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# The relationship between Technostress levels and job satisfaction of Teachers within the COVID-19 period

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## Abstract

This research aims to determine the technostress levels experienced by teachers in distance education during the COVID-19 period and examine the relationship between this technostress level and job satisfaction. The research was structured in relational comparison type. The attendees comprised 525 teachers working at different echelons of education, determined in accordance with the purposive sampling method. Technostress Scale, job satisfaction scale, and open-ended questions form were used as data collection tools during the research. The data were collected online through Google Forms due to COVID-19 conditions. Descriptive statistics, backward hierarchical multiple regression (BHMR), MANOVA analysis, and inductive content analysis were used for the data analysis. According to the research findings, it was figured out that teachers were exposed to intensive use of technology in distance education, this negatively affected their life and performance, their workload increased, and they had to put much more effort to adapt to modern technologies in the Covid-19 pandemic period. It was found that the teachers' job satisfaction levels were high in general, and the female teachers' job satisfaction levels were higher than those of male teachers. The job satisfaction levels of private school teachers were lower than those of public-school teachers. In the research, the gender of teachers and the institution type they work under, both being among the main factors affecting teachers' technostress level, were determined to make a significant difference. However, the distance education process, conducted during the COVID-19 period, was also noted to involve educational, psychological, and administrative challenges. Based on research results, it is recommended to improve teachers' online learning and technology literacy skills, and review present undergraduate programs in terms of preparation for distance education.

**Keywords** Covid 19 · Distance Education · Technostress · Job satisfaction · Teacher

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## 1 Introduction

The COVID-19 pandemic first appeared in Wuhan province of China in December 2019, spread rapidly in a pretty brief time, and was declared a pandemic by the World Health Organization due to its impact on large masses (Spinelli and Pellino, 2020; World Health Organization [WHO], 2020). The COVID-19 pandemic has deeply affected the education systems as well as all the service sectors, and serious difficulties have emerged in practice (Daniel, 2020; Sepulveda-Escobar and Morrison, 2020). Consequently, the functioning of institutions supplying education and training services had to be changed significantly (Dhawan, 2020; Williamson et al., 2020).

Due to the increasingly negative impact of the COVID-19 pandemic on societies and the lack of a foreseen treatment to control the pandemic, online education, and training services have begun to be provided, suspending face-to-face education in most countries (Adnan and Anwar, 2020; Toquero, 2020). It can be argued that during this pandemic period, most countries were caught off their guard in education-related matters since they had taken no precautions beforehand and underwent a rapid transformation to virtuate the distance education, believed to be the solution (Basilaia and Kvavadze, 2020; Korkmaz and Toraman, 2020).

During the COVID-19 pandemic, distance education has been commenced as an alternative education model and has been moved into all education echelons, with the increase of the pandemic in many countries (Batubara, 2021; Tarkar, 2020). Aiming to prevent the negative consequences of this change and transformation that have emerged with the pandemic in education, various measures have been taken in Turkey as well as in the rest of the world (Ozer, 2020). With the spread of the Covid-19 pandemic in Turkey, schools started distance education and delivered interactive course contents, prepared by the Ministry of National Education at all grade levels, to students through the internet and television infrastructure (Yamamoto and Altun, 2020). According to the course of the pandemic in Turkey, despite occasional returns to face-to-face education, education and training programs have been carried out primarily through distance education.

The educational environment has gone through a technology-intensive transformation in educational service delivery as the distance education process emerged due to the pandemic conditions. This transformation, where societies have been caught off their guard, has made up ground for the emergence of some problems in education as well (Kudyba, 2020; Mhlanga and Moloi, 2020). As a result of the studies conducted, during the distance education process, several problems such as lacking the opportunity to access distance education for every student (Burgess and Sievertsen, 2020; Dhawan, 2020; Thomas and Rogers, 2020), internet-related problems and limited access to technology (Eruchalu et al., 2021; Sari and Nayır, 2020), insufficient student-teacher interaction (Aydin and Erol, 2021; Korkmaz and Toraman, 2020), difficulty in classroom management in the online environment (Gül, 2021; Süğümlü, 2021), failure to achieve learning goals (Alea et al., 2020; Demir and Özdaş, 2020; Süğümlü, 2021; Toquero, 2020), insufficiency of technological literacy (Aydin and Erol, 2021; Hassan and Mirza, 2021; Rafiq et al., 2021) have been identified. However, it is possible to argue that teachers have been caught unprepared and unpracticed for distance education, currently used distance education systems have strained

them, they do not know how to evaluate in distance education, and distance education is not applicable for every field (Korkmaz and Toraman, 2020).

Distance education has ensured the formation of an enriched sharing world through recent technologies (Beldarrain, 2006; Gunawardena and McIsaac, 2013). This phenomenon has paved the way for positive technology-based changes such as; students' acquiring knowledge-sharing behaviors (Ghadirian et al., 2014), shared knowledge, emotions, and experiences ensuring social interaction among students (Tee and Karney, 2010), and the creation of learning communities through social relations (Ma and Yuen, 2011; Tseng and Kuo, 2010) that contribute to learning in subjects. Besides their positive contributions, technology-based changes have also been noted to cause negative moods such as anxiety, fear, and stress in individuals to keep up with the changes (Betoncu and Ozdamli, 2019; Fernández-Batanero et al., 2021).

Stress, worry, and anxiety states, related to the changes achieved in information and communication technologies, are expressed as technostress (Jena, 2015; Joo et al., 2016; Kim and Lee 2021). Technostress engenders adversary effects such as anxiety, fear, fatigue, low-spiritedness, motivation loss, low performance, and occupational dissatisfaction in individuals (Jena, 2015a; Tarafdar et al., 2015). Along with that, studies have revealed that technostress negatively affects individuals' quality of life (Lee et al., 2016; Nimrod, 2018) and job satisfaction (Al-Ansari and Alshare, 2019; Estrada-Muñoz et al., 2020; Ho-Jin and Cho, 2016; Jena, 2015; Khan et al., 2016; Kumar et al., 2013; Ragu-Nathan et al., 2008; Rui-Juan et al., 2017; Suh and Lee, 2017; Tarafdar et al., 2007) as well.

Job satisfaction can be defined as the gratifying states and emotions that individual experiences as a result of self-evaluation on the job and occupational life (Locke, 1976). Job satisfaction is a relevant variable enabling us to recognize teachers' feelings and thoughts about their job and occupational life (Arifin, 2015; Skaalvik and Skaalvik, 2011). Teachers' positive job satisfaction deeply affects their beliefs in education and professional development, as well as their positive moods (Kelchtermans, 2005). As their job satisfaction levels increase, their occupational motivations and performances increase; thus, the quality and efficiency of education increase (Baluyos et al., 2019; Iqbal et al., 2016; Ololube, 2006; Senyametor et al., 2019). It has been noted that factors such as unfavorable working conditions (Toropova et al., 2021), excessive workload (Butt and Lance, 2005; Paulík, 2012), students' academic failure, discipline problems at school (Caprara et al., 2006; Shen et al., 2012), failure to achieve occupational development, occupational inexperience (Renbarger and Davis, 2019; Klassen and Chiu, 2010), occupational anxiety, burnout, and stress (Demir, 2018; Ferguson et al., 2012) negatively affect job satisfaction.

In the studies conducted during the COVID-19 process, it has been determined that teachers are not ready for the distance education process and that they lack knowledge and experience regarding the use of technology in distance education (Eruchalu et al., 2021; Ferri et al., 2020; Sari and Nayır, 2020). In addition, it was determined in the researches that teachers could not reach their teaching goals (Alea et al., 2020; Demir and Ödtaş, 2020; Toquero, 2020), and that teachers had difficulties in the distance education process due to their insufficient technological literacy level (Aydin and Erol, 2021; Hassan and Mirza, 2021; Rafiq et al., 2021). Studies have reported that insufficient student-teacher interaction in distance education negatively

affects the teaching process (Aydin and Erol, 2021; Korkmaz and Toraman, 2020). When the research findings for teachers in the distance education process are evaluated in general, it is seen that the Covid 19 distance education process includes social, educational and technological difficulties for teachers (Ferri et al., 2020). The results of the research reveal that teachers face many problems in the distance education process. Social, educational and technological difficulties faced by teachers in the distance education process are likely to create technological stress for teachers and negatively affect their job satisfaction.

Throughout the distance education process, it is possible to say that teachers have been exposed to intensive and long-term use of technology and occasionally had to synchronously carry out multiple tasks, such as lecturing via recent technological software compatible with distance education, counseling the students and parents, participating in seminars and in-service events, fulfilling school-related duties and responsibilities. However, the distance education process has brought distance education-induced intensive use of technology (computer, mobile phone, tablet computer, extensive use of online environments, etc.) and accordingly being constantly online in its wake. It is likely that this technology-intensive time course, experienced in the distance education process, negatively affects teachers' technostress level and job satisfaction. The present research is deemed substantial for the sake of avoiding technostress caused by technology use and its perverse effects on job satisfaction, considering the increased use and importance of technology in distance education. However, in the covid 19 process, the use of distance education technologies is mandatory for all teachers, regardless of the technology use competencies of the teachers, and live lessons are also recorded. It can be said that the research is very important in terms of revealing the effects of this process, which is based on the intense use of technology, in which teachers are caught unprepared, and the effects of technology-induced stress on teachers and their job satisfaction. In addition, it can be said that the findings to be obtained in the research are important in terms of directing the distance education practices to be carried out by the teachers in the future."Might the use of technology in distance education recently have caused stress for teachers? Might it even have affected their job satisfaction accordingly?" These questions constituted the core motivation of the research. This research aims to determine the technostress levels experienced by teachers as a result of intensive use of computers, tablet computers, and mobile phones during distance education activities within the COVID-19 period and to analyze the relationship between this stress level and job satisfaction.

## 2 Method

Teachers' technostress and job satisfaction levels during the COVID-19 period and the relationships between these variables were investigated in the research. Therefore, the research was structured in relational comparison type ( Fraenkel et al., 2012). In this study, comparative type research is used to investigate the relationships between variables and causality. The causality sought was generated by the researchers, and it is not the causality that would be expected to be acquired through manipulation. The

relationships and causal similarities sought in the study are those that are most likely to be found in their own nature.

At the end of the study's data collection tool, an open-ended question was asked. Since qualitative research has its own distinctive designs, it cannot be stated that this open-ended question adds a qualitative approach to the investigation. The aim of this open-ended question is to generate data diversity and obtain relevant details.

## 3 Participants

Participation in the research was on a voluntary basis, and the teachers came across the option "I consent to participate in the research" when they opened the data collection page via the Google Forms link. The teachers, giving consent, were enabled to view the questions. In case of no consent, the questions were not activated, and the form was closed. Due to the voluntary-attendance principle, the researchers obtained data from the ones who consented to provide them. This made the research sample a purposeful one. When applying purposeful sampling, researchers specify the characteristics of the people who will constitute the population and then contact people having these characteristics. Based on the researcher's knowledge of the population, the individuals (subjects), who are likely to provide the best information for the purpose of research, are selected. (Christensen et al., 2014; McMillan and Schumacher, 2014). Some demographic variables of 525 teachers taking part in the study have been given in Table 1.

## 4 Ethical consideration

This research was conducted upon the approval of the Scientific Research Ethics Committee of Çanakkale Onsekiz Mart University (Date: 03.08.2021, Decision Number: E-84026528-050.01.04-2100019356).

## 5 Data Collection Tools

The research data were collected using two different scales. The Scales:

**Technostress Scale** The scale was developed by Tarafdar et al. (2007) to determine teachers' technostress levels, and was adapted to Turkish by Ilgaz et al. (2016). The scale consisted of 23 items in the five-point Likert type recording participant responses. Factor analysis confirmed the categorization of these 23 items under five subscales. The five subscales respectively included the dimensions of "technology-related workload (techno overload, items 1–5)", "technology-related invasion of private life (techno invasion of privacy, items 6–9)", "technologic challenges experienced (techno complexity, items 10–14)", "technology-induced insecurity (techno insecurity, items 15–19)", and "continuous technology change (techno uncertainty,

**Table 1** *Participating Teachers' Demographic Characteristics*

| Variable | | f (%) | Variable | | f(%) |
|---|---|---|---|---|---|
| Gender | Female | 275 (52.4) | Marital status | Single | 142 (27) |
| | Male | 250 (47.6) | | Married | 383 (73) |
| Type of School | Public School | 385 (73.3) | Educational status | Undergraduate | 390 (74.3) |
| | Private Sector School | 140 (26.7) | | Postgraduate | 135 (25.7) |
| School grade | Pre-school | 17 (3.2) | Seniority | 0–5 Years | 94 (17.9) |
| | Elemantary school | 158 (30.1) | | 6–10 Years | 87 (16.6) |
| | Secondary School | 146 (27.8) | | 11–15 Years | 102 (19.4) |
| | High school | 63 (12) | | 16–20 Years | 109 (20.8) |
| | Vocational high School | 38 (7.2) | | 21–25 Years | 77 (14.7) |
| | Special education | 86 (16.4) | | 26 Years and above | 56 (10.7) |
| | Other | 17 (3.2) | | | |
| Total | | 525 (100) | Total | | 525 (100) |

items 20–23)". Cronbach Alpha reliability was determined for these sub-dimensions. Reliability levels ranged from 0.70 to 0.90.

**Job satisfaction scale** The scale, developed by Brayfield and Rothe (1951) to measure the job satisfaction of employees, was abridged by Judge et al. (1998) and adapted into Turkish by Başol and Çömlekçi (2020). The five-point Likert-type scale comprised 5 items aiming to get responses from the attendees. Factor analysis confirmed the convergence of items under a single factor. The Cronbach Alpha reliability level of the scale was determined. The reliability level was found to be 0.93.

## 6 Analysis of the Research Data

The levels of technostress and job satisfaction experienced by teachers were analyzed through descriptive statistics (mean, standard deviation, median, minimum, and maximum scores). The effects of technostress, gender, institution type worked in (private or state), seniority, education level (undergraduate, postgraduate), and weekly lecturing hours (0–15 h, 16–30 h, 30 h and above) on job satisfaction during distance education were investigated using backward hierarchical multiple regression. There are numerous variables included in the regression model that have possible effects. Multiple linear regression models are used to analyze the effect of multiple independent (explanatory, predictive) variables on a dependent variable (Cohen et al., 2002). Backward hierarchical multiple regression method was applied to identify the most effective and explanatory variables on job satisfaction. In the first step of this method, all variables likely to affect job satisfaction are included in the model. Then, the variables having the highest and statistically significant effect remain in the model, and other variables exit step-by-step. At the last step, the variables of the highest effect remain in the model.

In the backward multiple regression modeling, the technostress level included in the model is a continuous variable. But the other variables (gender, seniority, etc.) are categorical. Categorical variables took place in the regression model as dummy

variables. This way, autocorrelation between variables is tried to be prevented (Power and Xie, 2000). Possible differences in the technostress levels of male and female teachers of different seniority working in public or private schools were analyzed using MANOVA.

At the end of the measurement tools, the form, covering open-ended questions, was included to allow the attendees to convey remarks upon their wish, and teachers were requested to comment on "consequences of COVID-19 pandemic on their lives, considering the technology-intense period they went through". Responses in this part were analyzed through inductive content analysis (Mayring, 2000).

## 7 Findings

### 7.1 Teachers' technostress and job satisfaction levels

Technostress and job satisfaction scales were applied to teachers in the research. Apart from these scales, relevant data on gender, type of the organization worked in (private or public), seniority, education level (undergraduate, postgraduate), and weekly lecturing hours in distance education were obtained from the attendees as demographic information. Descriptive statistics on the technostress level, based on the responses by 525 teachers, are given in Table 2.

Among the responses by the teachers to the technostress scale, the highest mean scores belonged to the remarks such as "being forced by technology to work faster", "the need to change working habits to adapt to recent technologies", "more workload due to increasing technology complexity", "being obligated to stay in touch with work even on vacation due to technology", "having to sacrifice holidays and weekends to stay up to date with modern technologies" and "invasion of personal life by technology".

On the other hand, the lowest mean scores referred to the remarks such as "not having knowledge of technology full enough to handle the job satisfactorily", "needing a long time to understand and use new technologies", "the newly-recruited staff having more knowledge of technology", "the perception of recent technologies to be complicated to understand and use", "job security being threatened by modern technologies", "the need to constantly improve technology skills to avoid job position changes", "the feeling of being under threat due to the colleagues with more technology skills", "avoiding to share knowledge with colleagues for the fear of job position change", "constant changes in computer software and hardware of the organization" and "frequent upgrades in computer networks of the organization".

If these results are expounded, it is clear that the intense use of technology during the COVID-19 pandemic process creates a perception of stress, psychological fatigue, workload and invasion of privacy in teachers. However, with the logic of with every crisis an opportunity arises, teachers also stated that this situation forces them to adapt to new technologies. It can be observed from the data that it will not take a long time for teachers to adapt to new technologies. Although the process is challenging, teachers consider that they do not need a long time to use these technologies. In Turkey, the private sector has a small role in education. This situation causes

**Table 2** *Teachers' technostress levels*

| Items | | N | Mean (S. Deviation) | Median (min-max) |
|---|---|---|---|---|
| 1 | I am forced by technology to work much faster. | 525 | 4.02(1) | 4(1–5) |
| 2 | I am forced by technology to do more work than I can handle. | 525 | 3.89(1.2) | 4(1–5) |
| 3 | I am forced by technology to work with very tight time schedules. | 525 | 3.78(1.2) | 4(1–5) |
| 4 | I need to change my work habits to adapt to new technologies. | 525 | 4(1.2) | 4(1–5) |
| 5 | I have a higher workload because of increased technology complexity. | 525 | 4.06(1.2) | 4(1–5) |
| 6 | I spend less time with my family because of technology. | 525 | 3.96(1.2) | 4(1–5) |
| 7 | I stay in touch with my work even on vacation due to technology. | 525 | 4.28(1.1) | 5(1–5) |
| 8 | I sacrifice my holidays and weekends to keep myself up-to-date with new technologies. | 525 | 4.02(1.1) | 4(1–5) |
| 9 | I feel my personal life is being invaded by technology. | 525 | 4.05(1.1) | 4(1–5) |
| 10 | I do not have full knowledge of technology enough to handle my job satisfactorily. | 525 | 2.57(1.3) | 2(1–5) |
| 11 | I need a long time to understand and use new technologies. | 525 | 2.9(1.3) | 3(1–5) |
| 12 | I can not find enough time to study to improve my technological skills. | 525 | 3.02(1.2) | 3(1–5) |
| 13 | I think that new recruits to this organization know more about computer technology than I do. | 525 | 2.74(1.3) | 3(1–5) |
| 14 | I find understanding and using new technologies often too complicated. | 525 | 2.74(1.3) | 3(1–5) |
| 15 | I feel a constant threat to my job security due to new technologies. | 525 | 2.33(1.4) | 2(1–5) |
| 16 | I have to constantly improve my skills lest my job position is changed. | 525 | 2.86(1.5) | 3(1–5) |
| 17 | I am threatened by colleagues having more technology skills. | 525 | 2.17(1.3) | 2(1–5) |
| 18 | I do not share my knowledge with my colleagues lest my job position is changed. | 525 | 1.75(1.2) | 1(1–5) |
| 19 | I feel that there is less sharing of knowledge among colleagues due to fear of job position change. | 525 | 2.11(1.4) | 2(1–5) |
| 20 | There are always new developments in technology that we use in our organization. | 525 | 3.02(1.3) | 3(1–5) |
| 21 | There are constant changes in computer software in our organization. | 525 | 2.6(1.2) | 2(1–5) |
| 22 | There are constant changes in computer hardware in our organization. | 525 | 2.65(1.3) | 2(1–5) |
| 23 | There are frequent upgrades in computer networks in our organization. | 525 | 2.68(1.3) | 3(1–5) |

the employees to guarantee their staff. Hence, teachers did not experience much anxiety about their job or position.

The attendee teachers' job satisfaction levels were scrutinized. The results have been depicted in Table 3.

Teachers' job satisfaction levels are high in general, and they love their jobs. The items in the measurement tool are designed as a 5-point Likert scale type. A 3-degree

**Table 3** *Teachers' job satisfaction levels*

| Items | | N | Mean (S. Deviation) | Median (min-max) |
|---|---|---|---|---|
| 1 | I love my job. | 525 | 4.37(0.9) | 5(1–5) |
| 2 | I find happiness at work. | 525 | 3.73(1.2) | 4(1–5) |
| 3 | I am content with my current job. | 525 | 3.8(1.4) | 4(1–5) |
| 4 | I find my job enjoyable. | 525 | 3.93(1.2) | 4(1–5) |
| 5 | Time goes by well at work. | 525 | 3.78(1.3) | 4(1–5) |

response to each item can be interpreted as a mean level of participation. The mean and median of the responses to the items are above 3. This was viewed as high job satisfaction. It is interesting that teachers' job satisfaction is high in a period with intense use of technology from home and during the COVID-19 period. Because, as shown in Table 2, teachers have complaints about the invasion of their privacy and continuous technology use.

## 8 The Effect of Technostress Level and some demographic variables on Teachers' job satisfaction

The effects of technostress, gender, institution type worked in (private or state), seniority, education level (undergraduate, postgraduate), and weekly lecturing hours (0–15 h, 16–30 h, 30 h and above) on job satisfaction during distance education were investigated using backward hierarchical multiple regression. The analysis results are given in Table 4.

The regression analysis, which had started with 15 variables, was modeled in 11 iterations. At the 11th iteration, 5 variables remained in the model. At all stages, the Variance Inflation Factor (VIF) analysis was performed on the models. This value is the indicator of multicollinearity between explanatory variables. The VIF data obtained remained 1 and below; thus, multicollinearity was not detected (Ozdamar, 2013). ANOVA test was employed at all iterations to test the model compatibility. Model compatibility was determined in all 11 stages ($p < .05$).

According to analysis results, the job satisfaction level of men was determined to be relatively lower compared to that of women. The job satisfaction levels of private school teachers were lower than those of public-school teachers. Techno overload and techno insecurity are the variables having negative impact on job satisfaction. On the other hand, techno uncertainty's impact is negative.

**Table 4** *Variables having impact on job satisfaction*

| Model | | B | S. Error | t | p | Lower Upper %95 Confidence Interval | |
|---|---|---|---|---|---|---|---|
| 11 | Male | -1.666 | 0.404 | -4.122 | 0.000 | -2.460 | -0.872 |
| | Private School | -2.603 | 0.487 | -5.343 | 0.000 | -3.560 | -1.646 |
| | Techno Overload | -0.195 | 0.047 | -4.159 | 0.000 | -0.287 | -0.103 |
| | Techno Insecurity | -0.116 | 0.040 | -2.913 | 0.004 | -0.195 | -0.038 |
| | Techno Uncertainty | 0.262 | 0.047 | 5.544 | 0.000 | 0.169 | 0.354 |

## 9 Teachers' gender, seniority, Organization Type worked in and Technostress Level

Possible differences between male and female teachers of different seniorities working in public or private schools, in terms of technostress level, were analyzed with MANOVA. The results have been given in Table 5.

The dimension of gender, one of the basic effects on teachers' technostress level, was determined to make a significant difference ($F_{[5-499]}=2.358$, $p<.05$). Among the primary effects, the organizations where the teachers work were determined to make a significant difference on the technostress level ($F_{[5-499]}=12.993$, $p<.05$). Again, among the primary effects, seniority was determined not to have influence on the technostress level ($p>.05$). Interaction of primary effects is also examined through MANOVA. The interactions of Gender-organization type, gender-seniority, organization type-seniority, and gender-organization type-seniority were observed not to make a significant difference on technostress level ($p>.05$).

The results of the ANOVA, conducted in MANOVA, were analyzed to determine the sub-scales/scales of the technostress, where the gender and institution type made a significant difference. The results have been given in Table 6.

**Table 5** *Comparison of technostress levels of male and female teachers of different seniorities working in public or private schools (MANOVA)*

| Effect | Value | F | Hypothesis df | Error df | p |
|---|---|---|---|---|---|
| Intercept | 0.935 | 1425.416 | 5 | 499 | 0.000 |
| Gender | 0.023 | 2.358 | 5 | 499 | **0.039** |
| School Type | 0.115 | 12.993 | 5 | 499 | **0.000** |
| Seniority | 0.071 | 1.447 | 25 | 2515 | 0.070 |
| Gender * School Type | 0.020 | 2.036 | 5 | 499 | 0.072 |
| Gender * Seniority | 0.062 | 1.269 | 25 | 2515 | 0.168 |
| School Type * Seniority | 0.058 | 1.179 | 25 | 2515 | 0.246 |
| Gender * School Type * Seniority | 0.031 | 1.038 | 15 | 1503 | 0.412 |

**Table 6** *Comparison of technostress level with reference to organization type and gender (ANOVA)*

| Source | Dependent Variable | Sum of Squares | df | Mean Square | F | p |
|---|---|---|---|---|---|---|
| Gender | Techno Overload | 43.239 | 1 | 43.239 | 2.308 | 0.129 |
| | Techno Invasion | 1.109 | 1 | 1.109 | 0.085 | 0.771 |
| | Techno Complexity | 0.528 | 1 | 0.528 | 0.020 | 0.887 |
| | Techno Insecurity | 114.698 | 1 | 114.698 | 4.477 | **0.035** |
| | Techno Uncertainty | 36.317 | 1 | 36.317 | 1.995 | 0.158 |
| School Type | Techno Overload | 0.160 | 1 | 0.160 | 0.009 | 0.926 |
| | Techno Invasion | 37.448 | 1 | 37.448 | 2.865 | 0.091 |
| | Techno Complexity | 4.828 | 1 | 4.828 | 0.184 | 0.668 |
| | Techno Insecurity | 911.023 | 1 | 911.023 | 35.563 | **0.000** |
| | Techno Uncertainty | 482.955 | 1 | 482.955 | 26.524 | **0.000** |

The gender of the teachers made a significant difference on "techno insecurity" ($F = 114.698$, $p < .05$). The mean techno insecurity of women (11.08) was lower than that of men (11.38).

The type of organization where the teachers work made a significant difference on "techno insecurity" ($F = 911.023$, $p < .05$). The mean techno insecurity of public-school teachers (10.13) was lower than that of private school teachers (14.22).

The organization type where the teachers work made a significant difference on techno uncertainty ($F = 482.955$, $p < .05$). The mean techno uncertainty value of public-school teachers (10.29) was determined to be lower than that of private school teachers (12.75).

## 10 Teachers' views on Technostress levels during COVID-19 period

At the end of the measurement tools, the form, covering open-ended questions, was included to allow the attendees to convey remarks upon their wish, and teachers were requested to comment on "consequences of COVID-19 pandemic on their lives, considering the technology-intense period they went through". Responses received in this part were analyzed through inductive content analysis. As a result of the analysis, codes split into four categories under the theme of distance education during the COVID-19 period. These categories are educational difficulties, psychological difficulties, managerial difficulties, and positive aspects. In Tables 7, 49 codes under those four categories and relevant remarks from attendee teachers are summarized.

Concerning the education and training activities conducted in distance education format during the COVID-19 pandemic period, the teachers consider the process to have brought challenges in terms of education, psychology, and administrators. Along with that, some teachers regarded the process as an opportunity and thought it had positive aspects. However, more problems and difficulties were expressed when looking at the repetition frequencies of the codes.

Teachers stated that distance education brought some problems such as the challenges in classroom management, difficulty in strongly interacting with students (poor interaction), insufficient participation from students, negative effects of distance education on students' social and emotional development and communication skills, inequality of opportunity due to the new format of course delivery, and inadequacy of the teachers in technology use. On the other hand, distance education was expressed by the teachers as an inefficient, exhausting, stressful, job-repellent, workload-increasing, and wearisome process that led to the invasion of private life. This process caught the administrators off their guard, and the education management failed to give a good test. Unnecessary bureaucracy arose, the quality remained neglected, and the quantity overshadowed the quality. However, the distance education process was not perceived that bad as well. Some teachers found the process to be positive due to participating in self-improvement activities from home, saving free time, getting motivation for technological improvement, and working with home comfort. Several of attendee teachers expressed their views as follows:

**Table 7** *Teachers' experiences and remarks on distance education during the COVID-19 period*

| Categories | Codes | n | Categories | Codes | n |
|---|---|---|---|---|---|
| **Educational Challenges** | Low participance of students | 75 | **Psychological Challenges** | Usurpation of private life | 99 |
| | Utilizing course enrollment as a pressure intrument | 59 | | Increasing workload | 83 |
| | Difficulty of classroom management | 58 | | Stressful | 81 |
| | Weakness of interaction | 52 | | Inefficiency | 80 |
| | Difficulty of building healthy relationship | 43 | | Tiring | 78 |
| | Inadequacy of teacher for technology use | 39 | | Causing to feel burnout | 63 |
| | Negative impact on student's social and emotional development | 37 | | Wearing | 54 |
| | Creating inequality of opportunity | 33 | | Neglecting relatives and loved ones | 44 |
| | Unperformed applied courses | 26 | | Waist, neck, eye health hazard (constant sitting) | 27 |
| | Failure to track courses | 24 | | Increasing dependency on technology | 23 |
| | Inadequate student success | 20 | | Causing loss of motivation | 22 |
| | Weakening of students' communication skills | 11 | | Alienating from the job | 18 |
| | Difficulty of controlling the students | 3 | | Trying to get used to | 13 |
| **Positive Aspects** | Creation of free time (n=31) | 31 | | Psychological strain | 8 |
| | Comfort of working from home (n=28) | 28 | | Decision for retirement | 8 |
| | Easy participance from home to occupational development activities (n=16) | 16 | | Difficulty in adapting to technology | 6 |
| | Ensure continuous research (n=9) | 9 | | Being stuck in front of the screen | 5 |
| | Easier Access to knowledge sources (n=8) | 8 | | Challenges due to uncertainty | 3 |
| | Enabling shy students to express themselves (n=7) | 7 | **Administrative Challenges** | Inadequacy of infrastructure | 71 |
| | Understanding the importance of learning the technology (n=6) | 6 | | Unnecessary bureaucracy | 56 |
| | Availability of improvement opportunity and experience (n=5) | 5 | | Poor management | 35 |
| | Easy to adapt to (n=4) | 4 | | Meaningless correspondence | 33 |
| | Opportunity of acquiring new professional skills (n=4) | 4 | | Meaningless bureaucracy | 25 |
| | Being enjoyable (n=3) | 3 | | Quantity overshadowing Quality | 14 |
| | Offering an enjoyable experience (n=3) | 3 | | | |

*Online education has been a more labor-demanding and more time-consuming method. Despite all the effort and time we have sacrificed, the feedback received from student achievements is not as productive as face-to-face education. The fact that we allocate too much personal time obliges us to stay in touch with the developments at every moment of the day, and thus our personal space is being narrowed.*

*It helped me realize and cover up my deficiencies in technology. I think online education is useful too, as long as we manage to adapt to it. I have a positive view of online education.*

*Being unable to make eye contact with students, going through synchronization problems due to different internet speeds, being bound to constantly sitting on a chair while teaching, having difficulty in expressing myself as I wish, and being disturbed by the loss of my privacy since my lesson is followed up by a crowded audience, drove my lessons away from rationality. When the infrastructure did not allow us to deliver an online course, I figured out that we were not prepared for such a situation at all; the teacher was billed for the whole of it, unfortunately...*

*Since I could not see the students face to face, the lesson could not go far beyond giving information. It was not a satisfying year. I love my job, but this year, delivering courses felt like a burden. My plans in between home and work did not work out. And this made me feel inadequate in both respects.*

"*It allowed us to give each attending student an equal say and to observe knowledge status during the lesson. In face-to-face education, the incidents of giving say on a voluntary basis were occurring more commonly. In distance education, on the other hand, I can make every student an addressee through all kinds of questions from easy to difficult. However, it has become more difficult to monitor the students socially, emotionally, and support in this respect. Because sharings in this sense have been restricted. Since distance education creates the feeling of being in a one-to-one course environment for some students, it has enabled such students to participate in the lesson more freely. It has made us realize that introvert and shy students in the classroom might be participative when they are provided with appropriate environments. Thus, we have learned by experience how important it is to provide suitable conditions for a student in education and training.*"

*It is unnecessary and nonfunctional; it has just increased the workload. Statistical data have overshadowed qualitative data. That is to say, doing the work for numerous people has become more important than doing it efficiently. There have been times we worked even at night as the concept of working hours has changed. We had to leave our own children unsupervised. We went through challenges in our private life. Although we worked harder and stayed under stress, our profession has become worthless in the eyes of society, as if we did not work at all and did not deserve a salary.*

*At first, I felt like a newly recruited teacher. Knowing the subjects and being experienced in classroom management was no longer enough; sometimes not even necessary. I urged my own limits for the sake of in-class privacy. It was*

*such a period that being technology-friendly in course delivery came to the fore, rather than being an experienced teacher. Besides, it was psychologically quite a challenging period for me. It is undoubtedly sad and worrying to wear both the parent and the teacher hat in the same house, playing both roles synchronously with no timing, no limitation, and no transition process, and still facing a societal perception like "teachers are just sitting back, doing nothing". It was a time I felt like I always had to defend myself. Having to explain to oneself by saying "because... because... because..." was a tremendous psychological phase". Fortunately, I had many colleagues who were just like me. I got used to it by soothing myself that I was not alone. Now, I just want to switch back to face-to-face education as soon as possible.*

*I work for 3000 TL a month (while public-school teachers get paid approximately 6000 TL). In addition to 34 hours of class a week, there is a lot of work such as club, counseling, family talks, etc. Moreover, the insurances are not being fully paid during this period. The founder (owner of the school) says the ones who do not like it can leave. He attends online lectures and watches; families are also involved. I am wordless to explain the stress and troubles I went through. I have injured my neck due to sitting for a long-time during distance education; I have started physical therapy.*

## 11 Conclusion and discussion

With respect to research findings on teachers' technostress levels, during the COVID-19 period, teachers had to work faster through technology use, had much more workload due to increased techno complexity, stayed in touch with work even on vacation because of technology. Along with that, the teachers had to change their work habits to adapt to recent technologies, sacrificed holidays and weekends to stay up to date on modern technologies, and deemed their personal lives invaded by technology during the COVID-19 period. COVID-19 pandemic period exposed the teachers to intense technology use through distance education, and thus negatively affected their life and performance. In addition, one can say that teachers' workload increased, and they had to put much more effort into adapting to recent technologies in distance education. It can be argued all these factors contributed to teachers' increased technostress levels. In addition to the continuation of all face-to-face education curriculum in distance education format, the online continuation of activities, such as occupational development, school-related responsibilities, guidance activities for families and students, together with the teaching task, can be argued to be effective on this outcome.

In the research, as a consequence of the responses to the technostress scale, the items which had the lowest mean were identified as; teachers' lack of knowledge on technology adequate enough to do their job satisfactorily, the need for a long time to understand and use recent technologies, the thought of newly recruited colleagues having more knowledge on computer technology than the person himself, new technologies' becoming more complicated to understand and use, feeling the job security under threat due to modern technologies, the need to constantly improve skills to avoid from changes in the job position, feeling of being threatened by colleagues with

more technological skills, avoiding sharing of knowledge with colleagues for fear of job position change, constant changes in computer software and hardware, frequent upgrades in computer networks within the organization. Reviewing the research results, it is possible to claim that teachers have been exposed to less technostress, in terms of technology literacy and job security, during the COVID-19 period. In Covid 19 distance education process, both the fact that especially the public-school teachers have staff security (Aktan et al., 2021), and partial requirement of technology literacy to use EBA platform for offline education, EBA TV for online education, and live course software for live lessons (Ministry of National Education [MoNE], 2020) can be argued to have an impact on these results.

According to the research results, it is possible to say that the teachers have high job satisfaction levels in general and love their jobs. Similarly, in several other studies, teachers appeared to have high job satisfaction levels (Demir, 2020; Kalkan, 2020) and love their jobs (Aktan et al., 2021; Idris et al., 2021). It can be argued that the problems experienced during the Covid 19 period were not effective on teachers' job satisfaction. That the teachers love their jobs can be deemed effective on this result. According to research results, the job satisfaction level of men was determined to be lower than that of women during the Covid 19 period. Several studies obtained related results, indicating that female teachers' job satisfaction levels were higher than male teachers' (Shaukat et al., 2019; Toropova et al., 2021). However, in some studies, gender was not effective on teachers' job satisfaction levels (Crossman and Harris, 2006; Shrestha, 2019; Singh and Kumar, 2016), while in some others, contrarily to our research findings, male teachers had higher job satisfaction levels (Chitra, 2020; Maina et al., 2021). The research results indicated that private school teachers' job satisfaction levels were lower than public-school teachers'. In some studies of the Covid 19 period (Ali et al., 2021; Çolakoğlu and Toygar, 2021; Khanal et al., 2021; Simon and Hasan, 2021), comparable results implied that public-school teachers had higher job satisfaction levels.

According to research results analyzed, technology-induced workload (techno overload) and insecurity (techno insecurity), the sub-dimensions of the teachers' technostress scale, were determined to be the variables that negatively affected job satisfaction. Due to the nature of the distance education process, the teachers had to use technology intensively and accordingly to be continuously online. One can argue that long-time use of technology exposes teachers to technostress and hampers their job satisfaction. In relevant studies suggesting that techno overload negatively affects teachers' job satisfaction, equivalent results were obtained (McDaniel et al., 2021; Yin et al., 2018). Having analyzed the research results, the continuous technology change (techno uncertainty), one of the sub-dimensions of the technostress scale, was determined to have a positive impact on teachers' job satisfaction. It can be said that the use of technology changes for education within the context of educational technology and the efforts by teachers for continuing their occupational development to adapt to these changes were effective on this result.

Upon the analysis of research findings, the gender and the organization type teachers work in, among the primary effects on teachers' technostress level, were determined to make a significant difference. Seniority, another primary effect, was determined not to make a difference on the technostress level. Thus, it can be stated

that teachers' occupational seniority was not an effective variable on technostress levels. Besides, the gender-organization type, gender-seniority, organization type-seniority, and gender-organization type-seniority interactions were determined not to make a significant difference on the technostress level. The gender of the teachers was determined to make a significant difference in the techno insecurity sub-dimension, and the mean of women's techno insecurity was lower than that of men. Thus, it is possible to state that female teachers had a lower level of technostress.

According to the research findings, the teachers' technostress levels made a significant difference in the techno insecurity sub-dimension, with reference to the organization type where the teachers worked. The mean techno insecurity of public-school teachers was lower than that of private school teachers. Private school teachers can be said to experience much more stress due to reasons such as the private school environment with more parental pressure and stressful work (Brady and Wilson, 2021), teachers' exposure to intense use of technology in distance education (Pandey and Pal, 2020; Panisoara et al., 2020; Penado Abilleira et al., 2021; Rapanta et al., 2020), and private school teachers' deprivation of job security (Khanal et al., 2021; Simon and Hasan, 2021). Besides, it is possible to argue that switching to distance education with the lockdown of schools, the teachers' confrontations with technology-related problems, and thus their increasing fear for losing their job security were also effective on this result.

The research findings indicated that the technostress levels of the teachers made a significant difference in the "continuous change in technology (techno uncertainty)" sub-dimension, with reference to the organization type where the teachers worked. The mean of public-school teachers' techno uncertainty sub-dimension scores was lower than that of private school teachers. It is possible to state that private school teachers felt the obligation of constantly improving their technological competencies, more strongly than public-school teachers, lest they lose their job security. Accordingly, one can argue that this perception exposed private school teachers to more technological stress. On the other hand, that the occupational development of public-school teachers is optional and a mechanism to force them to occupational development is absent can be argued to be also effective in these results.

When the research findings were analyzed, it was determined that, though some considered the COVID-19 pandemic period as an opportunity and thought it had some positive aspects as well, most of the teachers had the opinion that the distance education process brought educational, psychological, and administrative challenges with itself. Some results obtained in the research implied that teachers had problems in classroom management and interacting with students during distance education, teacher-student interaction was weak, student participation in distance education was low, distance education negatively affected students' social-emotional development and communication skills, distance education created inequality of opportunity, and teachers' use of technology was inadequate. However, it has been determined that the distance education process causes low achievement in students. In some studies focusing on the effects of the COVID-19 pandemic on the academic performance of students, similar findings were obtained indicating that the academic achievement of the students decreased and learning losses occurred in the students (Azevedo et al., 2021; Engzell vd., 2021). Among the reasons for the low academic achievement of

the students, the fact that distance education is not as effective as face-to-face education (Demir and Demir, 2021; Tomasik et al., 2021) and that some students do not have access to distance education can be counted as the main reasons (Bergdahl and Nouri, 2021; Sari and Nayır, 2020).

The inability to follow lessons in distance education and the fact that live class recording is seen as an element of pressure are other educational difficulties emphasized by teachers in the COVID-19 distance education process. In some studies, it is seen that similar findings have been reached regarding the difficulty of following the lessons in the distance education process (Sepulveda-Escobar and Morrison, 2020; Stamatis, 2021) and the pressure on teachers with live class recordings (Bozkurt and Sharma, 2020; Mengi and Alpdoğan, 2020). Based on these results, it is possible to deduce that the distance education process has many educational problems for teachers and that these problems negatively affect student-teacher interaction and teaching process along with the teachers' professional motivation.

On the other hand, distance education was determined to be a process causing the usurpation of private life, inefficient, exhausting, stressful, job-repellent, increasing the workload, and wearisome. Technology-induced invasion of private life (techno-invasion) defines the situations where the lines between work and personal life get fuzzy, and the individual is compelled to be 'online' all the time (Tarafdar et al., 2007). Particularly within the COVID-19 period, it can be argued that along with their switch to home-working and staying online continuously, the work-private life border disappeared, and the teachers' private lives were negatively affected by this condition. It is possible to argue that the teachers perceived their being accessible anytime and anywhere, through technological software in the distance education process, as an intervention to their freedom and private life.

When the opinions of the teachers were evaluated, it was determined that the teachers were psychologically fatigued during the distance education process, they were faced with the problems brought by uncertainty, and they experienced exhaustion and loss of motivation. In some studies on the distance education process, it has been ascertained that teachers have psychological difficulties due to the uncertainties of the COVID-19 distance education process (Bozkurt et al., 2020 Bergdahl and Nouri, 2021), that they experience occupational burnout (Pressley, 2021; Sokal et al., 2020) and loss of motivation due to the problems they face ( Mikušková and Verešová, 2020). However, in some studies, it has been stated that despite the burnout, difficulties and uncertainties experienced by teachers during the COVID-19 process, they also have a dynamic desire to teach in the distance education process, a strong motivation to cope with difficulties with students, and a sense of achievement (Sokal et al., 2020; Wong and Moorhouse, 2020). This situation can be explained by teachers' sense of professional dedication towards students. With this feeling, it can be said that teachers actively provide guidance and process companionship in order to prevent their students' learning losses, not to be affected by the difficulties of this process or to be affected at a minimum level.

According to the results of the research, it is seen that long-term screen use causes various health problems in teachers due to inactivity. Similarly, some studies showed that long-term screen use causes health problems (Nagata et al., 2020; Wong et al., 2021). Furthermore, it has been determined that exposure to intensive technology

use triggers technology addiction (Colomo Magaña et al., 2021), stress, burnout and technology-related concerns during the COVID-19 process are effective on teachers' career and retirement preferences (Dos Santos, 2021). According to the results of the study, it was detected that the teachers neglected their loved ones due to the long-distance education processes. It can be said that in families with more than one child, whose spouse is also a teacher and attends school, almost every room of the house turns into separate virtual classrooms at different times. Hence, the time and interaction that the family spends together during these processes are limited.

The research results indicated that the educational administrators were caught off their guard and failed to give a good test of educational administration within the COVID-19 distance learning process. Besides, one can argue unnecessary bureaucracy to have been created, the quality of education not to be adequately considered, and the quantity to come to the forefront. Studies have shown that similar problems are experienced as a result of being caught unprepared for the COVID-19 process (Kudyba, 2020; Mhlanga and Moloi, 2020). On the other hand, it was determined that there were also positive aspects of the distance education process, such as participating in personal development activities from home, saving free time, getting a motivation source for technological improvement, and working in home comfort. In some studies, the possibility of working from home and in a comfortable environment with distance education, not spending time and money for transportation (Dolenc et al., 2021; Saeed et al., 2021), providing online professional development opportunities (Chin et al., 2022), making learning easy and enjoyable (Parkes and Barrs, 2021) become prominent as the positive aspects of the COVID-19 pandemic period. It can be said that the COVID-19 distance education process offers numerous learning opportunities in education, personal development, technological and professional fields due to the online professional development opportunities as well as the difficulties (Moorhouse and Wong, 2021). It has been determined that teachers who benefit from these opportunities overcome the process more successfully (Alqahtani and Rajkhan, 2020).

In addition to this, it can be said that during the distance education process, teachers have the opportunity to participate in online professional development activities on different subjects and contents from home. In order to support the professional development of teachers, 1 million 187 thousand 852 in 2020 and 2 million 773 thousand 317 teachers in 2021 participated in the in-service teacher training programs organized by the Ministry of National Education for different subjects and participants, generally conducted online (MoNE, 2021). Based on the study findings, one can say that teachers experience some educational, administrative, and psychological problems in the distance education process. Besides, it can be said that the process is pleasant and comfortable for teachers, teachers have the opportunity to develop professional and personal development with online in-service training programs, and they improve their professional knowledge and skills.

### 11.1 Recommendations

According to the research findings, it was assessed that the teachers were heavily exposed to technology use in the COVID-19 period, had much workload, and thus adversely affected in terms of technostress level. Based on the research results, it can

be ensured that teachers' teaching hours in distance education are flexed, flexible working schedules and employment methods are applied. The results of the study reveal that teachers experienced psychological, administrative, and educational difficulties during the COVID-19 process. Psychological support can be provided to reduce the stress, job burnout, and psychological exhaustion of teachers. It is necessary to determine the negative situations that cause burnout and stress in teachers and to take policies and measures to eliminate these negativities. In-service training programs can be designed for improving technology literacy as a solution to the problems faced by teachers regarding the use of technology. To be prepared for online learning, undergraduate programs of education faculties can be reviewed in terms of content. Improved employment conditions, personal rights, and working conditions of private school teachers can increase their job satisfaction. In order to improve teachers' online learning skills and ensure them be prepared to distance education during pandemic periods, it is also possible to cover relevant content, in teacher training curriculums, about online learning skills and emergency distance education. In order to maintain distance education activities more efficiently, the mentorship of experienced teachers can be used to support teachers who have problems in using distance education technologies. In-service training programs can be structured to improve teachers' occupational skills regarding e-content preparation, e-learning design, classroom management, e-assessment, and evaluation.

### 11.2 Limitations

Some limitations are under question in this research, which investigates the levels of technostress, the teachers went through in the COVID-19 pandemic distance education process, as well as the relationship between this technostress level and job satisfaction. It is important to assess the research findings with respect to these limitations. Due to COVID-19 conditions, data collection was performed online instead of face-to-face interviews. That the study group was not wide enough so as to cover multiple provinces has been another limitation. The small number of teachers to represent all the teachers and the purposive structure of the sample constituted a limitation as well.

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