves (Yakın & Okur, 2018). Undoubtedly, teachers are one of the most important stakeholders in the integration of information and communication technologies into learning and teaching environments and in enabling students to use these technologies effectively and efficiently (Ozan & Taşgın, 2017). Teachers who benefit from instructional technologies in education and use materials suitable for their lessons contribute to both the more effective and efficient teaching of the lessons and the more permanent and understandable lessons by attracting the attention of the students (Akgün, 2020). However, the fact that each of the teachers cannot benefit from educational technology as needed has created the need to provide a unity for the use of educational technologies (Coklar, 2008). To increase leadership level, teachers and school administers should increase their technological leadership level not

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only males but also females as well. Considering that the technological leadership of female school principals is low compared to men, when the school principal is evaluated by considering the low number of female employees, this situation should be considered in the context of women being a candidate for management (Tulunay Ateş &Akın Mart, 2021). In order to ensure this unity, it is very important to determine what skills and knowledge educators should have in order to use technology more effectively in the classroom, and various guiding frameworks and standards have been developed around the world (Crompton & Sykora, 2021).

One of these standards is the educational technology standards for teachers, students, administrators and technology coaches determined by The International Society for Technology in Education (ISTE). ISTE Standards, which have been adopted by many countries today, have been accepted as a guide for the use of educational technologies (Türker, 2019). Aligned with UNESCO's Sustainable Development Goals, the ISTE Standards provide competencies for learning, teaching and leadership in the digital age, providing a comprehensive roadmap for the effective use of technology in schools worldwide (ISTE, 2019).

ISTE standards, first published in 1993 under the name of NETS, have taken their current form by making various updates over the years. (Orhan, Kurt, Ozan, Vural, & Türkan, 2014). ISTE Standards for teachers (ISTE, 2019) determined with the update made in 2019; It is presented under the titles of Student Educators, Leader Educators, Citizen Educators, Collaborative Educators, Designer Educators, Facilitator Educators, and Analyst Educators. ISTE standards give teachers the role of students who constantly renew themselves by following technological developments; the role of a leader who empowers his students and enhances their learning; the role of a citizen who inspires students to make positive contributions to the digital world and to be aware of their responsibilities; its collaborative role, collaborating with colleagues and students in developing digital applications and finding solutions to problems; to the role of designer who designs student-centered activities and environments; It requires them to have the role of facilitator facilitating their students' learning with technology and the role of analyst who makes use of data in order for their students to achieve their learning goals.

Educational technology standards and explanations for teachers are stated by ISTE as follows (Şimşek and Author, 2017):
1. Facilitating students' learning and encouraging creativity: Teachers organize activities that will improve students' learning, creativity and innovative features in both face-to-face and virtual environments by using technology in the learning-teaching processes.
2. Designing and developing learning environments and assessment activities suitable for the digital age: Teachers design, develop and evaluate original learning activities integrated with contemporary learning tools for effective learning to take place.
3. Pioneering the digital age of work and learning: Teachers, the digital age required They lead by displaying the knowledge, skills and attitudes that an innovative employee should have.
4. Being a model in digital citizenship: Teachers take responsibility for the local and universal problems of the information society, they take care to comply with the rules by acting ethically in their professional life.
5. Participating in professional development and leadership activities: Teachers develop themselves continuously, become a model for lifelong learning, and exhibit leadership behaviors by using technological tools and resources effectively.

Teachers' self-efficacy towards educational technology standards constitutes an important dynamic of the teaching process. It is thought that teachers who have proficiency in the integration of technology into educational activities and educational technology standards in the education process will make learning environments richer and more productive (Akdiş, 2022). Teachers' use of technology in teaching both increases the effectiveness and efficiency of the lessons and can support more permanent learning by attracting students' attention to the lesson (Akgün, 2020). However, it is an inevitable fact that information and communication technologies, which bring dizzying developments in education as well as in all fields, bring with them a number of problems as well as many opportunities.

The inclusion of information and communication technologies in organizational life has led to the renewal of the definitions of organizational structures and work processes and has increased the level of technology dependence

of employees (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). As in all organizations, the use of technology in schools, which are educational organizations, is becoming increasingly widespread, and with this spread, many positive and negative consequences are encountered.

Information and communication technologies; It causes stress due to its complex nature, frequent changes, requiring more work, causing excessive multitasking and bringing technical problems with it (Ragu-Nathan, Tarafdar, Ragu-Nathan & Tu, 2008). This type of stress originating from technology is referred to as technostress in the literature.

Brod (1984) used the concept of technostress, which he defined as a modern adaptation disease arising from the inability to adapt to new technologies, for the first time in the literature. Technostress is a concept that expresses the stress experienced by individuals due to the use of information and communication technologies (Brod, 1984; Ragu-Nathan, Tarafdar, Ragu-Nathan & Tu, 2008). Technostress, which is frequently mentioned in recent years and seen as a harmful attitude for organizations, appears as an important threat factor that leads to a decrease in the effectiveness and effectiveness of organizations and to prevent their success (Sen, 2022). Technostress, which lowers the living standards of individuals and causes health problems, may reduce the performance of teachers, who shed light on the future, by causing a loss of motivation (Çelik, B. N., 2022).

Teachers' positive or negative attitudes towards any lesson, subject, situation, person or object in the education process may cause a similar effect on their students (Akgün, 2020). Therefore, it is an expected result that students of teachers who experience technology-induced stress and have a negative attitude towards technology will experience similar anxieties.

Fears and anxieties stemming from technostress may result in individuals' resistance to innovation. However, the survival of organizations in today's competitive environment is closely related to their innovative features (Çetin & Bülbül, 2017). It is important for organizations to develop their employees in a way that can resist technostress conditions and their consequences, such as adopting information technologies, increasing their technological awareness and competencies, and not mixing the boundaries of working life and private life (Sen, 2022).

It is thought that increasing teachers' self-efficacy towards educational technology standards will have an effect that may reduce their technostress in the use of technology in education. For this purpose, it is important to first investigate teachers' self-efficacy for educational technology standards, and then to address the relationship of this self-efficacy with technostress. There are no studies in the literature examining the relationship between educational technology standards self-efficacy and technostress. The main purpose of this research is to examine the relationship between teachers' self-efficacy towards educational technology standards and their technostress levels resulting from the use of technology in education. For this purpose, answers to the following questions were sought:

1. What is the teachers' perception of their self-efficacy towards educational technology standards?
2. Teachers' perceptions of their self-efficacy towards educational technology standards; gender, age, and vocation or Does it show a significant difference in terms of school level variables?
3. What is the teachers' technostress perception level?
4. Teachers' perceptions of technostress; Does it show a significant difference in terms of gender, age and school level variables?
5. Is there a significant relationship between teachers' self-efficacy towards educational technology standards and their technostress perceptions?
6. Is teachers' self-efficacy towards educational technology standards a significant predictor of teachers' technostress perceptions?

Method

Quantitative research approach was used in this study, which aimed to examine the relationship between teachers' self-efficacy towards educational technology standards and teachers' technostress levels. One of the most frequently used techniques in quantitative research is survey type research. In this study, relational screening design, which is one of the quantitative research approach types, was used. The opinions of the participants on a

subject or their interests, skills, abilities, attitudes, etc. Studies conducted on larger samples than other studies, in which the characteristics of the research are determined, are called survey studies (Şen, 2015). Relational screening models; Since it is used for research models aiming to determine the existence or degree of co-variance between two or more variables, it is considered appropriate for this type of research (Cohen, Manion, & Morrison, 2007; Karasar, 2006).

The research population consists of teachers working in public schools affiliated to the Ministry of National Education in Çaycuma district of Zonguldak province in the 2022-2023 academic year. Information about the universe was obtained from the Strategy Development Services Unit of the Çaycuma District Directorate of National Education. There are a total of 839 teachers in kindergartens, primary schools, secondary schools and high schools in Çaycuma district of Zonguldak province. The sample of the study, which was determined by the convenience sampling method, consists of 269 people, who are thought to represent the universe of 839 people. Of the scales distributed to a total of 269 teachers, 241 were returned and 8 scales that were not filled properly were canceled and 233 scales were included in the analysis. Detailed information about the sampling is given in Table 1.

Table 1. Demographic Characteristics of Participating Teachers

Independent variable	Category	f	%
Gender	Female	136	58,4
	Male	97	41,6
Age	30 years and under	25	10,7
	31-40 years	71	30,5
	41-50 years	89	38,2
	51 years and older	48	20,6
School Grade	Pre-school	8	3,4
	Primary School	96	41,2
	Secondary School	91	39,1
	High School	38	16,3
Total		233	100

According to Table 1, there are a total of 233 teachers whose opinions were taken within the scope of the research. It is seen that more than half of the 233 teachers, 136 female and 97 male teachers, are female teachers. When the distribution of teachers in terms of age variable is examined, it is seen that the teachers in the 41-50 age group take the first place (38.2%). This was followed by teachers aged 31-40 (30.5%) and 51 years and older (20.6%). In terms of age variable, teachers aged 30 and younger took the last place (10.7%). In terms of the school level in which they work, teachers working in primary schools are in the first place (41.2%). This was followed by teachers working in secondary schools with 39.1%. Teachers working in kindergartens took the last place with 3.4%.

Data Collection Tools

During the data collection phase, besides the "Personal Information Form" developed by the researcher, 2 different scales were used, namely the "Teachers' Self-Efficacy Scale for Educational Technology Standards" and "Teachers' Technostress Levels Determination Scale". 'Teachers' Self-Efficacy Scale for Educational Technology Standards', developed by Şimşek and Yazar (2016), consists of 40 items and 5 sub-dimensions. The sub-dimensions of the scale are (1) Facilitating students' learning and encouraging creativity (2) Designing and developing learning environments and assessment activities suitable for the digital age (3) Leading the working and learning approach of the digital age (4) Being a model in digital citizenship (5) Professional participation in development and leadership activities. In this study, Cronbach's alpha coefficient was calculated for the overall scale and its sub-dimensions for the reliability of the scale, and .976 for the overall scale; for its sub-dimensions, it was found as .908, .953, .916, .846, .933.

The "Teachers' Technostress Level Determination Scale" developed by Çoklar, Efilti, and Şahin (2017) consists of 28 items and 5 factors. They are "Learning-Teaching Process Oriented", "Profession Oriented", "Technical Subject Oriented", "Personally Based" and "Social Oriented". The scale is 5-point Likert type. The scale items are

"Totally Agree", "Agree", "Partly Agree", "Disagree" and "Strongly Disagree". In this study, the Cronbach's alpha coefficient calculated for the reliability of the scale was found to be .932 for the overall scale; for the sub-dimensions it was found as .813, .814, .863, .860 and .745.

Analysis of Data

SPSS 26.00 program was used for data analysis in the research. Before starting the analysis of the data, the distribution of the data was examined. As a result of the Kolmogorov Smirnov normality test, which was performed to determine whether the distribution of the data was normal, it was seen that the research data were not normally distributed.

The significance level of the study, in which all the results were tested bilaterally, was accepted as at least 0.05, and all statistical analyzes were performed with the SPSS 26.0 program.

Self-efficacy levels were evaluated as follows, according to the range in which the mean scores of the Self-Efficacy Scale decreased.

1.00 – 1.80 I strongly disagree
1.81 – 2.60 Disagree
2.61 – 3.40 I somewhat agree
3.41 – 4.20 Agree
4.21 – 5.00 Totally agree

Technostress levels were evaluated as follows, according to the range in which the mean scores of the Technostress Scale decreased:

1.00 – 2.33 Low Level
2.34 – 3.67 Intermediate
3.68 – 5.00 Advanced

Findings

Findings Related to the First Sub-Problem

When the table 4, in which the self-efficacy scores of 233 teachers participating in the research are given, is examined, the arithmetic mean of the teachers' educational technology standards self-efficacy scores was found to be 4.07 and the standard deviation 0.53. Considering that the highest average score that can be obtained from the scale is 5, it can be stated that the educational technology standards self-efficacy scores of the teachers participating in the research are at the level of "agree". Descriptive Statistics Values of Sub-Dimensions of "Self-Efficacy Scale" are presented in Table 2.

Table 2. Descriptive Statistical Values of the Sub-Dimensions of the "Self-Efficacy Scale"

Self-Efficacy Scale Sub-Dimensions	N	X	sd
(1) Facilitate students' learning and encourage creativity	233	4,20	,54
(2) Designing and developing learning environments and assessment activities suitable for the digital age	233	3,98	,65
(3) Pioneering work and learning in the digital age	233	3,97	,65
(4) Being a model in digital citizenship	233	4,11	,53
(5) Participating in professional development and leadership activities	233	4,04	,60

According to Table 2, while teachers have self-efficacy at the level of "agree" in the sub-dimensions of "facilitating students' learning and encouraging creativity", "being a model in digital citizenship" and "participating in professional development and leadership activities"; It was found that they were at the level of "totally agree" in the sub-dimensions of "designing and developing learning environments and assessment activities suitable for the digital age" and "leading the working and learning approach of the digital age".

Findings Related to the Second Sub-Problem

At this stage of the findings section, the results of the hypothesis tests carried out to reveal the differences in the total score averages of the "Self-Efficacy Scale" are included.

In order to test the significant difference between teachers' educational technology standards self-efficacy, the Mann-Withney U test was performed for the gender variable, and the results obtained by performing the Kruskal Walles analysis for the age and school level variables are given in Table 3.

Table 3. **Differences Between Self-Efficacy Scale Total Means by Gender, Age and School Level Variables**

Self-efficıency Scale	Gender	N	p	Age	N	p	School Grade	N	p
(1) Facilitate students' learning and encourage creativity	Female Male	136 97	,647	30 years and unders 31-40 years 41-50 years 51 years and older	25 71 89 48	,180	Pre-School Primary School Secondary School High School	8 96 91 38	,311
(2) Designing and developing learning environments and assessment activities suitable for the digital age	Female Male	136 97	,789	30 years and unders 31-40 years 41-50 years 51 years and older	25 71 89 48	,007	Pre-School Primary School Secondary School High School	8 96 91 38	,049
(3) Pioneering work and learning in the digital age	Female Male	136 97	,530	30 years and unders 31-40 years 41-50 years 51 years and older	25 71 89 48	,020	Pre-School Primary School Secondary School High School	8 96 91 38	,330
(4) Being a model in digital citizenship	Female Male	136 97	,386	30 years and unders 31-40 years 41-50 years 51 years and older	25 71 89 48	,314	Pre-School Primary School Secondary School High School	8 96 91 38	,298
(5) Participating in professional development and leadership activities	Female Male	136 97	,600	30 years and unders 31-40 years 41-50 years 51 years and older	25 71 89 48	,060	Pre-School Primary School Secondary School High School	8 96 91 38	,038
Self-efficıency Scale Total Score	Female Male	136 97	,777	30 years and unders 31-40 years 41-50 years 51 years and older	25 71 89 48	,059	Pre-School Primary School Secondary School High School	8 96 91 38	,084

*p<.05 **p<.01 ***p<.001

According to the gender variable, there was no statistically significant difference between the total score averages and sub-dimensions of the self-efficacy scale. [p>.05]. Female and male teachers have equal self-efficacy perceptions regarding educational technologies.

In the Kruskal Walles analysis performed for the mean self-efficacy total score according to the age variable, there was no statistically significant difference according to the age variable, but it was reached that there was a difference in the 2nd Sub-dimension and the 3rd Sub-dimension scores. In both sub-dimensions, it was found that there was a significant difference between the educational technology standards self-efficacy of "30 years old and under" and "41-50 years old" teachers. The self-efficacy of “30 years old and under” teachers in educational technology standards is higher than teachers aged “41-50”.

In the Kruskal Walles analysis conducted for the self-efficacy total score average according to the variable of the school level, there was no statistically significant difference at the level of .05. However, a significant difference was found between the 2nd and 5th sub-dimensions of the Self-Efficacy scale. In both the 2nd and 3rd sub-dimensions, it was revealed that the teachers working in kindergarten had higher educational technology standards self-efficacy scores than the teachers working at other levels.

Findings Related to the Third Sub-Problem

The technostress scores of 233 teachers participating in the research are given in Table 4. The arithmetic mean of teachers' technostress scores was found to be 2.49, and the standard deviation 0.55. The highest average score that

can be obtained from the scale is 5. These findings indicate that teachers' technostress scores are at a moderate level. In Table 4, Statistical Values of the "Technostress Scale" are presented.

Table 4. Statistical Values of the "Technostress Scale"

Technostress Scale Sub-Dimensions	N	X	sd
(1) Learning – Teaching Process Oriented	233	2,63	,66
(2) Professional design and development	233	2,05	,58
(3) Technical Subject Oriented	233	2,79	,77
(4) Personally Originated	233	2,29	,71
(5) Socially Oriented	233	2,74	,71

According to Table 4, a low level of teacher technostress perception was reached in the "designing and developing for the profession" sub-dimension and the "personal origin" sub-dimensions. In the sub-dimensions of "learning-teaching process focused", "technical subject focused" and "social focused", there is a medium level of teacher technostress perception.

Findings Related to the Fourth Sub-Problem

At this stage of the findings section, the results of the hypothesis tests carried out to determine the differences between the total score averages of the "Technostress Scale" according to the independent variables collected by the questionnaire are included.

According to the gender variable, the results of the unrelated group "Mann Whitney U test", in which the difference between teachers' technostress levels were tested, are given in the table below.

Table 5. Differences in Total Means of Technostress Scale by Gender, Age and School Level Variables

Technostress Scale	Gender	N	p	Age	N	p	School Grade	N	p
(1) Learning – Teaching Process Oriented	Female	136	,523	30 years and unders	25	,275	Pre-School	8	,009
	Male	97		31-40 years	71		Primary School	96	
				41-50 years	89		Secondary School	91	
				51 years and older	48		High School	38	
(2) Professional design and development	Female	136	,550	30 years and unders	25	,292	Pre-School	8	,034
	Male	97		31-40 years	71		Primary School	96	
				41-50 years	89		Secondary School	91	
				51 years and older	48		High School	38	
(3) Technical Subject Oriented	Female	136	,009	30 years and unders	25	,238	Pre-School	8	,087
	Male	97		31-40 years	71		Primary School	96	
				41-50 years	89		Secondary School	91	
				51 years and older	48		High School	38	
(4) Personally Originated	Female	136	,127	30 years and unders	25	,333	Pre-School	8	,424
	Male	97		31-40 years	71		Primary School	96	
				41-50 years	89		Secondary School	91	
				51 years and older	48		High School	38	
(5) Socially Oriented	Female	136	,054	30 years and unders	25	,268	Pre-School	8	,181
	Male	97		31-40 years	71		Primary School	96	
				41-50 years	89		Secondary School	91	
				51 years and older	48		High School	38	
Technostress Scale Total Score	Female	136	,131	30 years and unders	25	,451	Pre-School	8	,022
	Male	97		31-40 years	71		Primary School	96	
				41-50 years	89		Secondary School	91	
				51 years and older	48		High School	38	

*p<.05 **p<.01 ***p<.001

According to the gender variable, there was no statistically significant difference between the total mean scores of the Technostress Scale. [p>.05]. The technostress levels of female and male teachers are equal. Among the sub-dimensions, there was a significant difference between the averages of only the 3rd sub-dimension.

According to the Kruskal Walles analysis performed for the technostress total score average according to the age variable, there was no statistically significant difference at the .05 level. The technostress levels of teachers in different age groups are equal to each other.

In the Kruskal Walles analysis performed for the total technostress score average according to the variable of the school level, a statistically significant difference was found at the level of .05. According to the results of the analysis, it was found that there is a significant difference between the technostress total scores of the teachers working at the "primary school" and "high school" levels. The technostress level of the teachers working at the "high school" level is higher than the teachers working at the "primary school" level. In addition, in the 1st sub-dimension and 2nd sub-dimension scores of the technostress scale, it was revealed that the teachers working in primary schools got lower scores than the teachers working in both secondary and high schools, that is, they had higher technostress.

Findings Related to the Fifth Sub-Problem

The independent continuous variable of the study is the perception of self-efficacy, and the dependent continuous variable is the level of technostress. At this stage of the research, the relationships between the sub-dimensions of self-efficacy and technostress scales were tested with Spearman's rho correlation analysis and the results are shown in Table 6.

Table 6. Relationships Between Total and Sub-Dimensions of Teacher Self-Efficacy and Technostress Scale

	Self-Efficacy Average	Self-Efficacy 1.subdimension	Self-Efficacy 2.subdimension	Self-Efficacy 3.subdimension	Self-Efficacy 4.subdimension	Self-Efficacy 5.subdimension
Technostress average	-,338**	-,308**	-,249**	-,305**	-,337**	-,827*
technostress 1. subdimension	-,262**	-,248**	-,203**	-,212**	-,232**	-,274**
technostress 2. subdimension	-,377**	-,344**	-,284**	-,345**	-,314**	-,396**
technostress 3. subdimension	-,128	-,121	-,090	-,113	-,127	-,109
technostress 4. subdimension	-,440**	-,387**	-,338**	-,341**	-,333**	-,447**
technostress 5. subdimension	-,181**	-,178*	-,140*	-,215**	-,171*	-,160**

The self-efficacy and technostress scales used in the research also have both total scores and five sub-dimensions. Correlation coefficients were calculated separately between both the total scores and the scores of the sub-dimensions of the two scales.

A correlation of -.338 was found between the total scores of the two scales. This result is significant at the .001 level. The findings in Table 6 reveal statistically significant negative relationships between both the total scores and all sub-dimensions of the scales.

As the total score of the self-efficacy scale and the scores of its sub-dimensions increase, both the total score and the scores of the sub-dimensions of the technostress scale decrease. These findings show that as teachers' self-efficacy in educational technology standards increases, their technostress levels decrease. More specifically, low self-efficacy creates high technostress.

Findings Related to the Sixth Sub-Problem

The independent continuous variable of the research is "self-efficacy" and the dependent continuous variable is "technostress" level. In order to test the sixth aim of the study, a simple regression analysis was performed to predict the total score of "Technostress" from the total score of "Self-efficacy" and the results are shown in Table 7.

Table 7. Regression Analysis Results-Self-Efficacy Total/ Technostress Total

Variable	B	Standart Error	β	t	p
Constant	3,756	,263		14,259	,000***
Self-Efficacy Total	-,309	,064	-,302	-4,812	,000***
	R:.302 R2: .091		**F=1087,782**	**p=.000**	

Self-efficacy total score variable gives a significant relationship with teachers' total "technostress" (R=.302, R2=.091, p<0.001). The "self-efficacy" total score variable explains 09% of the variance of teachers' technostress scores. The t-test results (t=-4.813, p=.000) show that self-efficacy total scores are a significant predictor of the technostress variable. The simple linear regression formula for this relationship is:
Total Technostress score is =3,756 +(-.309* self-efficacy score).

Results, Conclusions and Recommendations

In this section, the results, discussions and recommendations based on the results are given.

Results and discussion

In this study, the relationship between teachers' educational technology standards self-efficacy and technostress levels was examined. The first aim of the study is to determine the teachers' educational technology standards self-efficacy levels. In line with the findings, it was concluded that the self-efficacy total scores of the teachers participating in the research were at the level of "I agree". Considering that the use of technology in education is indispensable in our age, as in every field, and the great responsibility of teachers in the integration of technology into education, this finding can be evaluated positively. It is thought that teachers with high self-efficacy towards educational technology standards can create a richer learning environment by integrating technology into education effectively. In the study, the scores of the teachers regarding the sub-dimensions of the educational technology standards self-efficacy scale were also examined. At the level of "agree" in the sub-dimensions of "facilitating students' learning and encouraging creativity", "being a model in digital citizenship" and "participating in professional development and leadership activities"; In the sub-dimensions of "designing and developing learning environments and assessment activities suitable for the digital age" and "leading to the working and learning approach of the digital age", it was found that they had a self-efficacy perception at the level of "totally agree". It is also a very valuable finding that teachers see themselves as more competent than other dimensions in designing and developing the learning environment and assessment activities required by the digital age we live in and pioneering the working and learning approach of the digital age. The existence of teachers who pioneer the working and learning approach of the digital age and who can design and develop learning environments suitable for this age is one of the factors that support the emergence of a qualified education system suitable for the age. There are studies carried out for various purposes in the literature on teachers' self-efficacy in educational technology standards. Similar to the results of this research, Şimşek and Yazar (2017), Ermiş, Sarıtepeci and Çakır (2018), Kabataş and Yılmaz (2018), Güneş (2019), Türker (2019) and Akdiş (2022) stated that teachers' educational technology standards self-efficacy is at a high level. have found that it is. Similarly, Çoklar (2008) and Ozan and Taşkın (2017) found a high level of self-efficacy in their research examining pre-service teachers' self-efficacy in educational technology standards. The high level of educational technology standards self-efficacy findings obtained in all these studies coincide with the result of this research. Teachers' high level of self-efficacy in educational technology standards can be interpreted as teachers' openness to innovation and development, their efforts to follow technological innovations and integrating technology into education.

The second aim of the study is to determine whether teachers' educational technology standards self efficacy differ according to various variables. It was examined whether teachers' self-efficacy differed according to gender, age and school level variables. There was no significant difference between the teachers' self-efficacy in educational technology standards according to the gender variable. In the studies of Türker (2019) and Kılıç and Özkan (2022), similar to the result of this research, no difference was found regarding the educational technology standards self-efficacy of female and male teachers. However, there are also studies in the literature that concluded that self-efficacy differs according to the gender variable. In the research of Ermiş, Sarıtepeci and Çakır (2018), in favor of women; Çoklar (2008), Ozan and Taşgın (2017), Şimşek and Yazar (2017), Kabataş and Yılmaz (2018) and Güneş (2019) have found that there is a significant difference in favor of males. In this study, analyzes were made on whether teachers' self-efficacy differed according to the age variable. A significant difference was found between teachers' self-efficacy according to the age variable. It has been found that teachers under the age of 30 have higher levels of educational technology standards self-efficacy compared to teachers aged 41-50. This finding coincides with the findings of Türker's (2019) study, which aims to examine the self-efficacy perceptions of those who teach Turkish as a foreign language in terms of educational technology standards. Türker (2019) found in his research that educational technology standards self-efficacy differs significantly in favor of young teachers, and this situation is reflected in teaching and learning in the digital age. Interpreting that young people are more inclined to use technology effectively, which is an important component of the education process, he stated that it would be appropriate to provide in-service training for teachers in the middle and advanced age group on the use of technology in education. In this study, as a result of the analyzes carried out to show that there was no significant difference in terms of teachers' self-efficacy in educational technology standards according to the school level variable employed, no significant difference was found in the total score of the self-efficacy scale, but a significant difference was found between the 2nd and 5th sub-dimensions in favor of the teachers working in the kindergarten. Teachers working in kindergarten have higher educational technology self-efficacy than teachers working at other levels. In the 2nd sub-dimension of the scale, "designing and developing learning environments and assessment activities suitable for the digital age" and the 5th sub-dimension "participating in professional development and leadership activities", teachers working in kindergarten found themselves more competent than teachers working at other school levels. It is thought that the reason may be the limitation of technological equipment in the classrooms they work in and lower technological proficiency expectations. With the FATİH project in education, kindergartens have not yet been equipped with smart boards in schools. The fact that the students who are educated in kindergartens do not benefit from technological platforms such as EBA due to their age group also keeps the expectation of teachers to use technology in education lower than teachers working at other school levels. In the study, the difference according to the school level regarding the teachers' educational technology standards self-efficacy was seen only in the teachers working in kindergartens. There was no significant difference between the educational technology standards and self-efficacy of the teachers who performed in primary, secondary and high schools. This situation can be interpreted as that there are classes with similar technological equipment in all primary, secondary and high school levels and that teachers are strengthened with similar trainings. Şimşek and Yazar (2017), Kabataş and Karaoğlan Yılmaz (2018) similarly found in their research that there is no significant difference between the self-efficacy of educational technology standards of teachers working in primary, secondary and high schools, and this coincides with the results of this research.

The third aim of the study is to determine the technostress levels of teachers. Considering the total scores of the teachers in line with the findings obtained, it was found that they had a medium level of technostress perception; While it has a low level of technostress perception in the sub-dimensions of "designing and developing for the profession" and "personal origin", it has a medium level of technostress perception in the sub-dimensions of "learning-teaching process focused", "technical subject focused" and "social focused". conclusion has been reached. There are many studies in the literature with the finding that teachers' total technostress scores are moderate (Akman & Durgun, 2022; Gökbulut & Dindaş, 2022; Kıncı & Özgür, 2022; Arslan, 2022; Çelik, B. N., 2022; Kızıltoprak, 2022; Kutlu, 2022) . Similarly, in studies examining the technostress levels of teacher candidates (Coklar & Bozyiğit, 2021; Çalışkan, 2022; Çalışkan & Çoklar, 2022), in studies examining the technostress levels of school administrators (Çetin & Bülbül, 2017; Çelik, G., 2022) and the technostress levels of academicians. In the studies in which it was investigated (Akgün, 2019; Yangöz, 2021), it was concluded that the technostress levels were "moderate", supporting this research finding. In the light of the findings, it is thought that

teachers experience stress due to the use of technology in education and this stress is caused by social and technical issues.

The fourth aim of the study is to determine whether teachers' technostress levels differ according to various variables. It was examined whether the teachers' self-efficacy differed according to the variables of gender, age and the school level they were assigned to. There are studies in the literature that support the finding that there is no significant difference between teachers' technostress levels according to the gender variable (Çetin & Bülbül, 2017; Gökbulut, 2021; Kıncı, 2021; Akman & Durgun, 2022; Arslan, 2022; Çalışkan, 2022; Çelik, B. N., 2022; Çelik, F., 2022; Kızıltoprak, 2022). However, unlike this finding, there are also studies showing that female teachers have higher technostress levels compared to male teachers (Coklar, Efilti, Şahin, & Akçay; 2016; Yangöz 2021; Gökbulut & Dindaş, 2022).). It has been interpreted that this difference may be due to the opportunities offered to individuals according to their gender and the cultural values of the society they live in, but in recent years, women and men, regardless of gender, have the same opportunity to access technology such as mobile phones and the internet and receive the same training, which may have prevented the differentiation of their technostress levels (Çalışkan and Çoklar, 2006). 2022). The reason why it was found in the research that the technostress levels of teachers did not differ according to the age variable can be interpreted as the fact that teachers in every age group have the same opportunities and attend the same trainings. There are studies supporting this finding in the literature (Gökbulut and Dindaş, 2022; Akman and Durgun, 2022). However, there are also studies in the literature that show that technostress in teachers changes depending on the age variable and that technostress increases as the age increases (Çetin & Bülbül, 2017; Akgün, 2019; Kıncı, 2021; Arslan, 2022; Kızıltoprak, 2022). According to the findings obtained in this study, the fact that age and thus the time spent in the profession does not change the technostress level of teachers can be explained by the fact that technostress is fed by different dynamics such as the structure of the school, the working environment, the assigned tasks, and the stress experienced in using technology can be seen at all ages (Akman & Durgun, 2022). In this study, it was observed that teachers' technostress levels differed significantly according to the school level variable they worked in. Teachers working in high schools experience more technostress compared to teachers working in primary schools. Kaplan (2021), in his study, which aimed to determine the psychological capital and organizational stress source levels of teachers and to examine them according to some variables, revealed that teachers working in high schools experienced more organizational stress compared to teachers working in primary schools, similar to the findings of this research. He interpreted this finding as being triggered by reasons such as the conflicts arising from the fact that the target group working in high schools consisted of upper-age adolescents, and the fact that important exams took place during the high school period.

The fifth aim of the study is to determine whether there is a significant relationship between teachers' educational technology standards self-efficacy and technostress levels. According to the results of the research, there is a negative relationship between the total self-efficacy score and the technostress total score. As teachers' self-efficacy increases, their technostress levels decrease. Low self-efficacy creates high levels of technostress. When the relationships between technological self-efficacy and sub-dimensions of technostress are examined, each sub-dimension of technological self-efficacy reveals significant negative relationships with each sub-dimension of technostress. In the literature, there are many studies on both educational technology standards self-efficacy and technostress. No study was found in which educational technology standards self-efficacy and technostress were discussed together. However, there are some studies close to this research. Akgün (2019) examined the relationship between academicians' acceptance of information and communication technologies and their technostress perceptions, and revealed that there is a negative and low-level relationship between teaching staff's acceptance of information and communication technologies and technostress perceptions. The fact that the relationship is negative can be interpreted as people who know the importance of information and communication technologies, accept their use and think that it is useful, can easily integrate these technologies into their lives without experiencing too much stress and anxiety during the use of these technologies (Akgün, 2019). Erdoğan and Akbaba (2022), in their study examining the role of technological pedagogical content knowledge (TPACK) in predicting social studies teachers' technostress levels, revealed that TPACK is an important variable that significantly predicts teachers' technostress levels. Increasing proficiency in the TPACK model enriches the technology-supported teaching process and reduces technostress levels (Erdoğan & Akbaba, 2022).

The sixth aim of the study is to determine whether teachers' educational technology standards self efficacy is a significant predictor of technostress levels. As a result of the findings, it was concluded that technological self-efficacy is a significant predictor of the technostress variable. This finding can be interpreted as a teacher's self-efficacy for educational technology standards is an important variable that reduces the stress arising from the use of technology in education. In other words, the more a teacher feels competent about educational technology standards, the less his stress arising from the use of technology in education will be reduced.

Suggestions

The findings of the study are correct Suggestions to practitioners and researchers can be listed as follows:

• High self-efficacy of teachers in educational technology standards at the level of "I agree" is an important finding, but it is not sufficient. Considering the importance of integrating technology into education correctly and efficiently today, it is important that teachers' technological self-efficacy reach a very high level. For this reason, national educational technology standards that teachers should have should be determined and trainings should be organized to ensure that these standards are achieved.

• In the study, it was found that the perception of self-efficacy towards educational technology standards was affected by the age factor, and it was revealed that teachers in the 41-50 age group had lower self-efficacy than teachers aged 30 and under. Trainings can be provided to support teachers (especially middle-aged and above) in the integration of technology into education.

• Teachers' technostress levels were found to be moderate. Qualitative research can be done to investigate the sources of technostress experienced by teachers.

• This research is one of the first to examine the relationship between teachers' technological self-efficacy and technostress levels. For this reason, research in this area should be done in different sample groups.

• This research was conducted in public schools. Similar studies can be conducted in private schools, and the relationship between the technological self-efficacy of private-public school teachers and their technostress levels can be compared.

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