Investigation Of Techno-Stress Levels Of Teachers Who Were Included In Technology Integration Processes

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ABSTRACT
Techno-stress is defined as a modern adaptation disorder resulting from the failure in coping with new technologies in a healthy way. Techno-stress affects many occupational groups, including teachers. FATIH project and many other previous studies conducted in Turkey in recent years have necessitated the use of technology for teachers. The present research investigates the techno-stress levels of teachers in these processes. Techno-stress scale for teachers was conducted on 370 teachers from different levels of education and branches in 2015-2016 school years. According to the findings obtained in the present research, general techno-stress levels of teachers were medium level, and in terms of sub-scales, teachers had medium level learning-teaching process oriented, technical issue oriented and social oriented techno-stress, and low level profession oriented and personal oriented techno-stress. In terms of demographic variables, general techno-stress levels of teachers didn't vary by gender and length of service, and varied by average Internet use time variable.

Keywords: Teachers, Techno-stress, FATIH Project, Technology Integration, ICTs.

INTRODUCTION
Information and Communication Technologies (ICTs) have removed the concepts of time and place in business life, labour decreased as the production increased, and accordingly productivity of work has increased. This type of technological developments provided benefits in terms of work force in business life, but created some negativity for the employees (Nelson, 1990; Nelson & Kletke, 1990). Technological advancements in business life have decreased the difficulty at a significant level while psycho-physical work load has increased due to increased work speed (Bayazıt Hayta, 2007). Additionally, computer operating systems and software change so fast that, before users can adapt to software, new editions of those software are released. Due to these technological changes, the users may experience lack of confidence, technological exhaustion and fear (Sami & Panganniah, 2006). The concept of techno-stress emerged as a negative result of this case (Ragu-Nathan, et al., 2008; Weil & Rosen, 1997).

Stress and Techno-Stress as A Type Of Stress
Selye (1956), who was one of the scientists who conducted pioneer studied on the subject of stress, defined stress as a reaction of the body to a volition loaded to the body and couldn't be special (Johnstone, 1989). On the other hand, according to a definition provided by Brod (1984), techno-stress is modern disease resulting from the sense of incompetence while trying to adapt to computer technologies.

With the constant advancement of technology, many employees are suffering from techno-stress (Ahmad, Amin & Ismail, 2009). Basically, techno-stress refers to negative feelings, ideas, behaviours and attitudes employees

feel in their body, such as anxiety, during the time they should cope with new technologies (Kupersmith 1992; Weil & Rosen, 1997). In recent years, some scientists (Weil & Rosen, 1997; Brillhart, 2004) have focused on a new structure called techno-stress. Techno-stress refers to direct or indirect negative effects of the use of computer-based technologies on people's attitudes, thoughts, behaviours and psychologies (Tu, Wang & Shu, 2005). Psychologies and behaviours that prevent the best use of computer-based ICTs, such as fear, anxiety and enmity take the form of resistance (Shu, Tu & Wang, 2011). On the other hand Salanova, Llorens, Cifre and Nogareda (2007) define the concept of techno-stress as anxiety, mental fatigue, scepticism and ineffectiveness resulting from the focusing on ICT use or its future use. Many company employees are exposed to expectations of more efficiency with more complicated systems in order to adapt to rapid changes as a requirement of information age, which requires them to increase their technological knowledge and skills. For this reason, techno-stress refers to the technology management problem that employees encounter in their work environment (Hung, Chen & Lin 2014). As can be understood from the above mentioned definitions, in the most basic sense, techno-stress is a stress phenomenon occurring before and after ICT use in work life.

Techno-Stress and Teaching Profession

This concept, which emerged from the development of technologies that is a necessity of modern life, was claimed to be very different for the previous generations (Shu, Tu & Wang, 2011). This case may be resulting from the maladaptation to new technologies arriving at the employees work environment. First of all, it can be claimed that these technologies have removed the wall between work life and out of work life, since they are independent of the concepts of time and place. Additionally, because ICTs have found a broad field of application in various sectors, especially the employees in management level try to enable high work efficiency. Finally, it can be claimed that ICT isn't developing at a huge and unprecedented pace for employees. For these reasons, it is more likely that techno-stress occurs at work places, and it is intertwined with the individuals' out of work life (Karuppan, 1997; Smith & Carayon, 1995).

According to Zuboff (1988) three factors are effective on the formation of techno-stress. Working environments of the employees are constantly equipped with the updated software and hardware of new and great technologies (personal computers, organization applications, production application, connection devices, etc.). Additionally, due to ICTs, there is a significant difference between existing knowledge and required knowledge for certain tasks among employees and managers. It can also be claimed that in modern life, the development of ICTs has changed the working environment and culture.

As is the case very every occupational group, techno-stress is as important problem for teaching profession. Because of the facilities it provides, ICTs have taken its place as a pedagogical tool in education as of 2000s (Peeraer & Van Petegem, 2015) and been integrated to educational systems rapidly (Trucano, 2005). Teachers, who have an important role in the integration process (Roblyer, 2006), are affected from various factors. Techno-stress is one of these factors. In additional to the changing sense of education, the nature of technology (technical support, inability to use, vision of the school, social pressure, etc.) is among the reasons for techno-stress among teachers. Teachers especially experience techno-stress in the process of integrating new technologies, which is a common condition encountered with digital technologies (Lei, 2010; Lei & Zhao, 2007; Zhao & Frank, 2003). Moreover, the continuation of the pressure for technology integration in education both from the institutions and the society, and the lack of knowledge and support result in techno-stress among teachers (Longman, 2013).

In Turkey, where the present research is conducted, there has been an intensive technology investment in education for the last two decades. Especially, technology use is no longer an option for teachers in recent years, with a national level investment in the integration of technology (FATIH Project – Movement to Increase Opportunities and Technology), and it has become a must. Many researches conducted after FATIH project indicate that teachers are experiencing techno-stress (Aktaş, Gökoğlu, Turgut & Karal; 2014; Banoğlu et al., 2014; Çetinkaya & Keser, Ozkan & Deniz, 2014; Çiftçi, Taşkaya & Dursun et al., 2013; Genç & Genç, 2013).

Purpose of The Research

The main purpose of the present research is defining techno-stress levels of teachers. Accordingly, the answers are sought for the following question;
1.   What are techno-stress levels of teachers?
2.   Do techno-stress levels of teachers vary by
        a. gender,
        b. length of service,
        c. Internet use time variables?

METHODOLOGY
Research Model
The present research, which was conducted to define techno-stress levels of teachers, was designed in survey model, with a quantitative approach. Researches in survey model describe the existing case of the variables of the research one by one or in quantities, and investigate the relationships between two or more variables, related to the behaviours, attitudes, expectations, requirements and knowledge levels about the subject of the research (Gay, Mills & Airasian, 2006; Neuman, 2000).

Research Population and Sample
The population of the present research consists of all teachers who served in all central districts (Meram, Karatay and Selçuklu) of Konya province of Turkey in 2015-2016 school year. Due to size of the population, problems of time and access, the population was sampled with stratified sampling method. In accordance with the sub-purposes of the research, the type of schools (primary, secondary and high schools) teachers serve at was taken as a significant parameter for stratification, and the researchers tried to reach at least 90 teachers from each type of schools. In this context, the totals of 370 teachers were reached at, and the statistical data for the sample of the present research are presented in Table 1.

Table 1: Demographic Data of the Teachers who Participated in the Present Research

Variables		f	%
Type of School	Primary	109	29.5
	Secondary	171	46.2
	High	90	24.3
Gender	Female	191	51.6
	Male	179	48.4
Length of Service	Less than 5 years	83	22.4
	5 to10 years	64	17.3
	11 to 15 years	78	21.1
	16 and more	145	39.2
	Total	**370**	**100**

Data Collection Tools and Data Collection Process
In order to define techno-stress levels among teachers, "Techno-stress Scale for Teachers" developed by the researchers was employed. The scale, which consists of 5-point likert type items and was conducted on 395 teachers, consists of 28 items and five factors. Construct validity of the scale was tested with exploratory and confirmatory factor analyses, and the factors were named as "Learning-Teaching Process Oriented", "Profession Oriented", "Technical Issue Oriented", "Personal Oriented" and "Social Oriented" techno-stress. Internal consistency coefficient (Cronbach Alpha) of the scale was calculated as .917.

Data Analysis and Interpretation
Descriptive statistics were used to define teachers' techno-stress levels. In addition, in order to find out whether techno-stress levels of teachers varied by gender independent samples t-test, and in order to define the variation by length of service and Internet use time variable, which had more than two groups, one-way analysis of variance (ANOVA) were used. Additionally, a three level assessment range as low, medium and high, was used for the techno-stress levels obtained from the five point likert type items. Accordingly, based on (highest value-lowest value)/assessment range equation, ie. $(5-1)/3$, the assessment criteria presented in Table 2 was adopted.

Table 2: Assessment Ranges and Values for Techno-Stress Levels of Teachers

Assessment Range (Arithmetic Average)	Assessment Criteria
1,00 – 2,33	Low Level
2,34 – 3,67	Medium Level
3,68 – 5,00	High Level

For data analysis, significance level was taken as .05, and SPSS 21.0 (Statistical Package for the Social Sciences) program was used for analyses.

FINDINGS
Findings obtained in accordance with the sub-purposes of the present research, and their interpretations are presented below in sub-titles.

Techno-Stress Levels of Teachers
In order to define techno-stress levels of teachers, data collected from 370 teachers were analysed in accordance with descriptive statistics, and interpreted according to assessment ranges and criteria presented in Table 2. Obtained results from the analyses are presented in Table 3.

Table 3: Descriptive Statistics for Techno-Stress Levels of Teachers

Techno-stress Factors	$\overline{X}$	sd	Techno-stress Level
Learning-Teaching Process Oriented Techno-Stress	2,77	,776	Medium
Profession Oriented Techno-Stress	2,09	,762	Low
Technical Issue Oriented Techno-Stress	2,87	,906	Medium
Personal Oriented Techno-Stress	2,32	,903	Low
Social Oriented Techno-Stress	3,00	,934	Medium
TECHNO-STRESS AVERAGE	**2,60**	**,665**	**Medium**

According to Table 3, it can be reported that general techno-stress levels of teachers is medium ($\overline{X}$ =2.60). In other words, teachers experience medium level techno-stress from technology use. In terms of the dimensions, teachers experience medium level Learning-Teaching Process Oriented Techno-Stress ($\overline{X}$ =2.77), echnical-Issue Oriented Techno-Stress ($\overline{X}$ =2.60), and Social Oriented Techno-Stress ($\overline{X}$ =3.00). On the other hand, they experience low level Profession Oriented Techno-Stress ($\overline{X}$ =2.09) and Personal Oriented Techno-Stress ($\overline{X}$ =2.32). In terms of techno-stress dimensions, it can be stated that teachers suffer medium level techno-stress in terms of teaching process, and social and technical terms, however, teaching process and personal oriented techno-stress aren't considered as a problem, as these are low level.

Investigation of Techno-Stress Levels of Teachers in terms of Some Variables
In accordance with sub-purposes of the present research, techno-stress levels of teachers were investigated in terms of gender, professional length of service, and Internet use time variables.

Techno-Stress Levels of Teachers in terms of Gender
Table 4 presents the analysis results for the techno-stress levels of teachers in terms of gender.

Table 4: t-Test Results for Techno-Stress Levels of Teachers in terms of Gender

Gender	N	$\overline{X}$	Sd	sd	t	p
Female	191	2,63	,648	368	,750	,454
Male	179	2,57	,684			

According to Table 4, techno-stress levels of teachers aren't affected by gender variable [t(368)=0.454, p>.05]. In other words, female teachers ($\overline{X}$ =2,63), and male teachers ($\overline{X}$ =2,57) experience the same levels (medium level) of techno-stress, and the difference between is not significant at .05 significance level.

Techno-Stress Levels of Teachers in terms of Length of Service
Within the scope of the present research, it was investigated whether techno-stress levels of 370 teachers varied by professional length of service. Accordingly, descriptive statistics for teachers' techno-stress levels in terms of professional length of service, and one-way variance analysis results for the difference between groups were studied, and the obtained results are presented in Table 5.

Table 5: Comparison of Teachers' Techno-Stress Levels in terms of Professional Length of Service

Professional Length of Service	f	$\overline{X}$	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p	Significant Difference
A- Less than 5 years	83	2,48	,612	Within Group	2,143	3	,714	1,620	,184	
B- 5 to 10 years	64	2,65	,571	Between Groups	161,380	366	,441			-
C- 11 to 15 years	78	2,57	,708	Total	163,524	369				
D- 16 and more	145	2,66	,704							

According to Table 5, general techno-stress levels of teachers aren't affected from their professional length of service (F(3-366)= 1.620, p>.05). In other words, techno-stress levels of teachers are at the same level regardless of their length of service.

Techno-Stress Levels of Teachers in terms of Internet Use Time
Assuming that, there is a significant relationship between Internet use, which has increased in recent years, and technology use skill, therefore techno-stress, the relationship between Internet use time and techno-stress level was analysed. All of the teachers, who participated in the present research, stated that they used Internet. Therefore, no findings related to teachers, who don't use Internet, were presented. Descriptive statistics on teachers' techno-stress levels in terms of Internet use time and variance analysis results on the differences between groups are presented in Table 6.

Table 6: Comparison of Teachers' Techno-Stress Levels in terms of Internet Use Time

Internet Use Time	f	$\overline{X}$	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p	Significant Difference
A- A few hours a week	39	3,01	,572	Within Group	11,009	4	2,752	6,587	,000*	A-C, A-D, A-E
B- 5-10 hours a week	31	2,65	,668	Between Groups	152,514	365	,418			
C- 1-2 hours a day	171	2,62	,673	Total	163,524	369				
D- 3-4 hours a day	72	2,53	,625							
E- More than 4 hours a day	57	2,34	,622							

According to Table 6, Internet use time is a significant factor affecting techno-stress levels among teachers (F(4-365)=6.587, p<.05). According to the results of the analyses conducted to define between which groups the differences were, techno-stress levels of the teachers, who used Internet for a few hours a week ($\overline{X}$=3.01) are higher than the teachers, who used Internet for 1-2 hours a day ($\overline{X}$=2.62), 3-4 hours a day ($\overline{X}$=2.53) and more than 4 hours a day ($\overline{X}$=2.34). The differences between all other groups are not significant. In other words, the teachers, who use Internet for a few hours a week, experience more techno-stress than other teachers at a significant level.

CONCLUSIONS AND DISCUSSION
There are various models related to the integration of technology to educational environments and these models report that teachers have an important role for a successful integration process (Roblyer & Doering, 2013; Harris & Hoffer, 2011; Paraskeva, Bouta & Papagianna, 2008; Koehler & Mishra, 2005). In terms of the use of technology in integration process, teachers are in an important position with different visions, such as leadership, and guidance for students (Paraskeva, Bouta & Papagianna, 2008; Finger, Russell, Jamieson-Proctor & Russell, 2007). From this perspective, personal features of teachers (attitude, knowledge, anxiety, etc.) are considered among the important parameters of technology integration process (Roblyer & Doering, 2013; Imhof, Vollmeyer & Beierlein, 2007). Techno-stress is one of individuals' personal features related to technology use (Ahmad &Amin, 2012; Ayyagari, Grover& Purvis, 2011; Fudail & Mellar, 2008; Shepherd, 2004).

There has been an intensive ICT investment in the last two decades in Turkey. Especially with FATIH project, teachers are expected to use technology. From this perspective, teachers' techno-stress levels were investigated.

In order to define teachers' techno-stress levels, data were collected from the total of 370 teachers of 24 different branches at primary, secondary and high school levels, from central districts of Konya province. According to the findings, teachers general techno-stress is at medium level, and in terms of sub-dimensions, they experience medium level Learning-Teaching Process Oriented, Technical Issue Oriented, and Social Oriented techno-stress. Another finding of the present research is that, teachers experience low level Profession Oriented Techno-Stress and Personal Oriented Techno-Stress. The review of the related literature, provided studies conducted in different work fields (Fuglseth & Sørebø, 2014; Shu, Tu & Wang, 2011; Suharti & Susanto, 2014; Şahin & Çoklar, 2009; Tarafdar et al., 2011). In different studies, sub-dimensions of techno-stress levels were named differently (Quinn, 2000; Suharti & Susanto, 2014). It was reported that, there were higher levels of techno-stress in computerized work environments (Kinman & Jones, 2005). Factors, such as over work load in work environments where information and communication technologies are used (Hind, 1998; Shu, Tu & Wang, 2011; Suharti & Susanto, 2014), irrepressible development of technology and the necessity to use it (Fuglseth & Sørebø, 2014; Karuppan, 1997; Smith & Carayon, 2005), imbalance between work and life (Shu, Tu & Wang, 2011; Tarafdar et al., 2011) and failure in time management (Wang, Shu & Tu, 2008) are the reasons increasing techno-stress levels. There are limited numbers of studies conducted to study techno-stress levels among teachers. In one of these studies conducted on 145 primary school teachers, Longman (2013) reported that primary school teachers had low levels of techno-stress. It was also reported that teachers, who spend too much time on determining and planning technology sources in the classroom in learning-teaching processes, suffered from high-level techno-stress while teachers, who could highly integrate technology to their classroom, had low levels of techno-stress. Additionally, it was found that teachers, who took education on technology, had low levels of techno-stress, and teachers experienced higher techno-stress when they use technological devices they couldn't trust (Longman, 2013). Jena (2015), who conducted a research on Indian academicians, reported that academicians had medium level techno-stress. In another study conducted on nurse trainers, Burke (2009) reported that trainers had medium level techno-stress during hardware problems in the classroom, and low level techno-stress in Internet access.

The effect of gender on techno-stress level, which was studied in the present research, was also studied in many other researches (Ragu-Nathan et al., 2008; Venkatesh & Morris, 2000). Some of these studies (Shepherd, 2004; Tarafdar et al., 2011) reported that gender had a significant effect on techno-stress, while some others (Goddard, 2011; Wang, Shu & Tu, 2008) reported that it didn't. According to the findings obtained in the present research, general techno-stress levels of teachers didn't vary by gender, and female and male teacher had similar and medium level techno-stress. Ragu-Nathan et al. (2008) found that female experienced techno-stress more than male. However, with FATIH project conducted in Turkey by the Ministry of National Education, all teachers were provided with the same levels of technological opportunities, and the same in-service trainings, which may have prevented the variation in teachers' techno-stress levels.

On the other hand, another finding of the present research is that professional length of service didn't affect teachers' techno-stress levels at a significant level. In terms of sub-dimensions, teachers, who had 5 to 10 years of length of service, had higher level of technical oriented techno-stress than the teachers, whose length of services were less than 5 years. In many previous related studies, the ages of the participants were considered as a variable that was worth investigating (Evans, 2013; Ragu-Nathan et al., 2008; Rosen & Maguire, 1990). However, the number of researches, which studied length of service, is limited. In one of the studies in the related literature, Longman (2013) studied the techno-stress levels of teachers, who had less than 10 years and more than 10 years length of service, and reported that length of service didn't have a significant effect of techno-stress levels. In another study, Quinn (2000) stated that young learners had lower levels of techno-stress than older learners. On the other hand, Tarafdar et al. (2011) claimed that younger users were more familiar with technology in occupations related with information technologies, but experienced employees had lower levels of techno-stress because they were better at coping with stress. From this perspective, it can be claimed that technology use competence and teaching experience balance each other in techno-stress.

Another finding of the present research is that, techno-stress levels of teachers varied by the time spent on Internet, which is an important source of information and communication today. Teachers, who used Internet for a few hours a week, experienced higher techno-stress than the teachers, who used Internet everyday for 1-2, 3-4 and 4 and more hours, and accordingly Internet use time can be reported as a significant variable. The number of researches, which studied the effects of Internet use time of techno-stress levels, is limited. Similarly, these studies report that participants, who spend more time with technologies, such as computers and Internet and use computers more effectively, have lower levels of techno-stress (Jane, 2015; Shepherd, 2004; Tarafdar et al., 2011).

SUGGESTIONS

According to the findings of the present research, teachers experience medium-level general techno-stress and learning-teaching process oriented, technical issue oriented and social oriented techno-stresses. In order to decrease the levels of techno-stress, teachers experience in these dimensions, in-service trainings can be organized. Shepherd (2004) emphasized the relationship between computer using skills and techno-stress. Accordingly, experimental studies can be conducted on trainings on education planning and defining the efficiency of these trainings, to define and decrease techno-stress levels of teachers. Additionally, it was found that average Internet use time varied techno-stress levels at a significant level, so it is a significant predictor of techno-stress. Studies to develop structural equation modelling can be conducted in this direction.

ACKNOWLEDGEMENT

REFERENCES

Ahmad, U. N. U., Amin, S. M., & Ismail, W. K. W. (2009). The impact of technostress on organisational commitment among malaysian academic librarians. *Singapore Journal of Library & Information Management*, 38, 103-123.

Banoglu, K., Madenoğlu, C., Uysal, Ş., & Dede, A. (2014). An investigation of teachers' perceptions of the implementation of the FATIH Project (Eskisehir Province Case). *Journal of Educational Sciences Research, 4*(Sp. Ed. 1), 39-58.

Ozkan, A., & Deniz, D. (2014). Orta öğretimde görev yapan öğretmenlerin FATİH Projesi'ne ilişkin görüşleri (The views of secondary education teachers on FATİH Project). *Ege Eğitim Dergisi, 15*(1), 161-175.

Ahmad, U. N. U.,& Amin, S. M. (2012). The dimensions of technostress among academic librarians. *Procedia – Social and Behavioral Sciences*, 65, 266-271.

Aktas, I., Gokoglu, S., Turgut, Y.E., & Karal, H. (2014). Teachers' opinions about FATIH Project: Awareness, foresight and expectations. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 8*(1), 257-286.

Ayyagari, R., Grover, V., & Purvis, R. (2011). Teknostress: Technological antecedents and implications. *MIS Quarterly, 35*(4), 831-858.

Bayazıt Hayta, A. (2007). Çalışma ortamı koşullarının işletme verimliliği üzerine etkisi. *Ticaret Turizm Eğitim Fakültesi Dergisi*, 1, 21-41.

Brillhart, P. E. (2004). Technostress in the workplace managing stress in the electronic workplace. *Journal of American Academy of Business*, 5, (1), 302–307.

Brod, C. (1984).Technostress: The human cost of the computer revolution. Reading, MA: Addison-Wesley.

Burke, M. S. (2009). The incidence of technological stress among baccalaureate nurse educators using technology during course preparation and delivery. *Nurse Education Today*, *29*(1), 57-64.

Çetinkaya, L. & Keser, H. (2014). Öğretmen ve öğrencilerin tablet bilgisayar kullanımında yaşadıkları sorunlar ve çözüm önerileri. *Anadolu Journal of Educational Sciences International, 4*(1), 13-34.

Çiftçi, S., Taşkaya, S.M. ve Alemdar, M. (2013). Sınıf öğretmenlerinin fatih projesine ilişkin görüşleri. *İlköğretim Online, 12(1),* 227-240.

Evans, E. M. W. (2013). *Understanding productivity and technostress for oncology nurses using an electronic health record (EHR) to increase safety, quality, and effectiveness of care for patients with cancer*. Doctoral Dissertation, Capella University.

Finger, G., Russell, G., Jamieson-Proctor, R., & Russell, N. (2007). *Transforming Learning with ICT: Making it Happen*. Pearson Education Australia.

Fuglseth, A. M., & Sørebø, Ø. (2014). The effects of technostress within the context of employee use of ICT. *Computers in Human Behavior*, *40*, 161-170.

Gay, L. R., Mills, G. E. & Airasian, P. (2006). *Educational research: competencies for analysis and applications* (8th ed). New Jersey: Pearson.

Genç, M. & Genç, T. (2013). Monitoring the Skills of Teachers' Vocational Development by Themselves; Fatih Project Sample. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi, 14*(2), 61-78.

Goddard, M. S. (2011). *Sleep quality, technostress, and maladaptive use of technology: Predictors of depression among college students*. Doctoral Dissertation, The University Of Memphis.

Harris, J.B. & Hofer, M.J. (2011). Technological pedagogical content knowledge (TPACK) in action: A descriptive study of secondary teachers' curriculum-based, technology-related instructional planning. *Journal of Research on Technology in Education*, 43(3), 211-229.

Hind, P. (1998). Captured by technology. *CIO magazine*, *9*, 22-23.

Hung, W. H., Chen, K., & Lin, C. P. (2014). Does the proactie personality mitigate the adverse effect of technostress on productivity in the mobile environment. *Telematics and Informatics*, 32 (1), 143-157.

Imhof, M., Vollmeyer, R., & Beierlein, C. (2007). Computer use and the gender gap: The issue of access, use, motivation, and performance. *Computers in Human Behavior*, 23, 2823-2837.

Jena, R.K. (2015). Technostress in ICT enabled collaborative learning environment: An empirical among Indian academician. *Computers in Human Behavior, 51*, 1116-1123.

Johnstone, M. (1989*). Stress in Teaching: An Overwiew of Research*.Edinburgh: SCRE.

Karuppan, C. M. (1997). Advanced manufacturing technology and stress: technology and management support policies. *International Journal of Technology Management*, *14*(2-4), 254-264.

Kinman, G., & Jones, F. (2005). Lay representations of workplace stress: What do people really mean when they say they are stressed?. *Work & Stress*, *19*(2), 101-120.

Koehler, M.J. ve Mishra, P. (2005). What happens when teachers design educational technology? The development of technological pedagogical content knowledge. *Journal of Educational Computing Research, 32(2),* 131-152.

Kupersmith, J. (1992). Technostress and the reference librarian. *Reference Services Review*, 20, 7-14.

Lei, J. (2010). Quantity versus quality: A new approach to examine the relationship between technology use and student outcomes. *British Journal of Educational Technology, 41*, 455-472.

Lei, J.,& Zhao, Y. (2007). Technology uses and student achievement: A longitudial study. *Computers & Education, 49*, 284-296.

Longman, S. M. D. (2013). *A comparison of the perceptions of technostress experienced by teachers versus technology used by teachers in elementary education in a southeastern school district*. Doctoral Dissertation, Southeastern Louisiana University.

Nelson, D.L. (1990). Individual adjustment to information-driven technologies: A critical review. *MIS Quarterly*, 14, (1): 79–98.

Nelson, D.L.,& Kletke, M.G. (1990). Individual adjustment during technological innovation: A research framework. *Behavior and Information Technology*, 9, (4): 257–271.

Neuman, W. L. (2000). *Social research methods: Qualitative and quantitative approaches* (4th ed.) Boston: Allyn & Bacon.

Paraskeva, F., Bouta, H., & Papagianna, A. (2008).Individual characteristics and computer self-efficacy in secondary education teachers to integrate technology in educational practice. *Computers& Education, 50(3),* 1084-1091.

Peeraer, J.,& Van Petegem, P. (2015). Integration or transformation? Looking in the future of information and communication technology in education in Vietnam. *Evaluation and Program Planning, 48*, 47-56.

Quinn, B. (2000). Overcoming technostress in reference services to adult learners. *The Reference Librarian*, *33*(69-70), 49-62.

Ragu-Nathan, T.S., Tarafdar, M., Ragu-Nathan, B., & Tu, Q. (2008). The consequences of technostress for end users in organizations: Conceptual development and empirical validation.*Information Systems Research*, 19, (4): 417–433.

Roblyer, M.D.,& Doering, A.H. (2013). *Integrating educational technology into teaching* (6th Ed.). Boston, MA: Pearson.

Rosen, L. D., & Maguire, P. (1990). Myths and realities of computerphobia: A meta-analysis. *Anxiety Research*, *3*(3), 175-191.

Salanova, M., Llorens, S., Cifre, E., & Nogareda, C. (2007). El tecnoestre´s: Concepto, medida y prevencio´n. *Nota Te´ cnica de Prevencio´ n*, 730. Madrid: INSHT.

Sami, L. K., & Pangannaiah, N. B. (2006). "Technostress" A literature survey on the effect of information technology on library users. Library review, 55(7), 429-439.

Selye, H. (1956). *The stress of life*. New York, NY: McGraw-Hill.

Shepherd, S.S.G. (2004). Relationship between computer skills and technostress: How does this affect me?.*Proceeding of the 2004 ASCUE Conference* (225-231). Myrtle Beach, South Caroline.

Shu, Q., Tu, Q. & Wang, K. (2011). The impact of computer self-efficacy and technology dependence on computer-related technostress: A Ssocial cognitive theory perspective. *International Journal of Human-Computer Interaction*, 27(10), 923–939.

Smith, M. J., & Carayon, P. (1995). New technology, automation, and work organization: stress problems and improved technology implementation strategies. *International Journal of Human Factors in Manufacturing*, *5*(1), 99-116.

Suharti, L., & Susanto, A. (2014). The impact of workload and technology competence on technostress and performance of employees. *Indian Journal of Commerce and Management Studies*,*5*(2), 1-7.

Şahin, Y. L., & Çoklar, A. N. (2009). Social networking users' views on technology and the determination of technostress levels. *Procedia-Social and Behavioral Sciences*, *1*(1), 1437-1442.

Tarafdar, M., Tu, Q., Ragu-Nathan, T. S., & Ragu-Nathan, B. S. (2011). Crossing to the dark side: Examining creators, outcomes and inhibitors of technostress. *Communications of the ACM*, 54(9), 113-120.

Trucano, M. (2005). *Knowledge maps: ICT in education*. Washington, DC: Infodev/World Bank.

Tu, Q., Wang, K. L., & Shu, Q. (2005). Computer-related technostress in China. *Communications of the ACM*, 48(4), 77–81.

Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS quarterly*, 115-139.

Wang, K. L., Shu, Q., & Tu, Q. (2008). Technostress under different organizational environments:An empirical investigation. *Computers in Human Behavior*, 24: 3002-3013.

Weil, M.,& Rosen, L. (1997). *TechnoStress: Coping with Technology @work @home @play*. New York, NY: J. Wiley.

Zhao, Y.,& Frank, K.A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American Educational Reseacrh Journal, 40*, 807-840.

Zuboff, S. (1988). *In the age of the smart machine: The future of work and power*. New York, NY: Basic Books.

Roblyer, M. D. (2006). *Integrating Educational Technology Into Teaching.* (4th Edition). New Jersey: Merrill Prentice Hall.