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Technostress levels of science field faculty members in the Kyrgyz Republic

Niveles de tecnoestrés del profesorado de ciencias de la República Kirguisa

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Erkan Efilti
Kyrgyz-Turkish Manas University, Kyrgyzstan
erkan.efilti@manas.edu.kg

Bakyt Borkoev
Kyrgyz-Turkish Manas University, Kyrgyzstan
bakyt.borkoev@manas.edu.kg

Akmatali Alímbekov
Kyrgyz-Turkish Manas University, Kyrgyzstan
akmatali.alimbekov@manas.edu.kg

Argen Zhumgalbekov
Kyrgyz-Turkish Manas University, Kyrgyzstan
argen.zhumgalbekov@manas.edu.kg

Kalipa Salíeva
Kyrgyz-Turkish Manas University, Kyrgyzstan
kalipa.salieva@manas.edu.kg

Aida Akmatalíeva
Kyrgyz-Turkish Manas University, Faculty of Humanities, Kyrgyzstan
akmatalievaaida1@gmail.com

Gulshat Muhametjanova
Kyrgyz-Turkish Manas University, Kyrgyzstan
gulshat.muhametjanova@manas.edu.kg

ABSTRACT

The purpose of this study was to examine the technostress levels of science field faculty members in the Kyrgyz Republic. The relational survey model was used to investigate whether there was a significant difference and a relationship between demographic variables such as gender, age, field of science, seniority, technological education level, and availability of a personal computer in terms of technostress and its sub-dimensions. The sample of the study consisted of 274 science faculty members, with 156 females and 118 males working at different universities in the Kyrgyz Republic. "Personal Data Form" and "Defining Teachers' Technostress Levels Scale" were used as data collection tools in the study. The results showed that the general technostress levels of the participants were at a medium level. General technostress levels and technostress sub-dimensions scores of science faculty members did not differ by their genders, ages, seniorities, technology educations, and availability of their computers. There was a low level of positive correlation between age and the scores of the occupational and personal sub-dimensions of technostress; It was determined that there was a low-level, positive, statistically significant relationship between the seniority variable and the personal-oriented sub-dimension. It can be concluded that as the year of seniority progresses, academicians' technostress scores also increase. These findings reveal that seniority has certain effects on the technostress levels of academicians, but these effects vary based on sub-dimensions.

KEYWORDS Higher education; technology in education; technological competence; technostress.

RESUMEN

El objetivo de este estudio era examinar los niveles de tecnoestrés de los profesores de ciencias de la República Kirguisa. Se utilizó el modelo de encuesta relacional para investigar si existía una diferencia significativa y una relación entre variables demográficas como el género, la edad, el campo de la ciencia, la antigüedad, el nivel de educación tecnológica y la disponibilidad de un ordenador personal en términos de tecnoestrés y sus subdimensiones. La muestra del estudio estaba formada por 274 profesores de ciencias, de los cuales 156 eran mujeres y 118 hombres que trabajaban en distintas universidades de la República Kirguisa. En el estudio se utilizaron como herramientas de recogida de datos el "Formulario de datos personales" y la "Escala de definición de los niveles de tecnoestrés de los profesores". Los resultados mostraron que los niveles generales de tecnoestrés de los participantes se situaban en un nivel medio. Los niveles generales de tecnoestrés y las puntuaciones de las subdimensiones de tecnoestrés de los profesores de ciencias no diferían en función de su sexo, edad, antigüedad, formación tecnológica y disponibilidad de ordenadores. Hubo un bajo nivel de correlación positiva entre la edad y las puntuaciones de las subdimensiones laboral y personal del tecnoestrés; Se determinó que existía una relación de bajo nivel, positiva y estadísticamente significativa entre la variable antigüedad y la subdimensión de orientación personal. Se puede concluir que a medida que avanza el año de antigüedad, también aumentan las puntuaciones de tecnoestrés de los académicos. Estos resultados revelan que la antigüedad tiene ciertos efectos sobre los niveles de tecnoestrés de los académicos, pero estos efectos varían en función de las subdimensiones.

PALABRAS CLAVE Enseñanza superior; tecnología en la educación; competencia tecnológica; tecnoestrés.

1. INTRODUCTION

Modern societies produce new technologies using the information they obtain through science and thus accelerate social change. New technology, with all its evolution, has been and continues to be the subject of numerous studies and research highlighting its positive and negative aspects (Chiappetta, 2017). By their own characteristics, technological and social changes are closely interconnected. Especially in modern societies, rapid technological change is accompanied by rapid social change. The level of development of today's society is generally measured by the science and technology it produces. There is only one way to achieve this, and that is education. Along with technological innovations, educational tools and equipment also need to be updated by the demands of the age. One of the key issues in this environment that develops with digital transformation is the need to bring technological quality to education. Education that does not benefit from technological opportunities cannot meet the social and individual expectations and needs of the age (Karasar, 2004). In addition to the use of technology in curriculum and evaluations, it also becomes necessary to encourage educators to include technology in teaching in order to facilitate learning, considering the education factor (Scherer et al., 2019).

In addition to the benefits of technology in the learning and teaching processes, it is known that the use of technology in academic studies by faculty members provides great convenience in their research. In order to integrate technology into education, it is known that educators must first be aware of this issue and have a positive perspective on the use of technology. However, understanding the factors that encourage and/or restrict educators to use information and communication technologies is considered crucial for an effective technology adaptation process (Ursavaş et al., 2014). Today's widespread use of technological tools and internet applications has placed a responsibility on teachers to use technological tools for educational purposes 24/7, not only in the school building and during working hours, but also outside working hours. Thus, teachers need to work harder in both their professional and social lives, and their responsibilities increase (Çetin & Bülbül, 2017). On the other hand, today's digital age children grow up with technology and have the skills to use technological tools. The fact that children grow up in technology places responsibilities on the teachers who will educate them in ensuring and enriching the integration of technology into educational environments (Gökbulut, 2021). Another condition for success in integrating technology into learning-teaching processes is that teachers feel psychologically comfortable when they turn to technology. When some teachers spend a long time with technology, they narrow down their personal space, encounter more information and data than they can process, or when they want to improve themselves technologically - more specifically in terms of changing teaching technologies - as a result of intense experiences, or they may feel stress due to their lack of knowledge and experience (Erdoğan & Akbaba, 2022).

The negative effects experienced by people due to technology were first defined as "Technostress" by the American psychologist Brod (1984). He defines the technostress as a modern adaptation disease caused by the inability to cope with new computer technologies in a healthy way (Brod, 1984). He argues that technostress is a type of adjustment disorder (Chiappetta, 2017; Çoklar et al., 2017). However, in another definition he states that "technostress is not a disease, but a negative psychological, behavioral and physiological effect caused directly or indirectly by technology" (Clark, 1996). Brod (1984) listed the most important symptom of technostress in users as anxiety towards computer technologies and others as follows: muscle cramps, joint pain, headaches and insomnia (as cited in Çoklar et al., 2016). Technostress, as a type of stress caused by technology, causes the individual to be under stress and give some reactions (anger, anxiety, restlessness, fear) (Weil & Rosen, 1997). There are many studies in the literature that have examined the impact of technostress on individuals' lives. High technostress levels in individuals cause a decrease in job satisfaction, organizational commitment and job performance, while increasing negative emotions (Ayyagari et al., 2011; Jena, 2015; Tarafdar et al., 2011). In other words, technostress is directly related to technology.

Studies in the literature that have examined the technostress levels of teachers and the relationship of technostress with other phenomena are: job satisfaction (Aktan & Toraman, 2022; Ranathunga & Rathnakara, 2022; Toraman & Aktan, 2022), professional motivation (Akman & Durgun, 2022), academic productivity (La Torre et al., 2020; Lee et al., 2016; Upadhyaya & Vrinda, 2021), satisfaction, anxiety, and performance (Abd Aziz et al., 2021; Fernández-Fernández et al., 2023; Rodríguez-Barboza, 2023) , academic success and well-being (Whelan at al., 2022), techno-pedagogical competence (Gökbulut, 2021), professional burnout (Gökbulut & Dindaş, 2022), perceived organizational support (Solís et al., 2023), job satisfaction and perceived performance (Al-Ansari & Alshare, 2019), work engagement and work-life balance satisfaction (Curcuruto et al., 2023), psychological capital (Efilti & Çoklar, 2019), work-family conflict (Shaukat et al., 2022). However, there are also studies examining the relationship between technostress and life satisfaction (Le Roux & Botha, 2021; Lee et al., 2016; Shaukat et al., 2022).

1.1. Literature review

Brod (1984) defines technostress as a modern adaptation disease caused by the inability to cope with new computer technologies healthily, and this stress situation occurs when the expertise requirements of information and correspondence technologies exceed the capacity level of users (Sharma & Gupta, 2022). In the literature, there are some studies examining the effects of technostress on individuals' lives. High levels of technostress in individuals may lead to a decrease in job satisfaction, organizational commitment and job performance, and an increase in negative emotions (Ayyagari et al., 2011; Jena, 2015; Tarafdar et al., 2011); reduces job satisfaction (Aktan & Toraman, 2022; Ranathunga & Rathnakara, 2022; Toraman & Aktan, 2022); may cause low professional motivation (Akman & Durgun, 2022); negatively affects academic productivity (La Torre et al., 2020; Lee et al., 2016; Upadhyaya & Vrinda, 2021); increases professional burnout (Gökbulut & Dindaş, 2022); affects life satisfaction (Le Roux & Botha, 2021; Lee et al., 2016; Shaukat et al., 2022); triggers work-life balance satisfaction (Curcuruto et al., 2023); reduces individuals' work participation and psychological capital levels (Efilti & Çoklar, 2019); may cause a decrease in the level of work performance (Abd Aziz et al., 2021; Al-Ansari & Alshare, 2019; Fernández-Fernández et al., 2023; Rodríguez-Barboza, 2023) and may be one of the factors affecting work-family conflict (Shaukat et al. al., 2022). There are some studies examining the relationship between technostress and gender variables. Some of these studies found that technostress levels of teachers did not differ by the gender variable (Akman & Durgun, 2022; Arslan et al., 2022; Çetin & Bülbül, 2017; Çoklar et al., 2016; Gökbulut, 2021; Le Roux & Botha, 2021; Li & Wang, 2021; Özgür, 2020; Yadav & Rahaman, 2020). However, some of these studies claimed that the level of technostress might differ according to gender (Abd Aziz et al., 2021; Akgün, 2019; Aktan & Toraman, 2022; Çoklar & Şahin, 2011; Gökbulut & Dindaş, 2022; Lee et al., 2014; Ragu-Nathan et al., 2008; Riedl, 2013; Shaukat et al., 2022; Shu et al., 2011; Upadhyaya & Vrinda, 2021). Other studies have examined the relationship between professional seniority and technostress (Marchiori et al., 2019; Penado Abilleira et al., 2021). As a striking factor during the literature review process, it was observed that there were very few studies focusing on the relationship between technostress and variables such as the field of science, technological education, and access to computers.

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Wang, et al., 2023 investigated psycho-emotional factors on students' technology acceptance. As results showed students achievement and emotions, and technological self-efficacy were significant predictors of technology acceptance. Teachers' technology acceptance and emotional intelligence were investigated by Zhi et al., (2023). Structural equation modeling and regression analysis were conducted, and results showed that 89% and 63% of variances were predicted by emotional intelligence and self-efficacy of Chinese EFL teachers' technology adoption.

Factors that create technostress: Factors frequently used to explain technostress factors are: 1) techno-overload, 2) techno-invasion, 3) techno-complexity, 4) techno-uncertainty and 5) techno-insecurity (Ragu-Nathan et al., 2008; Singh et al., 2022; Tarafdar et al., 2007, 2011). Techno-overload refers to the need to process information from multiple tasks simultaneously using technological devices. Techno-invasion occurs when technology invades personal life and privacy, creating the need to connect anytime, anywhere. Techno-complexity is defined as the complexity associated with the use of technology and means putting in the time and effort to learn how to use technology effectively. Techno-uncertainty is since technology is a stressful factor due to constant updates and changes, making it difficult for users to establish a solid foundation of experience and domain in using technology. Techno-insecurity is the feeling that technology threatens job stability and maintenance of employment (Araoz et al., 2023).

It is possible to identify different categories for prevention and intervention strategies. Primary prevention focuses on increasing the knowledge of affected individuals, who should focus on preventive aspects to avoid technostress. On the other hand, when technostress symptoms are already present, secondary intervention is applied and is carried out through direct training by experts. Finally, the tertiary strategy is applied in cases where technostress occurs aggressively and with all its consequences and requires the provision of psychological and medical support to confront it effectively (Salanova et al., 2011).

1.2. Research questions

As the literature review shows, the inadequacy of teachers in technology causes technostress, which negatively affects their job performance. Based on the research problem and the findings in the literature, the purpose of the research is to examine the technostress levels of university science faculty members based on some variables. The starting point of the study is the proliferation of information communication technologies across organizations therefore affecting people who are not technology experts, and the limited number of studies conducted on the subject by faculty members in science fields. Science faculty members are chosen as the research universe due to their close interaction with technology, reliance on digital tools, and the need to adapt swiftly to technological advancements. Therefore, the study focused on faculty members, who are non-technologist experts who are exposed to information communication technologies as a regular part of their workday. Additionally, it is believed that the study will fill these gaps by examining the technostress levels of academicians in terms of some variables in a developing country such as the Kyrgyz Republic, where online teaching is a relatively new concept and universities have just started to create and offer online programs. In this context, the researcher used the following research questions to achieve the purpose of the study:

1. What are the technostress levels of science faculty members?
2. Do the technostress levels of science faculty members differ by their demographic variables (gender, age, science field, professional seniority, technological education level, and personal computer availability)?

3. Is there a significant relationship between age and seniority variables and technostress levels of science faculty members?

2. MATERIAL AND METHOD

In the study, the situation was determined using the relational survey model among the quantitative research methods. While survey models are defined as research approaches that aim to describe a past or ongoing situation as it exists, relational survey models are defined as research models that aim to determine the existence or degree of change between two or more variables (Karasar, 2014). In addition, the individual or object subject to research is tried to be defined as it is and within its conditions. In addition, this model is the model in which participant opinions on a topic or event are determined (Büyüköztürk, 2021).

2.1. Population and Sample

The population of the study consisted of science faculty members working at universities in the Kyrgyz Republic in the 2022-2023 academic year. It consisted of 274 science faculty members working at different universities in the Kyrgyz Republic who agreed to participate in the study voluntarily. In determining the sample, a simple random sampling technique was used, where participants were selected randomly (Ekiz, 2015; Lavrakas, 2008). Demographic and descriptive statistical data about the sample group is presented in Table 1:

TABLE 1. **Demographic Characteristics of Participants (n=274)**

	GROUP	n	%
Gender	Female	156	56,9
	Male	118	43,1
Age	27-40	80	29,2
	41-55	111	40,5
	56 and over	83	30,3
Field of Science	Chemistry	61	22,3
	Biology	75	27,4
	Mathematics	48	17,5
	Geography	49	17,9
	Informatics	41	15,0
Seniority	1-15 years	78	28,5
	16-30 years	115	42,0
	31 years and over	81	29,6
Getting technology education	Educated	166	60,6
	Uneducated	108	39,4
Having Personal Computer	Those who have a computer	160	58,4
	Those who do not have a computer	114	41,6

As seen in Table 1, 56.9% (n=156) of the sample of the study are females and 43.1% (n=118) are males. 40.5% (n=111) of the participants are between the ages of 41-55, 29.2% (n=80) are between the ages of 27-40, and 30.3% (n=83) are aged 56 and over by the age variable. 27.4% (n=75) of the participants studied in biology, 22.3% (n=61) studied in chemistry, 17.9% (n=49) studied in geography, 17.5% (n=48) studied in mathematics and 15% (n=41) studied in informatics. 42% (n=115) of the participants have 16-30 years of seniority, 28.5% (n=78) have 1-15 years of seniority, and 29.6% (n=81) have 31 years or more of seniority.

2.2. Data Collection Tools

The data was collected through the Personal Data Form created by the researcher, including demographic factors, and the "Defining Academicians' Technostress Levels Scale" developed by Çoklar et al. (2017) and adapted into Kyrgyz by Efilti and Zhumgalbekov (2023).

2.2.1. Personal Data Form

The form, created by the researcher, includes the demographic information of the participants (gender, age, field of science, seniority, technological education, and availability of personal computers).

2.2.2. Defining Academicians' Technostress Levels Scale

The scale was developed by Çoklar et al. in 2017. It consists of 28 items and 5 factors. The factors are "Learning-Teaching Process Oriented", "Profession Oriented", "Technical Issue Oriented", "Personal Oriented" and "Social Oriented". The scale items are 5-point Likert type and are "Totally Agree", "Agree", "Partly Agree", "Disagree" and "Strongly Disagree". The internal consistency coefficient (Cronbach's Alpha coefficient) for the whole scale was found to be .917, and the Spearman-Brown coefficient calculated for dividing into two halves was found to be .845. The internal consistency coefficient (Cronbach's Alpha coefficient) of the factors that make up the scale takes values between .712 and .788. The calculations made on the arithmetic mean score are based on the interpretation of the findings obtained depending on the analysis of the data. The criteria for evaluating the technostress levels of academicians in the scale are as follows: 1.00 – 2.33 – low level, 2.34 – 3.67 – medium level, 3.68 – 5.00 – high level (Çoklar et al., 2017).

A high positive correlation was determined between the original Turkish and Kyrgyz versions of the scale ($r=0.798$, $p<0.01$). As a result of the analysis, a measurement tool consisting of 27 items and 5 sub-dimensions explaining 63.74% of the total variance was obtained, and it was observed that the items in the sub-dimensions exactly matched the items in the original form. The internal consistency coefficient of the Kyrgyz version of the scale was calculated as $\alpha=0.95$ and the internal consistency coefficient of the 5 sub-dimensions ranged between 0.77-0.85. The correlation value of the test-retest method was calculated as 0.811 (Efilti & Zhumgalbekov, 2023).

2.3. Data Collection and Analysis

To collect data, the application method of the scales was created. The prepared form was applied to the target participants face-to-face by interviewers. Information on how to answer the questions was given on the first pages of the scales.

A statistical package application was used to analyze the data. To determine which test types, parametric or non-parametric tests, would be used in the analysis of the data, the normal distribution of the data was examined. In studies conducted in the field of social sciences, understanding whether the data has a normal distribution feature is mostly achieved by Skewness and Kurtosis values. If the values are between +1.5 and -1.5, it is accepted that the data fulfills the normality distribution condition (Tabachnick and Fidell, 2013).

TABLE 2. Kurtosis and Skewness Values of Data

VARIABLES	SKEWNESS	KURTOSIS
Technostress (Total Score)	**0,151**	**-0,063**
1. Learning-Teaching Process-Oriented	-0,014	-0,204
2. Profession-Oriented	0,453	0,003
3. Technical-Issue-Oriented	0,298	0,008
4. Personal-Oriented	0,219	-0,251
5. Social-Oriented	0,469	0,023

As seen in Table 2, the Kurtosis and Skewness values of the data are between -1.5 and +1.5. In addition, histogram, Q-Q Plot, Boxplot graphics, and Kolmogorov-Smirnov (K-S) (significance value for all scales was insignificant, $p \geq 0.05$) test results were examined to determine the normal distribution. Accordingly, it was understood that the data met the normal distribution condition and it was decided to use parametric tests. Having a normal distribution in measurements and using parametric tests gives stronger results (Pallant, 2017). For analyses on demographic variables, a t-test for independent samples and a One-Way ANOVA test was applied, and the Pearson Product Moment Correlation Test was applied for correlational analyses between dependent variables. If there was a significant difference in the results of the comparison tests obtained, the effect size of the significance was decided with the formula eta square (), and the eta square value of the effect size was reported.

3. RESULTS

In this section, first, the general situation regarding the participants' levels of technostress and its sub-dimensions was described, then this dependent variable was compared with various independent variables and its relationship status was examined. Table 3, in next page, shows the technostress levels of the participants.

TABLE 3. Descriptive Statistics and Cronbach's Alpha Values for Technostress and Sub-Dimensions

VARIABLES	N	x̄	SD	α	DEGREE
Technostress (Total Score)	**274**	**2,71**	**0,504**	**0,917**	**Medium**
1. Learning-Teaching Process-Oriented	274	2,76	0,587	0,746	Medium
2. Profession-Oriented	274	2,49	0,625	0,772	Medium
3. Technical-Issue-Oriented	274	2,95	0,641	0,797	Medium
4. Personal-Oriented	274	2,45	0,632	0,780	Medium
5. Social-Oriented	274	2,88	0,678	0,718	Medium

As seen in Table 3, the technostress average of the participants was found to be 2.71. Mean scores for technostress sub-dimensions were calculated as follows; 2.76 for learning-teaching process-oriented, 2.49 for profession-oriented, 2.95 for technical-issue-oriented, 2.45 for personal-oriented and 2.88 for social-oriented. The data presented in the table shows that among the technostress sub-dimensions, the personal-related and professional-oriented sub-dimensions have the lowest mean, and the technical-issue-oriented and social-oriented sub-dimensions have the highest mean. However, the overall technostress levels of the participants are at a medium level. Cronbach's Alpha coefficients of the variables reveal that the data are quite reliable.

To determine whether the technostress levels of academicians differ by gender variable, the t-test for independent samples was conducted. The analysis results of the test are presented in Table 4:

TABLE 4. T-test Results for Independent Samples Regarding the Differentiation of Technostress Levels Based on Gender Variable

	GENDER	n	x̄	SD	t	df	p
Technostress (Total Score)	**Female**	**156**	**2,74**	**0,512**	**1,121**	**272**	**0,263**
	Male	**118**	**2,67**	**0,50**			
1. Learning-Teaching Process-Oriented	Female	156	2,76	0,58	0,212	271	0,832
	Male	118	2,75	0,59			
2. Profession-Oriented	Female	156	2,55	0,60	1,874	271	0,062
	Male	118	2,41	0,64			
3. Technical-Issue-Oriented	Female	156	2,98	0,66	0,468	271	0,640
	Male	118	2,94	0,61			
4. Personal-Oriented	Female	156	2,45	0,62	0,141	271	0,888
	Male	118	2,44	0,64			
5. Social-Oriented	Female	156	2,94	0,71	1,601	271	0,111
	Male	118	2,81	0,62			

As seen in Table 4, the general technostress levels of the participants do not show a statistically significant difference based on the gender variable [*t*(340)= 1.121; *p*>0.05]. The scores regarding the technostress sub-dimensions do not show a significant difference based on the gender variable (*p*>0.05). However, it was found that both females and males had a medium-level technostress score.

Table 5 shows the differences in the technostress levels of the participants based on the age variable:

TABLE 5. One-Way ANOVA Test Results Regarding the Differentiation of Technostress Levels Based on Age Variable

	AGE	n	x̄	SD	F	df	p
Technostress (Total Score)	**1) 24-40**	**80**	**2,64**	**0,504**	**1,779**	**2**	**0,171**
	2) 41-55	**111**	**2,70**	**0,475**			
	3) 56 and over	**83**	**2,79**	**0,546**			
1. Learning-Teaching Process-Oriented	1) 24-40	80	2,74	0,554	0,647	2	0,525
	2) 41-55	111	2,72	0,581			
	3) 56 and over	83	2,82	0,627			
2. Profession-Oriented	1) 24-40	80	2,38	0,618	2,215	2	0,111
	2) 41-55	111	2,49	0,550			
	3) 56 and over	83	2,59	0,713			
3. Technical-Issue-Oriented	1) 24-40	80	2,87	0,653	1,679	2	0,188
	2) 41-55	111	2,96	0,610			
	3) 56 and over	83	3,05	0,664			
4. Personal-Oriented	1) 24-40	80	2,33	0,636	2,794	2	0,063
	2) 41-55	111	2,44	0,620			
	3) 56 and over	83	2,56	0,631			
5. Social-Oriented	1) 24-40	80	2,87	0,708	0,531	2	0,589
	2) 41-55	111	2,93	0,634			
	3) 56 and over	83	2,84	0,706			

Table 5 shows that the general technostress levels of the participants did not show a statistically significant difference based on the age variable [*F*(2)= 1.779; *p*>0.05]. It was determined that the scores regarding the technostress sub-dimensions did not show a significant difference based on the age variable (*p*>0.05).

Table 6 shows the differentiation of technostress levels of participants based on the field of science variable:

TABLE 6. **One-Way ANOVA Test Results Regarding the Differentiation of Technostress Levels Based on the Field of Science Variable**

	FIELD OF SCIENCE	n	x̄	SD	F	df	p	EFFECT SIZE ()	DIFFERENCE
Technostress (Total Score)	1. Chemistry	61	2,73	0,500	2,460	4	0,046*	0,03	4-5
	2. Biology	75	2,67	0,515					
	3. Mathematics	48	2,70	0,477					
	4. Geography	49	2,87	0,512					
	5. Informatics	41	2,54	0,493					
1. Learning-Teaching Process-Oriented	1. Chemistry	61	2,74	0,560	1,623	4	0,169		
	2. Biology	75	2,76	0,639					
	3. Mathematics	48	2,75	0,569					
	4. Geography	49	2,89	0,590					
	5. Informatics	41	2,57	0,521					
2. Profession-Oriented	1. Chemistry	61	2,55	0,626	2,936	4	0,021*	0,04	4-2 4-5
	2. Biology	75	2,38	0,603					
	3. Mathematics	48	2,49	0,605					
	4. Geography	49	2,69	0,631					
	5. Informatics	41	2,30	0,625					
3. Technical-Issue-Oriented	1. Chemistry	61	2,96	0,661	0,985	4	0,416		
	2. Biology	75	2,93	0,666					
	3. Mathematics	48	2,90	0,519					
	4. Geography	49	3,11	0,633					
	5. Informatics	41	2,88	0,699					
4. Personal-Oriented	1. Chemistry	61	2,46	0,623	3,290	4	0,012*	0,04	4-5
	2. Biology	75	2,38	0,609					
	3. Mathematics	48	2,48	0,643					
	4. Geography	49	2,67	0,654					
	5. Informatics	41	2,21	0,578					
5. Social-Oriented	1. Chemistry	61	2,82	0,686	0,870	4	0,483		
	2. Biology	75	2,93	0,695					
	3. Mathematics	48	2,91	0,667					
	4. Geography	49	2,96	0,632					
	5. Informatics	41	2,74	0,699					

*$p<0.05$

As seen in Table 6, it was determined that the general technostress levels of the participants showed a statistically significant difference based on the field of science variable [$F(4)= 2.460$; $p<0.05$]. The calculated eta-squared effect size coefficient showed that this difference had a low impact on the variance (=0.03). Among the technostress sub-dimensions, the scores of the learning-teaching process-oriented, technical-issue-oriented, and social-oriented sub-dimensions did not differ based on the field of science variable ($p>0.05$), while the scores for the profession-oriented [$F(4)= 2.936$; $p<0.05$]. and personal-oriented technostress [$F(4)= 3.290$; $p<0.05$] sub-dimension scores were found to differ statistically significantly. To find out which groups this difference was between, the Tukey test was applied since the Levene test was not significant. As a result of the test, according to the technostress sub-dimension for the profession, between academicians in the field of geography and the field of biology and informatics, and according to the personal-oriented technostress sub-dimension, it was understood that there was a significant difference between academicians in the field of geography and the field of informatics. This shows that academicians in the field of geography have higher professional and personal technostress levels. The calculated eta-squared effect size coefficient shows that this difference has a low impact on the variance (=0.04).

Table 7 shows the differences in the technostress levels of the participants based on the variable of seniority:

TABLE 7. **One-Way ANOVA Test Results Regarding the Differentiation of Technostress Levels Based on the Seniority Variable**

	YEAR	n	x̄	SD	F	df	p
Technostress (Total Score)	1) 1-15	78	2,67	0,490	1,730	2	0,179
	2) 16-30	115	2,66	0,489			
	3) 31 and over	81	2,79	0,542			
1. Learning-Teaching Process-Oriented	1) 1-15	78	2,80	0,528	2,086	2	0,126
	2) 16-30	115	2,67	0,592			
	3) 31 and over	81	2,83	0,625			
2. Profession-Oriented	1) 1-15	78	2,45	0,589	1,153	2	0,317
	2) 16-30	115	2,45	0,581			
	3) 31 and over	81	2,57	0,714			
3. Technical-Issue-Oriented	1) 1-15	78	2,91	0,651	1,366	2	0,257
	2) 16-30	115	2,92	0,622			
	3) 31 and over	81	3,06	0,654			
4. Personal-Oriented	1) 1-15	78	2,34	0,668	2,726	2	0,067
	2) 16-30	115	2,42	0,606			
	3) 31 and over	81	2,57	0,619			
5. Social-Oriented	1) 1-15	78	2,87	0,695	0,088	2	0,916
	2) 16-30	115	2,90	0,630			
	3) 31 and over	81	2,86	0,731			

$^*p<0.05$

As seen in Table 7, the general technostress levels of the participants [$F(2)= 1.730$; $p>0.05$] and it was determined that the scores regarding the technostress sub-dimensions did not show a statistically significant difference based on the seniority variable ($p>0.05$).

Table 8 shows the differentiation of the participants' technostress levels based on the variable of having technological education.

TABLE 8. **T-test Results for Independent Samples Regarding the Differentiation of Technostress Levels Based on the Variable of Having Technological Education**

	TECHNOLOGICAL EDUCATION	n	x̄	SD	t	df	p
Technostress (Total Score)	Have	166	2,69	0,512	-0,393	272	0,695
	Not Have	108	2,72	0,502			
1. Learning-Teaching Process-Oriented	Have	166	2,76	0,607	0,038	271	0,970
	Not Have	108	2,75	0,558			
2. Profession-Oriented	Have	166	2,45	0,624	-0,986	271	0,325
	Not Have	108	2,53	0,627			
3. Technical-Issue-Oriented	Have	166	2,96	0,640	0,259	271	0,796
	Not Have	108	2,94	0,644			
4. Personal-Oriented	Have	166	2,43	0,632	-0,496	271	0,621
	Not Have	108	2,47	0,635			
5. Social-Oriented	Have	166	2,85	0,693	-1,053	271	0,293
	Not Have	108	2,93	0,651			

As seen in Table 8, the general technostress levels of the participants [$t(272)=-0.393$; $p>0.05$] and the scores related to the technostress sub-dimensions did not show a statistically significant difference based on the variable of having technological education ($p>0.05$).

Table 9 shows the differentiation of the participants' technostress levels based on having personal computer availability variable:

TABLE 9. **T-test Results for Independent Samples Regarding the Differentiation of Technostress Levels Based on Having Personal Computer Availability Variable**

	COMPUTER	N	x̄	SD	t	df	P
Technostress (Total Score)	Have	160	2,71	0,516	-0,008	272	0,993
	Not Have	114	2,70	0,496			
1. Learning-Teaching Process-Oriented	Have	160	2,76	0,591	0,208	271	0,835
	Not Have	114	2,74	0,583			
2. Profession-Oriented	Have	160	2,48	0,646	-0,109	271	0,913
	Not Have	114	2,49	0,599			
3. Technical-Issue-Oriented	Have	160	2,92	0,632	-1,159	271	0,248
	Not Have	114	3,01	0,652			
4. Personal-Oriented	Have	160	2,43	0,627	-0,359	271	0,720
	Not Have	114	2,46	0,642			
5. Social-Oriented	Have	160	2,93	0,671	1,325	271	0,186
	Not Have	114	2,82	0,683			

As seen in Table 9, the general technostress levels of the participants [*t*(272)=-0.008; *p*>0.05] and the scores related to the technostress sub-dimensions did not show a statistically significant difference based on the personal computer availability variable (*p*>0.05).

Table 10 includes the findings of the correlation test conducted to determine the relationships between the technostress levels of the participants and the variables of age and seniority:

TABLE 10. Pearson Correlation Coefficients of the Relationships Between Technostress and Age and Seniority Variables

	1	2	3	4	5	6	7	8
1) Technostress(Total Score)	1							
2) Learning-Teaching Process-Oriented	0,773**	1						
3) Profession-Oriented	0,825**	0,540**	1					
4) Technical-Issue-Oriented	0,811**	0,497**	0,534**	1				
5) Personal-Oriented	0,817**	0,468**	0,684**	0,587**	1			
6) Social-Oriented	0,793**	0,516**	0,541**	0,633**	0,602**	1		
7) Age	0,114	0,047	0,127*	0,111	0,142*	-0,021	1	
8) Seniority	0,090	0,022	0,077	0,090	0,138*	-0,004	0,764**	1

***p<0,01, *p<0,05*

As seen in Table 10, it was determined that there was a low-level, positive, statistically significant relationship between the age variable and the scores of the profession-oriented [*r*=0,127; *p*<0,05] and personal-oriented [*r*=0,142; *p*<0,05] sub-dimensions of technostress. Accordingly, it can be said that as the age level increases, professional and personal technostress scores of academicians also increase. It has been determined that there is no statistically significant relationship between the age variable and the general technostress level score [*r*=0,114; *p*>0,05], and the scores of the learning-teaching process-oriented [*r*=0,047; *p*>0,05], technical-issue-oriented [*r*=0,111; *p*>0,05] and social-oriented [*r*=-0,021; *p*>0,05] sub-dimensions.

It was determined that there was a low-level, positive, statistically significant relationship between the seniority variable and the personal-related sub-dimension score [*r*=0,138; *p*<0,05]. Accordingly, it can be inferred that as the seniority of academicians progresses, their technostress scores increase. It has been determined that there is no statistically significant relationship between the variable of seniority and the general technostress level score [*r*=0,09; *p*>0,05], and the scores of the learning-teaching process-oriented [*r*=0,022; *p*>0,05], profession-oriented [*r*=0,077; *p*>0,05], technical issue-oriented [*r*=0,09; *p*>0,05] and social-oriented [r=-0,004; *p*>0,05] sub-dimensions.

However, it was observed that there were positive, statistically significant relationships between technostress and its sub-dimensions.

4. DISCUSSION

In this research, the technostress levels of science faculty members working in universities in the Kyrgyz Republic based on some variables were examined. As a result of the research, it was seen that the general technostress levels of the participants were at a medium level. In support of the research finding, Çoklar et al. (2016) and Gökbulut (2021) revealed that technostress levels were at a medium level in their study with teachers. The results showed that the stress level of academicians and teachers associated with technology use is medium and neither too high nor too low. Medium levels of technostress may indicate that participants experienced some difficulties adjusting to technology use, but it did not seriously affect overall job performance.

Technostress by Gender

General technostress levels and technostress sub-dimensions scores of science faculty members did not show a statistically significant difference based on gender. The results of several studies on the subject obtained from the literature support the study findings. Akman and Durgun (2022), Arslan et al. (2022), Çetin and Bülbül (2017), Çoklar and Bozyiğit (2021), Çoklar et al. (2016), Gökbulut (2021), Khlaif et al. (2023), Le Roux and Botha (2021), Li and Wang (2021), Mokh et al. (2021), Özgür (2020), Yadav and Rahaman (2020) revealed that technostress levels of teachers did not show a significant difference based the gender variable. Gökbulut and Dindaş (2022), who used the same scale as we used in their study, did not find a significant difference between the sub-dimensions of the technostress scale, namely teaching-learning and profession, and the gender variable. However, contrary to the research findings, a significant difference was found in technostress (general) and its technical-issue-oriented, social-oriented, and personal-oriented sub-dimensions based on the gender variable. They found that the technostress levels of female teachers were higher than those of male teachers. Some studies support this result. Abd Aziz et al. (2021), Aktan and Toraman (2022), Çoklar and Şahin (2011), Riedl (2013), Lee et al. (2014), Upadhyaya and Vrinda (2021), Shaukat et al. (2022) revealed that females experienced higher technostress than males. On the contrary, Akgün (2019), Estrada-Muñoz et al. (2020), Ragu-Nathan et al. (2008), and Shu et al. (2011) revealed that the technostress levels of males were significantly different from females. In conclusion, while the result of this research shows that there is no significant difference in technostress levels based on the gender variable, it is possible to say that the relationship between gender and technostress may be complex and diverse as different studies obtain different results.

Technostress by Age

In the age variable, the general technostress levels and technostress sub-dimensions scores of university science faculty members did not show a statistically significant difference. There are contradictory findings in studies conducted on this subject. Akman and Durgun (2022), Maier et al. (2015), Krishnan (2017), Le Roux and Botha (2021) and Wang et al. (2008) stated that there was no significant difference between age groups in terms of technostress levels and sub-dimensions. The studies generally showed a tendency that the technostress levels of teachers did not change depending on their age. However, Çoklar and Şahin (2011), Hauk et al. (2019), Shaukat et al. (2022), Tams et al. (2018), Venkatesh et al. (2012) and Yadav and

Rahaman (2020) revealed that teachers in older age groups experienced more technostress. However, other researchers claim that young people have significantly higher levels of technostress than older people (Hsiao, 2017; Ragu-Nathan et al., 2008; Tarafdar et al., 2011). These findings suggest a potential effect of age on technostress and appear to be incompatible with the findings of other studies. These conflicting results may result from using different research methodologies, sample characteristics, or assessment tools. Additionally, contextual factors such as education systems or technology usage habits may also have an impact. In this context, clearer results are needed by extracting these different results from literature studies and trying to conduct general studies in this direction (Marchiori et al., 2019; Upadhyaya & Vrinda, 2021).

Technostress by Field of Science

In the field of science variable, general technostress levels, profession-oriented, and personal-oriented sub-dimension scores of academicians in science fields differed statistically significantly. However, the scores of the learning-teaching process-oriented, technical-issue-oriented, and social-oriented sub-dimensions did not differ statistically significantly. In the study, it was determined that there was a significant difference between academicians in the field of geography and academicians in the field of informatics based on the personal-related technostress sub-dimension, and there was also a significant difference between academicians in the field of geography and academicians in the field of biology and informatics based on the profession-oriented technostress sub-dimension. The results show that academicians in the field of geography have higher professional and personal technostress levels. As a result, the research revealed that the technostress levels of academicians in the field of geography stand out and that this situation is especially evident in the professional and personal sub-dimensions. The results can be taken into account in support and resource allocation for academics working in these fields.

Technostress by Seniority

In the variable of seniority, the general technostress levels and technostress sub-dimensions scores of science academicians did not show a statistically significant difference. There are studies in the literature that support the findings. Aktan & Toraman (2022); Çoklar et al., (2016); Gökbulut, (2021); Gökbulut & Dindaş (2022); Mokh et al. (2021); Yadav & Rahaman (2020) revealed that there was no significant difference between technostress levels and professional seniorities of teachers, that was, seniority did not affect the technostress level. However, Marchiori et al. (2019) and Penado Abilleira et al. (2021) found that techno-anxiety levels differ depending on the year of seniority. They found that older people are exposed to technostress more frequently than younger people. This result does not support the findings of this research. These conflicting findings highlight the complexity of technostress and the difficulty of context-free generalizations. More comprehensive and multi-perspective research is needed to understand technostress and evaluate its effects.

Technostress by Technological Education Level

According to the variable of having technological education, the general technostress levels and technostress sub-dimensions scores of science academicians did not show a statistically significant difference. Considering that technostress is the result of not being able to cope with new computer technologies healthily, this result is of course unexpected and remarkable. The result of their study by Akman and Durgun (2022) also supports our findings. The results show that there is no statistically significant difference between the technostress levels of academicians with and without technological education associated with their work in science fields. This means that receiving technology education does not significantly affect the technostress levels of academicians or the sub-dimensions of stress. It can also be said that another issue that needs to be taken into consideration here is the quality of the technological education provided.

Technostress by Technological Device Access

According to the variable of having personal computer availability, general technostress levels and scores on technostress subdimensions did not show a statistically significant difference. The result shows that whether individuals have their computers or not does not affect their technostress levels. Therefore, it can be inferred that this variable does not have a statistically significant effect on general technostress levels. Additionally, no studies have been found in the literature that examined the differences in technostress levels of academicians based on having personal computer availability variable.

Relationship Between Age and Technostress

As a result of the research, it was determined that there was no statistically significant relationship between the age variable and the general technostress level score, or the scores of the learning-teaching process-oriented, technical-issue-oriented, and social-oriented sub-dimensions. However, there was a low-level, positive, statistically significant relationship between age and the scores of the profession-oriented and personal-oriented sub-dimensions of technostress. Accordingly, it can be inferred that as academicians' age increases, their professional and personal technostress levels also increase. There is a study that supports this finding. Penado Abilleira, M. et al. (2021) revealed that there was a positive significant relationship between age and the techno-anxiety levels of university faculty members. Hauk et al. (2019) revealed that age was negatively associated with technology-related stress. The link between age and technology-related strain is explained by behavioral disengagement, which older workers use less than younger workers. In this context, age may not affect the general technostress level of academicians, but as age increases, there is an increase in professional and personal technostress levels. This may indicate that cumulative experiences over time, professional responsibilities, and the use of personal resources may have an impact on certain subdimensions of technostress.

Relationship Between Seniority and Technostress

In the study, it was determined that there was a low-level, positive, statistically significant relationship between the seniority variable and the personal-oriented sub-dimension score. Accordingly, it can be inferred that as the year of seniority progresses, academicians' technostress scores also increase. It has been determined that there is no statistically significant relationship between the variable of seniority and the general technostress level score, and the scores of the learning-teaching process-oriented, profession-oriented, technical issue-oriented, and social-oriented sub-dimensions. Penado Abilleira M. et al. (2021) revealed that there was a positive significant relationship between seniority and the techno-anxiety levels of university faculty members. Marchiori et al. (2019) discussed the positive relationship between years of professional experience in the public sector and technostress. In general, these findings reveal that seniority has certain effects on the technostress levels of academicians, but these effects vary based on sub-dimensions.

5. CONCLUSIONS

In conclusion, technostress is a crucial issue that needs to be further investigated in academic life. It is related to many key issues such as job satisfaction, performance, productivity, and burnout. Studies on the technostress levels of faculty members will help identify technology-related challenges specific to them and develop solutions to these challenges, develop strategies to increase technology integration in education, program development studies for teacher training, and help universities and other educational institutions develop their strategies regarding the use of technology.

5.1. Limitations and future lines of research

Considering the present pace of development of technology, future studies should conduct repeated studies on a larger sample within the stipulated time limits, covering all scientific fields, and also studies on variables such as job satisfaction, job stress, burnout, intention to quit, job performance, and managerial support. It is thought that it would be useful to carry out longitudinal or experimental designs to better describe the causal connections between these variables.

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