

TECHNOSTRESS'S IMPACT ON INTENTION TO APPLY NOVEL TEACHING TECHNOLOGY: CASE STUDY IN LECTURERS AT UNIVERSITIES IN HANOI

Nghiem Xuan Dung, People's Security Academy

ABSTRACT

Technostress is conceptualized as a modern adaptive disorder caused by a failure in adapting to information technology, reflecting the body's response to technology application. It remarkably impacts various areas of society and professional groups including university lecturers since they have been mandated to apply technology in the teaching career in the recent years. Research surveying nearly 400 university lecturers in Hanoi indicates that the lecturers' tension in technology significantly affects their intention to utilize it in teaching. According to the study results, technology stress poses an influence on their intention to harness teaching technology and there go several changes related to gender, working seniority and Internet-using time.

Keywords: Lecturers, Technostress, Effects of Technostress, Information Technology, Armed Forces.

INTRODUCTION

Information technology has transformed numerous facets of our daily life and production. Thanks to the implementation of technology, there has been a tremendous boost in productivity. However, accompanying such merits are certain negative impacts on employees (Coklar et al., 2016). Technology advancements have drastically mitigated the workload as well as the pressure upon the physical and mental health of the workforce, bolstering their productivity. Moreover, the meteoric transformation of technology means that users are hardly capable of keeping up with such pace, rendering them insecure, wearied and technophobic (Mishra, 2006). The ramification of such case is the emergence of the concept of “*Technostress*” (Grandgenett, 2008).

Scientific works hitherto mainly focus on how to encourage lecturers to better harness technology in their teaching. Nonetheless, as pointed out in several works, there have been countless adversities. For example, the deficiency of adequate training, infrastructure and professional support might engender anxiety and tension in the lecturers themselves, leading to the physical and mental pressure pertinent to the utilization of technology. This phenomenon, termed as “*Technostress*” (Brod, 1984), had become exceptionally concerned in the academic field as neoteric developments such as digital textbooks, cloud computing and interactive technologies are permeating classrooms. Weil and Rosen (1997) defined Technostress as “*any negative impacts on the attitudes, thoughts, behaviors or psychologies caused by technology, whether directly or indirectly*”. Despite its coming in numerous other forms like cyberphobia, computer anxiety (Wang et al., 2008), Technostress is archetypically manifested by the anxiety and tension of an individual when interacting with technology. Substantial significance should be

attached to such negative impacts due to their tendency to undermine users' impressions when utilizing technologies, especially innovative ones, in their work.

In Vietnam, there has been a modest amount of research concerning Technostress and its impacts on how novel technologies should be implemented. Indeed, such concerns are of great rational and practical value and, thereby, require meticulous research endeavors as well as the acquirement of pivotal skills to not only serve immediate objectives but also long-term goals of education in the 4.0 era. This research is conducted with a view to evaluating the impact of technostress on how university lecturers in general and those working in Hanoi in particular would employ technology.

LITERATURE REVIEW

Stress and Technostress

Selye (1956) a pioneering researcher in the field of stress—defined stress as a reaction of the body to a negative assumption from the environment or the society. Stress mainly stems from outer impacts rather than internal ones, the degree of which also depends on an individual's ability to respond to negative stimuli (Dung & Tam, 2012). Furthermore, according to Brod (1984), Technostress is a modern illness derived from fruitless attempts to adapt to computer technologies.

The ceaseless progress of technology leaves numerous labors succumbing to stress (Coklar et al., 2016). Fundamentally, Technostress refers to negative feelings, ideas, behaviors and attitudes that betide within an employee while adjusting to novel technologies (Weil & Rosen, 1997). Technostress is also referred to as negative impacts, whether direct or indirect, of harnessing computer technology on human attitude, thought, behavior and psychology (Wang et al., 2008). Besides, Salanova and his co-researchers define Technostress as weariness, mental fatigue and doubts emanating from the futile utilization of technology in the present or in the future. With that in mind, a considerable number of employees encounter numerous impediments when interacting with state-of-the-art technologies (Hung et al., 2014 & 2015).

Through the aforementioned definitions of Technostress, it can be concluded that Technostress is a negative phenomenon affecting human psychology, physical health, attitudes and thoughts that befall prior to or ensuing the application of information technology at work as well as in daily life.

Factors Affecting Technostress of University Lecturers

Technology advancement is an indispensable demand of modern life, it also reflects the difference between the later generation and the former generations (Shu et al., 2011). Technostress grounds in many causes: foremostly, technology probably blurred the border separating life from work, time and place; it means people can work regardless of time and place. In addition, information technology further improves work efficiency as well as claims its application in numerous distinct areas, so managers always desire to employ information technology for efficiency enhancement. Consequently, technostress occurs in the workplace and can even poses an intertwined effect on an employee's life after his or her working schedule (Coklar et al., 2016). It is possibly being asserted that in today's modern life, the development of information technology has changed the working environment and culture, people's life in all fields.

Being vital to economic and social development, technostress is a critical issue for the education sector. Due to its effectiveness, information technology has made itself a pedagogical tool in education since the 2000s (Jena, 2015). Teachers, who play an important role in the process of educational reform and integration, are impacted by tremendous factors, of which technostress is one of the noteworthy factors. In addition to the meaning of changing education, the adoption of new technology relies on technical support, the ability of teachers to effectively access technology, the school's vision and social pressures (Al-Fudail & Mellar, 2008) and these aforementioned become the root of the stress over technology for teaching staffs. Particularly, with new technologies, lecturers are assessed to undergo intensely stressful technology experiences when employing new technologies (Lam et al., 2010). Moreover, the pressure of technology integration in education by state management agencies and society, the deficiency of knowledge and support leads to such an affliction over new technology with teachers (Longman, 2013). Advocating to those opinions, Assoc. Prof. Dr. Tran Thanh Nam (Vietnam National University) also posits that the application of new technology in teaching by lecturers is affected by the following factors: Lack of professional support, ineffective access to teaching tools and resistance to change.

Various studies conduct analysis and evaluation to conclude the factors affecting the technostress of lecturers as follows: (i) technological problems; (ii) technical support issues; (iii) psychological problems of lecturers; (iv) lecturers' ability of technology adaption. This can be verified through the studies of Al-Fudail and Mellar (2008) who implemented a qualitative research with nine in-service lecturers to determine their technical level. Observations of in-class lectures and face-to-face interviews indicates many factors contributing to technostress such as malfunctions in technology systems, insufficient technical support to use technology, increased setup and preparing time for lectures with technology application in class.

This research has focused on analyzing the influence of psychological and physical stress on the technology utilization, as defined by Brod (1984), on lecturers' choice to employ new technology. The adoption of new initiatives related to the application of technology such as technical support, limited usability, university requirements, social pressure can all cause stress for lecturers.

Research Model

The study selects "*intention to apply technology*" as a consequence for the management and use of the lecturers since intention pertains to decision about how to behave according to the technology acceptance model known as TAM (Davis, 1989). The theory of technology acceptance is related to the Theory of Rational Action (TRA) coined by Fishbein and Ajzen (1975). Asserting that human behavior is predicted by an individual's intentions, TRA has been recognized as a plausible model explaining behavior when employing new technology. The use of TRA, TAM specifically assesses individual behaviors related to technology acceptance which is based on behavioral concepts such as intentional use and actual use. This study focuses on intentional use, not actual use of the technology, as digital textbook technology is still in its infancy and few instructors have actually experienced the specific technology.

Previous studies have shown that anxiety or stress attached to technology use holds a negative impact on intention to use technology. Regarding the predictive variables, Vannatta (2004) reports that school support (or school pressure) significantly influences the lecturers' intention to incorporate technology in teaching and easily entails stress for teachers in the

process of choosing to use technology. Longman (2013) pinpoints the pressure of technological integrate in education from society, lecturers' deficiency of knowledge and technical support all result in the technostress of teaching staffs.

Research Hypotheses

Based on literature review, the research question aims to find the structural relationship between factors affecting technostress of university lecturers and decision to apply new technology in teaching. The research hypotheses for this study are described as follows:

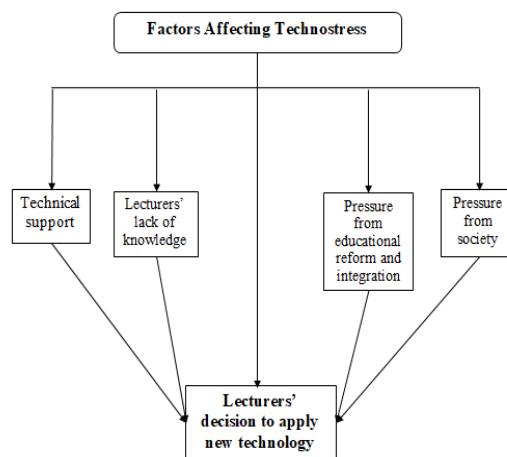
Hypothesis 1. Technological support directly affects university lecturers' decision to apply new technology.

H₂: *Lecturers' lack of technology knowledge directly affects the university lecturers' decision to apply new technology.*

H₃: *Pressure from educational reform and integration directly affects the university lecturers' decision to apply new technology.*

H₄: *Pressure from society directly affects the university lecturers' decision to apply new technology.*

Hence, the research model (Figure 1) for this study is presented hereinafter:



**FIGURE 1
RESEARCH MODEL**

RESEARCH METHODOLOGY

Research Participants

Data was collected from 370 university lecturers at universities in Hanoi under two forms: face-to-face and online surveys. A total of 90 respondents (24.3%) aged 30 to 35; 119 participants (32.2%) aged 36 to 40; 85 of them (23%) aged 41 to 50 and the rest 76 people (20.5%) aged over 50 participated in the survey. Among these lecturers, 191 are female, accounting for 51.6%, 179 are male, accounting for 48.4%. Regarding seniority, there are 83 lecturers with less than 5 years of experience (22.4%); 64 respondents working for 5 to 10 years

(17.3%); 78 people with 11 and 15 years of teaching experience (21.1%) and 145 working at least 16 years (39.2%).

400 questionnaires were delivered through online and paper survey to lecturers, and 370 valid votes were collected (92.5%). The questionnaires were sent out and distributed directly in January 2021 and collected in early March 2021.

Research Instruments

The study employs a quantitative approach to determine how technological stressors influence university lecturers' decisions to apply new technology. The variables in the survey model are evaluated by the five-level Likert scale, 28 observed variables with 5 factors were built into a survey questionnaire. Cronbach's Alpha tool is used to check the reliability of the scales in the model. Upon the results of the reliability analysis, the author utilizes the exploratory factor analysis (EFA) to test the factors and identify the suitable ones used in the linear regression analysis, thereby determine the rate of influence of each factor on the given research model. Collected data with the scale and research hypothesis are tested by SPSS 23.0 software. For data analysis, the significance level is taken as 0.05.

In addition, a three-level rating scope of low, medium and high with a five-point scale is also applied to gauge the technostress levels of lecturers with each factor. The specific criteria are as follows: 1.00 - 2.33: low level; 2.34 - 3.67: average and 3.68 - 5.0: high.

RESEARCH FINDINGS AND DISCUSSION

The study implements Cronbach's Alpha reliability analysis to remove non-representative variables. A scale with Cronbach's Alpha coefficient from ≥ 0.6 is acceptable. Variables with a total correlation coefficient less than 0.3 will be excluded. Hoang Trong-Chu Nguyen Mong Ngoc (2008). The results of Cronbach's Alpha analysis for the observed variables are 0.917, which means that all given variables are valid for the ensuing analysis.

In order to identify the technostress levels of lecturers when applying new technology in teaching, data collected from 370 lecturers was analyzed and presented in the table below.

Table 1 DESCRIPTIVE STATISTICS ON TECHNOSTRESS LEVELS OF LECTURERS			
Factors Affecting Technostress	<i>X</i>	<i>Sd</i>	Level
Technical support in teaching process	2,77	776	Medium
University support	2,09	762	Low
Lecturers' lack of technology knowledge	2,87	906	Medium
Pressure from reform and integration in education	3,00	934	Medium
Pressure from society	2,32	903	Low
TECHNO-STRESS AVERAGE	2,60	665	Medium

Source: Data from survey

As can be clearly seen in Table 1 that the general technostress level of lecturers is average ($X=2.60$). In other words, teachers undergo a medium-leveled technostress in their decision to apply new technology. In terms of size, stress due to *technological problems* ($X=2.77$) and *pressure from requirements of reform and integration in education* ($X=3.00$) as well as *pressure from lecturers themselves* ($X=2.87$) are the main technostress for lecturers;

whilst *pressure from society* ($X=2.32$) and *university support* ($X=2.09$) are not critical, then they were rated at a low level.

The relation between lecturers' technostress affecting the decision of applying new technology and gender is analyzed in the following table:

Table 2 T-TEST RESULTS FOR LECTURERS' TECHNOSTRESS LEVELS BY GENDER						
Gender	N	X	Sd	Sd	t	p
Female	191	2,63	648	368	750	454
Male	179	2,57	684			

Source: Data from survey

Table 2 states that lecturers' technostress levels are not impacted by gender variables $t(368)=0.454$, $p>0,5$). In other words, female lecturers ($X=2.63$) or male lecturers ($X=2.57$) share the same average level of technology adoption and the difference between them is insignificant at the 0.05 significance level.

Examining the level of lecturers' technostress by seniority shows that its influence on the stress in the decision to apply new technology is as follows:

Table 3 TECHNOSTRESS LEVELS OF LECTURERS BY SENIORITY										
Seniority	F	X	Sd	Source	Sum of Squares	df	Mean Squares	F	p	Sign
>5 years	83	2,48	612	Within Group Between Total	2,143	3	714	1.620	184	
5-10 years	64	2,65	571		161,380	366	441			
11-15 years	78	2,57	708		163,524	369				
>16 years	145	2,66	704							

Source: Data from survey

According to Table 3, the stress in lecturers' decision on novel technology application is not affected by their seniority ($F(3-366) = 1.620$, $p>0.5$). In other words, lecturers' technostress is not impacted by seniority.

It is hypothesized that there exists a significant relationship between internet use, which has increased in recent years is lecturers' capacity to utilize technology, thereby creating technostress, the relationship between Internet-using time and lecturers' decision on new technology adopt are also put into analysis.

Table 4 TECHNOSTRESS LEVELS OF LECTURERS BY INTERNET-USING TIME										
Time	F	X	Sd	Source	Sum of Squares	df	Mean Squares	F	p	Sign
few hours/week	39	3,01	572	Within Group Between Total	11,009	4	2,752	6,587	000*	
5-10 hours/week	31	2,65	668		152,514	365	418			A-C
1-2 hours/day	171	2,62	673		163,524	369				A-D
3-4 hours/day	72	2,53	625							A-E
>4 hours/day	57	2,34	622							

Source: Data from survey

All lecturers participating in the study confirmed their constant use of the internet during their work, so no results related to non-internet users were recorded. Descriptive statistics of technostress, decision to adopt new technology with time of internet use and analysis of variance results are shown in Table 4 below:

Table 4 indicates that Internet-using time is one of the important factors affecting the technostress levels of lecturers ($F(4-365) = 6,587, p < .05$). Participants using the internet for a few hours per week experience more stress than those with more than 4 hours per day. Thus, it can be seen that the more time lecturers use internet, the less possibility of stress in integrating new technology they have, and vice versa.

CONCLUSION

There go multiple research models concerning the application of technology in the educational environment, and most of them affirm the crucial role of lecturers in technology application, especially in the process of reform and international education integration (Koehler Matthew, et al., 2013; Alireza Ghonoodia-Ladan Salimi, 2011). Regarding the decision to use technology in education, lecturers' personal qualities (attitude, knowledge, psychology) have been considered in relation to important factors of the technology application process (Koehler Matthew, et al., 2013). Technostress is one of the personal characteristics of each teacher, related to the use of technology in teaching (Coklar et al., 2016). Research on the influence of technological stressors on the decision to apply novel technology in university lecturers in Hanoi shows that:

First, technical assistance holds a significant impact on lecturers' decision to adopt new technology in their teaching. This also underpins the study by Coklar et al. (2016), Matthew and William (2013), whereby the authors states that technical support from experts casts an impact on the decision made by lecturers to incorporate new technology. Given meticulous and ceaseless support, lecturers' tension would lessen when applying novel technology; on the contrary, the lack of technical support would lead to lecturers' confusion and hesitance in applying technology. In addition, the support from the university does not pose a significant impact on the stress in lecturers' choice to adopt technology. Therefore, investing in experts and necessary and regular technical support for lecturers is one of the factors mitigating their stress in technology application.

Second, lecturers' technology knowledge also exerts a significant impact on the decision to adopt new technology. This finding reflects results of previous studies by Kay (2008) and Hardy (1998). Specifically, Hardy (1998) argues, based on a theoretical assessment that lecturers with knowledge and experience in the technology utilization may have lower anxiety levels when using computers. Therefore, before applying a new technology, lecturers is required to be trained and fostered in technology methodically to promote the application of new technology for teaching.

Third, the pressure from reform and integration in education is an assessing factor that entails a significant influence on the stress in applying new technology. Specifically, the pressure stems from the requirements and conditions of educational innovation in Vietnam, including the requirement to exploit more technology in the teaching process. At the same time, the integration of international education shows that without new technology employment, teachers are about to draggle behind rapidly due to the teaching requirement mandating a certain level of technology. To facilitate the lecturers, strategies such as communities of practice have been proposed and

deployed (Shulman & Shulman, 2004), so that teachers can gain experience from others and develop their expertise by sharing knowledge, experience and skills. This may drastically placate their technostress.

Nevertheless, the study presents a negligible influence from social pressure factors on the decision to adopt new technology, causing less stress for lecturers. The decision on technology application grounds in the job requirement, expertise and technical support rather than external pressure. When teachers feel pressured to change their pedagogy and use new technology due to external requirements, they are more likely to resist adopting this technology. Therefore, administrators and researchers should be aware of the downside of top-down strategies for using technology and recognize the technostress experienced by lecturers during the acquiring technology.

On the other hand, the research pinpoints the indifference in the technostress levels by gender, evidenced by the similarity between male and female lecturers in average technostress. This derives from the fact that lecturers are equally offered chances to access and use new technologies, which may have restricted the shift in technostress levels among them.

The research findings unravel no significant effect of seniority on the level of lecturers' technostress. Lecturers with 5 to 10-year experience or more frequently possess better skills and ability to apply technology than those with less than 10 years of seniority, but that is only a secondary indicator. Numerous preceding publications by Quinn (2001), Rezaei (2008) discuss that age is a worthwhile variable to investigate in assessing technostress, but the limited scope fails to cover all case studies. In contrast, a research by Longman (2013) on technostress in lecturers with less than 10 years in service remarks the seniority's effect is not significant on technostress. Quinn (2000) states that the youth are of greater ease in acquiring and utilizing new technologies than older ones, but Alireza Ghonoodia - Ladan Salimi (2011) finds that younger users are more familiar with novel technologies, but experienced users cope better with technostress. From this perspective, it is possibly asserted that technology competency and teaching experience uphold a corresponding balance in technostress.

This article also reveals the level of lecturers' technostress varies over time using the internet - a pivotal source of information and communication today. It is out of doubtfulness that lecturers using the internet on daily basis predicate less technostress than those with only few hours a week, and accordingly, internet-using time can be considered an important variable. Despite a humble number of fact-finding works on this aspect, there have been some reports that people spending more time on technology, specifically computers, undergo lower level of technostress (Baek et al., 2008).

Upon the aforementioned results, the author offers several recommendations as follows:

To mitigate the level of technostress among lecturers in implementing innovative technologies, there needs to be more technical support and training so that lecturers' ability to adjust to technology will be drastically promoted. It is essential that periodical training sessions suiting learners' demands are organized to foster fundamental skills and the application of technologies in teaching as a habit.

Moreover, the average amount of Internet-using time on a daily basis may serve to abate technostress level. Hence, lecturers themselves should view the utilization of Internet as a habit and a prosperous source for learning.

To diminish the pressure of the overhaul and integration of education for lecturers whose impacts will tremendously affect how they embrace technology, teachers should refrain from unsolicited utilization of technologies to fulfil the burdening demands or quotas of their

employing institution (The Ministry of Education and Training), schools, unions and themselves. Besides, it is of paramount that appropriate teaching methods and roadmaps to further boost the implementation of technology in teaching, rather than imposing strenuous demands and requiring precipitous adjustments from lecturers. Each lecturer also needs to be more proactive and creative in incorporating technology into their teaching.

REFERENCES

- Al-Fudail, M., & Mellar, H. (2008). *Investigating teacher stress when using technology*. *Computers & Education*, 51(3), 1103e1110.
- Alireza Ghonoodia-Ladan Salimi (2011). *The study of elements of curriculum in smart schools*. *Procedia - Social and Behavioral Sciences*, 28(1), 68- 71.
- Baek, Y.G., Jong, J., & Kim, H. (2008). What makes teachers use technology in the classroom? exploring the factors affecting facilitation of technology with a Korean sample. *Computers & Education*, 50(1), 224e234.
- Brod, C. (1984). *Technostress: The human cost of the computer revolution*. Mass. Addison-Wesley.
- Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319e340.
- Dung, T.K., & Tam, T.T.T. (2012). *Measuring stress level of university staffs at work*. *Journal of Economic Development*, 262, 38-46.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Grandgenett, N.F. (2008). *Perhaps a matter of imagination TPCK in mathematics education*. In *AACTE Committee on Technology and Innovation (Ed.)*, Handbook of technology pedagogical content knowledge (TPCK) for educators, Pp. 145e165.
- Hung, W.H., Chen, K., & Lin, C.P. (2014). *Does the proactive personality mitigate the adverse effect of technostress on productivity in the mobile environment*. *Telematics and Informatics*, 32 (1), 143-157.
- Hung, W.H., Chen, K., & Lin, C.P. (2015). Does the proactive personality mitigate the adverse effect of technostress on productivity in the mobile environment? *Telematics and Informatics*, 32(1), 143-157.
- Koehler Matthew, J., & Cain, W. (2013). what is Tachnological Pedagogical Content Knowledge (TPACK). *Journal of Education*, Pp13-19.
- Koehler Matthew, J., & Cain, W (2013). what is Tachnological Pedagogical Content Knowledge (TPACK). *Journal of Education*, Pp13-19.
- Jena, R.K. (2015). Technostress in ICT enabled collaborative learning environment: An empirical study among Indian academician. *Computers in Human Behavior*, 51, 1116-1123.
- Jena, R.K. (2015). Technostress in ICT enabled collaborative learning environment: An empirical among Indian academician. *Computers in Human Behavior*, 51, 1116-1123.
- Joo, Y.J., Lim, K.Y., & Kim, N.H. (2016). The effects of secondary teachers' technostress on the intention to use technology in South Korea. *Computers & Education*, 95, 114-122.
- Kay, R.H. (2008). Exploring the relationship between emotions and the acquisition of computer knowledge. *Computers & Education*, 50(4), 1269e1283.
- Lam, S., Cheng, R.W., & Choy, H.C. (2010). School support and teacher motivation to implement project-based learning. *Learning and Instruction*, 20(6), 487e497.
- Lin, M.H., & Chen, H.G. (2017). A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(7), 3553-3564.
- 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.
- Quinn, B. (2001). Overcoming technostress in reference services to adult learners. *The Reference Librarian*, 33(69-70), 49-62.
- Rezaei, M., Mohammadi, H.M., Asadi, A., & Kalantary, K. (2008). Predicting e-Learning application in agricultural higher education using technology acceptance model. *Turkish Online Journal of Distance Education*, 98(1), 85e95.

- Shu, Q., Tu, Q., & Wang, K. (2011). The impact of computer self-efficacy and technology dependence on computer-related technostress: A Social cognitive theory perspective. *International Journal of Human-Computer Interaction*, 27(10), 923-939.
- Shulman, L.S., & Shulman, J.H. (2004). How and what teachers learn: a shifting perspective. *Journal of Curriculum Studies*, 36(2), 257-271.
- Teo, T., & Noyes, J. (2014). Explaining the intention to use technology among pre-service teachers: a multi-group analysis of the Unified Theory of Acceptance and Use of Technology. *Interactive Learning Environments*, 22(1), 51-66.
- Vannatta, R.A., & Fordham, N. (2004). Teacher disposition as predictors of classroom technology use. *Journal of Research on Technology in Education*, 36(3), 253-271.
- Wang, K., Shu, Q., & Tu, Q. (2008). Technostress under different organizational environments: an empirical investigation. *Computers in Human Behavior*, 24(6), 3002-3013.
- Weil, M.M., & Rosen, L.D. (1997). *Technostress: Coping with technology @Work @Home @Play*. New York: Wiley.