A STUDY ON TECHNOSTRESS AMONG FIRST SEMESTER POSTGRADUATE STUDENTS IN UNIVERSITI TEKNOLOGI MARA, SHAH ALAM

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Abstract

Technology stress (Technostress) can be defined as a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner. Clear symptoms of Technostress include inability to concentrate on a single issue, increased irritability and feeling of loss of control. The study was conducted among 1st semester postgraduate students in Universiti Teknologi MARA, Shah Alam in order to measure the level of their stress. Domains of Technostress can be classified as learning, border, communication, time, family, workplace, and societal perception of technology. The instrument, Personnel Technostress Inventory (PTSI) created by Rosen & Weil (1999), was revised, simplified and finalized according to the research objectives. Result shows that family technostress is the major domain experienced by participants apart from having a moderate level of technostress.

Keywords: *Technostress, Innovation Theory, Information and Communication Technology (ICT).*

1. Introduction

Technology has become an important commodity in our society. Its tremendous impact upon our lifestyle has reached a level where it causes a disease and/or heightens the anxiety level among the modern society. This disease or anxiety disorder has been identified by psychologists as a form of stress caused by technology or in other words, technostress. The term ''technostress'' is defined as ''a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner'' (Brod, 1984). Rosen and Weil (1997) expanded the definition of technostress to include ''any negative impact on attitudes, thoughts, behaviours or psychology caused directly or indirectly by technology.''

In producing quality graduates, the education process, which calls for greater self-directed learning, plays a vital role. With the help of technology, geographical barriers are no longer an issue for graduates to find sources or references needed to complete their assignments or task at hand. In other words, online collaboration is likely to happen in higher education setting as means of working on more sophisticated projects or assignments, extending research, sharing expensive and specialized equipment, and including more geographical dispersion of project teammates (Nagarajah *et al.*, 2009).

However, it is not impossible that such intense dependency on technology can create a pressing problem for the end users. This is because too much time and energy spent on comprehending and practising new ways of communicating, coordinating, and cooperating in an environment characterized by urgency, and in most cases, individuals who are affected by such situation will have a high possibility of experiencing stress.

Thus, it is important to determine whether the overload of ICT into the social settings, residence and public institutions of higher education can cause technostress to occur among postgraduate students. They have to cope with the problem of information overload with increasing availability of information sources and ways to access the source, as well as continuous and rapid upgrades, enhancements, and totally new hardware and software.

This study intends to determine the type of technostress affecting first semester postgraduate students in Universiti Teknologi MARA, Shah Alam as well as the different levels of technostress experienced by these graduates according to their age, gender, marital status, faculty, employment agency, employment status and feelings toward using new technology.

This paper is organized as follows. In section 2, the literature review related to technostress is discussed. In section 3, the research methodology used for this study is presented. The results obtained for this paper are presented in section 4. Finally, our work of this paper is summarized in the last section.

2. Literature Review

We begin by specifying the notation that will be used in the rest of this paper. With reference to several studies done by psychologists such as Rosen and Weil (1997), Figueredo (2001), Brod (1984) and Yu *et al.* (2009) on technostress, they had managed to identify several symptoms or side effects caused by technostress. Among the symptoms are health related problems such as headache, higher heart beat rates, nerves strains, eye sore and becoming phobia or agitated with technological equipment (e.g., computers, fax machines, printers, etc.). These health problems occur as technostress is also a symptom of stress related disease, which can happen to any individuals (Rosen & Weil, 1997; Sarafino, 2002). In some extreme cases, there are individuals who tend to damage technological equipment that they are using apart from being less productive because of technology. In addition, Rosen and Weil (1997) also posited that there are seven independent components of technostress, namely;

a)   Learning technostress
Learning technostress is a form of stress experienced by individuals who are learning and trying to understand technology. Rosen and Weil (1997) stated that this situation normally occurs when the newest and latest technology is made available in the market. According to Rosen, there is no doubt that technology is developing rapidly and thus, making it more difficult to predict its progress.

b)   Boundary technostress
Boundary technostress is a type of technostress initiated by the attitude of individuals who are unable to determine a clear time limit while using technology whether at home, workplace, during exercise and relaxation. This type of technostress is visible if individuals feel that they need to answer all messages or manage any given tasks immediately although they can actually choose the message or task based on their own needs (Rosen and Weil, 1997).

c)   Communication technostress
According to Rosen and Weil (1997), when individuals communicate, they will try hard to convey the intended message by using appropriate channels and methods. This is to ensure that the message, which they wish to convey, will be received by the target audience. However, there is no doubt that communication technology equipment and ICT sometimes have the tendency to malfunction until it becomes a hindrance to the communication process.

d)   Time technostress
Time technostress, according to Rosen and Weil (1997), is a form of stress that happens due to technology's role as a time saving device. It causes pressure among individuals if the technology tends to waste more time instead of saving it. However, sometimes, because of saving too much time, technology causes individuals to do more than one task at a time and pay less attention to other matters.

e)   Family technostress

Family technostress, according to Rosen and Weil (1997), refers to pressure which occurs mainly at home and among adults. This is because adults prefer to underestimate themselves and think that children understand technology better than they do. Adults normally sustain a feeling of doubt, which makes them to believe that some technologies, especially the internet, are not safe for children, thus, leads them to experience family technostress.

f)Workplace technostress

Workplace technostress is a type of stress that happens among individuals at the workplace (Rosen and Weil, 1997). It becomes visible when people attempt to show that they have sufficient knowledge about technology compared to their colleagues, even though, in reality, they don't really have the required knowledge. Other than that, workplace technostress can also occur if people often bring back home all of their work, which should be completed at their workplace.

g)   Societal technostress

According To Rosen and Weil (1997), societal technostress happens because of the emergence of new technology in social settings. Nowadays, ICT continues to develop and change because of relentless technological innovations that occur within our society. However, not all individuals in the society can afford to own or operate the latest ICT innovations. For some people, such change is long-awaited and serves to be a new challenge for them; yet for some other people, it seems to be impossible for them to accept such idea.

In short, from the information presented on technostress and its components, it can be concluded that technostress can happen to all individuals who are different in terms of demographic, geography, physiology, psychology and also behaviour, as long as these individuals are the users of technology.

Furthermore, this study uses The Diffusion of Innovation Theory as a basis to discuss on the study of technostress among technology users. Apart from taking the approach of The Diffusion of Innovation Theory advocated by Rogers (2003), this study also adapts other related theories to explain the use of technology and consequences for using it, which can actually lead to stress. The theories involved are The Information Theory proposed by Krippendorff (2009) and theories related to stress, namely, The Learning Theory introduced by Ivan Pavlov in 1927 and also The Cognitive Transactional Model of Stress by Lazarus and Launier in 1978.

By using The Diffusion of Innovation Theory approach, Rogers (2003) stated that most diffusion scholars who followed the classical model of innovation diffusion merely focused on the relationship visualized in Figure 1 as arrow #1 (the variable that relates to individuals' acceptance towards technology). However, Rogers (1991) added that studies conducted on communication technology had expanded the field of innovation diffusion research by exploring variables' relationship described by arrow #2 (refers to outcomes of the use of new media) and arrow #3 (refers to factors related to social impact of new media).

According to Rogers (2008), there are three consequences of acceptance or rejection of an innovation. The consequences are; 1) the desired and undesirable consequences; 2) the direct and indirect consequences; and 3) the expected and unexpected consequences.
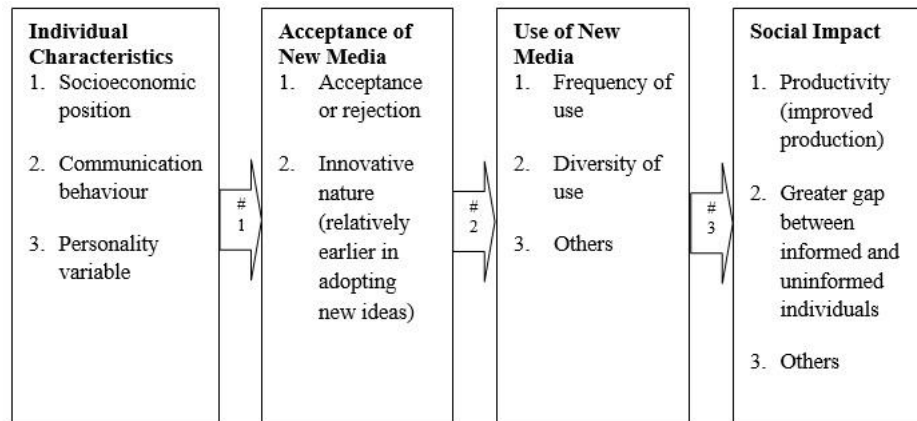
Figure 1: The Variables in the Study of Acceptance, Use and Social Impact of Communication Technology

Based on the discussion of The Diffusion of Innovation Theory by Rogers (2008), the researchers feel that the study on technostress among first semester postgraduate students also represents a study that aims to identify the social impact of communication technology experienced by graduates who use ICT.

Additionally, the demographic profile of individuals who will adopt a new form of communication technology is important in order to explain about the variable of acceptance of new technology. Rogers also mentioned that among the distinctive features identified is the socio-economic aspect of individuals. The socio-economic feature can be measured through income, job status and the amount of formal education they received. Other factors such as different patterns of age, gender, marital status, race, behaviour and psychograph can also influence individuals' acceptance towards technology (Rosen & Weil, 1999; Sarafino, 2002).

The acceptance of technology, as mentioned earlier, is influenced by the demographic profile of individuals. This is because every individual has different reactions and feelings toward technology. Therefore, understanding the acceptance of technology among individuals is very important because any form of negative attitudes toward technology will result in individuals' total rejection of every existing plan of ICT development.

Rogers (2008) further suggested that the use of technology is influenced by individuals' acceptance towards technology. In relation to that, Rogers added that the use of new media or technology can be measured by its frequency and diversity of usage. He also included other factors that are not clearly stated because the relevance of these factors depends on the research being conducted. Thus, it is believed that relying on The Diffusion Innovation Theory would not be sufficient to describe the effects of technology on communication processes and individuals. Therefore, to explain about the use of technology, the researchers also adopted The Information Theory to identify the indirect effects of technology on individuals and channels (communication technology) used, which in turn can also be associated with the theory of stress. By doing so, the relevance or relationship can be seen between the acceptance and use of technology with the unexpected effects such as technostress among users of technology. The researchers believed that The Information Theory can be utilized to describe the process of communication using ICT. Furthermore, this theory can explain how the elements of interference or noise, uncertainty, unpredictable, and redundancy exist when using communication technology. Rosen and Weil (1997) also agreed that the nature of technology itself is uncertain and unpredictable. It is because technology changes rapidly.

From the psychological context, the elements of interference, uncertainty, unpredictable and redundancy are the factors that trigger stress in humans' life. In The Learning Theory, Ivan Pavlov (Rogers, 1991) has developed a Classical Conditioning Model to explain how stress occurs within

individuals. From this Classical Conditioning Model, it can be seen that the major element being discussed is interference. According to this model, interference is an unconditioned stimulus that occurs when individuals are using or observing something. Before conditioning, the individuals would normally be anxious and distracted when interference occurs but they are not afraid of any object used or observed. During conditioning, on the other hand, individuals will be afraid of the interference that takes place and they become frightened by the used or observed object. Apparently, after conditioning, individuals will automatically become terrified of the used or observed object even without the interference. In relation to the study, the researcher believed that, emotionally, people become worried or terrified of being left behind by others in following the current changes of technology or they felt less confident with the level of knowledge that they have about technology. Consequently, the stressful event that happens regularly will increase input to the cumulative pressures of individuals toward technology until they become worried and afraid to use it.

In accordance to The Cognitive Transactional Model of Stress proposed by Lazarus and Launier (1978), stress does not only occur because of the environment stimulation, personal characteristics of individuals, or people's reaction, but it also happens because of the relationship between the requirement and capability to handle an object or event without any physical or psychological loss or damage (Coyne & Holroyd, 1982). According to Rice (1999), there are two important aspects that need to be taken into consideration in defining how stress occurs. First, one can interpret an event as stressful, however, that particular event also may not cause stress to other people. It means that personal cognitive appraisal determines whether an event can cause an individual to become stress or not. Second, the same individual can interpret the same event under one circumstance as a cause of stress, but sometimes the same event under a different circumstance does not cause stress to him or herself. This situation occurs probably because of the changes in physical or psychological condition of individuals.

In this study, the elements of interference, uncertainty, unpredictable and redundancy were used as measurement items for the level of technostress. The researchers assumed that the social impact or social domino effects caused by the use of technology are actually technostress experienced by users of technology. This is because effects derived from the use of technology can also be seen as somewhat of unwanted and unexpected (Rosen & Weil, 1999). The theoretical framework of the study was designed by using the variables in the study of acceptance, use and social impact of communication technology from The Diffusion Innovation Theory as shown in Figure 2.
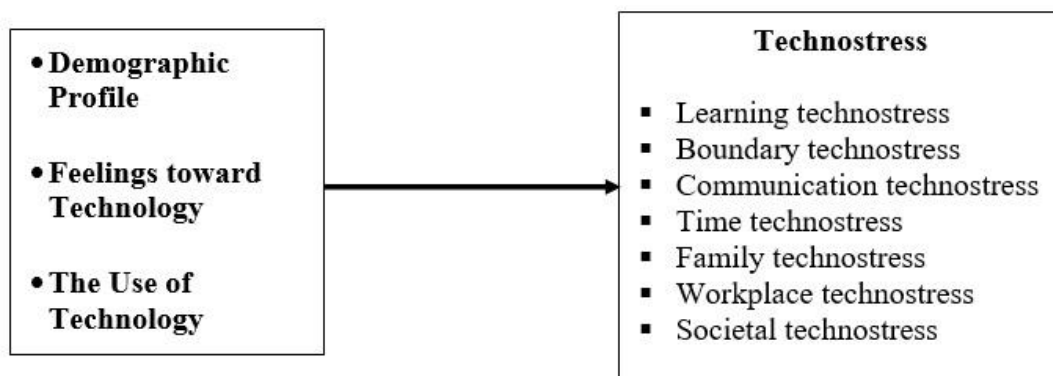

Figure 2: Theoretical Framework of the Study

3. Research Methodology

The research design of this study is quantitative descriptive approach. The method of data gathering was conducted through distribution of questionnaire forms. In addition, based on the research instrument developed by Rosen and Weil (1999) on technostress, the researchers had adapted the

questionnaire form as a basis for the study of technostress among first semester postgraduate students in Universiti Teknologi MARA, Shah Alam. The research instrument adapted for this study is called Personal Technostress Inventory (PTSI).

The selection was made based on the nature of the respondents who were still working while pursuing their master degree at the same time. Furthermore, it was also believed that the subjects of the study were also vulnerable to pressure or stress problems in the workplace as a result of the introduction and use of ICT to date, as other professionals experienced. This pressure may exist mainly due to the workload that they faced back at their workplace on weekdays as well as academic obligation on weekends such as attending classes, assignments, presentations, and research. Apparently, postgraduates also, like the other members of society, have to learn and update themselves on the current changes that occur within the societal settings as a result of technological advancements and innovations.

The study conducted only took into account 5 faculties, which consisted of; i) Faculty of Accountancy, ii) Faculty of Art and Design, iii) Faculty of Business Management, iv) Faculty of Education, and v) Faculty of Communication and Media Studies due to their high volume of postgraduate candidates. The number of students who registered under the postgraduate programmes of each faculty consists of 95 accountancy students, 64 art and design students, 109 business management students, 40 education students, and 33 communication and media studies students. Hence, the total number of students, which is 341 students, represents the population of the study. From the population of the study, a total of 181 respondents were selected and accepted as the sample of the study.

The research instrument used was a set of questionnaire that comprised of three sections; Section A, Section B and Section C. For the questionnaire form, the researcher utilised an instrument that had been adopted from Rosen and Weil10, in their study about technostress (Personal Technostress Inventory, PTSI). In addition, the researchers also had made some modifications on the questions featured in the demographic part to match the sample of the study. This instrument contained 53 questions. It was designed and divided into three sections to measure the subjects of the study in terms of: (1) demographic characteristics; (2) acceptance of technology; (3) technostress effects due to the use of technology.

To meet the objectives of the study, technostress will be identified as overall technostress and broken down into individual components of technostress. The components of technostress are learning technostress, boundary technostress, communication technostress, time technostress, family technostress, workplace technostress, and societal technostress.

4. Results and Analysis

Table 1:

Demographic Profile	Frequency	Percentage
Age		
23 - 30 years	102	56.4
31 - 38 years	57	31.5
39 - 46 years	18	9.9
Above 46 years	4	2.2
Gender		
Male	97	53.6
Female	84	46.4
Marital Status		
Single	72	39.8
Married	109	60.2
Faculty		
Faculty of Accountancy	32	17.7
Faculty of Art and Design	30	16.6
Faculty of Business Management	56	30.9
Faculty of Education	43	23.8
Faculty of Communication and Media Studies	20	11.0
Employment Agency		
Government	83	45.9
Private	75	41.4
Self-employed	23	12.7
Employment Status		
Permanent	88	48.6
Contract	86	47.5
Part time	7	3.9

Demographic Profile of the Respondents (n=181)

Based on the findings for each component of technostress mentioned, it is believed that respondents experienced more of family technostress (min = 2.78, standard deviation 0.416) compared to other components. It is then followed by the components of time technostress, boundary technostress, societal technostress, workplace technostress, learning technostress, and communication technostress.

Table 2: Level of Family Technostress among Postgraduates (n=181)

Level of Family Technostress	Frequency	Percentage	Mean	S.D
Low (1 – 1.67)	0	0		
Medium (1.68 – 2.34)	40	22.1	2.78	0.416
High (2.35– 3)	141	77.9		

Results from the survey also indicated that most of the respondents experienced moderate levels of technostress (52.5%) for nearly all components accepts for several technostress components with several obvious significant differences, namely, societal technostress, workplace technostress, boundary technostress and time technostress.

In relation to that, Rosen and Weil (1999) stated that individuals who use technology will be more or less to experience technostress in their lives. Nevertheless, there are not many of the first semester postgraduate students who experienced high level of technostress as there were only 6 of them, which represent those at the age of 46 years and above.

Table 3: Level of Technostress among Postgraduates (n=181)

Level of Technostress	Frequency	Percentage	Mean	S.D
Low (1 – 1.67)	80	44.2		
Medium (1.68 – 2.34)	95	52.5	1.68	0.498
High (2.35 – 3)	6	3.3		

Significant differences in technostress level in accordance to respondents' feelings towards technology also showed that those who are fully receptive towards technology and willing to try new technology experienced less technostress compared to those who would rather wait to use new technology until they are required to do so.

Table 4: One Way Analysis of Variance (ANOVA) by Feelings toward Technology (n=181)

Employment Agencies	n	Mean	S.D	t	p
Eager adopters	8	1.25	0.46	13.25	.000
Hesitant Prove It	72	1.39	0.49		
Resisters	69	1.64	0.51		
Feel free to use it	32	2.03	0.54		

5.Conclusion

Results from the study discovered that first semester postgraduate students in Universiti Teknologi Mara, Shah Alam often experienced more of family technostress compared to the rest of technostress components. Although the level of technostress experienced by most postgraduates is moderate, the level of technostress according to the individual components found that a high amount of the respondents experienced family technostress. The students involved in this study were very sensitive and concerned about the issue of content in the Internet. In relation to that, it is highly recommended that individuals need to take proactive measures to ensure that inappropriate and detrimental content of the internet are filtered out and not easily accessible by children. In addition, the study also discovered that many of the respondents believed that technology can cause family bond to become weak and frail. Respondents also believed that children are becoming more IT savvy compared to adults because of their overuse of technology. Both of these notions clearly indicated that postgraduates are very concerned with the effects of technology on family institutions as innovations in ICT continue to grow and expand.

To sum up, the overall results of the study showed that majority of the respondents experienced moderate technostress level. However, there are several respondents who experienced high and low level of technostress based the different components of technostress. This clearly shows that stress is a process that is transactional in which there are certain individuals who are stress and others who are not at a given similar time and place. Based on discussions about the implications of the above theory, it can be concluded that to identify technostress among users of technology, there is a relation that can made between communication theory and stress theory. This method will eventually help to develop further knowledge in the field of communication studies, especially in ICT.

References

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

Coyne, J. C. & Holroyd, K. (1982). Stress, coping, and illness: A transactional perspectives. In T. Millon, C. Green, & R. Meagher, Handbook of clinical health psychology (103-127). New York: Plenum.

Figueiredo, J. (2001). Coping with Technostress. Magazine of Health Today. Jan-Feb 2001.

Lazarus, R. S. & Launier, R. (1978). Stress-related transactions between person and environment. In Pervin, L.A. & Lewis, M. (Eds.), Perspectives in interactional psychology, (287-327). New York: Plenum.

Nagarajah, L., Rozinah, J. and Ravichandran, P. (2009, August 12-13). ICT in Student − Supervisor Communication: A Case Study at a Public Institution of Higher Learning in Malaysia. Paper presented at the meeting of the International Conference on Information, Kuala Lumpur.

Rice, P. L. (1999). Stress and health. 3rd Ed. Pacific Grove: Brooks/Cole Publishing Company.

Rogers, E. M. (1991). Communication Technology: The new media in society. New York: The Free Press Macmillan, Inc.

Rogers, E. M. (2003). Diffusion of Innovation. 5th Ed. New York: Free Press Macmillan, Inc.

Rosen, L. D. & Weil, M. M. (1997). Technostress: Coping with technology @work @home @play. New York: John Wiley & Sons, Inc.

Rosen, L. D. & Weil, M. M. (1999). Personal Technostress Inventory (PTSI): Assessment of reliability, validity, and preliminary results. Retrieved June 22, 2015, from http://mlk2.melaka.uitm.edu.my/mail/razif813.nsf/iNotes/Mail/?OpenDocument&PresetFields=s_ViewLabel;Inbox,s_ViewName;%28%24Inbox%29&KIC&UNH=sp3lakgi9j03caoigkpummv1i9s.

Sarafino, E. P. (2002). Health Psychology: Biopsychosocial interactions. 4th Ed. New York: John Wiley & Sons, Inc.

Krippendorff, K. (2009). Mathematical theory of communication. In Littlejohn, S.W. & Foss, K.A. (Eds.), Encyclopedia of communication theory (pp. 614-618).

Yu, J.C., Kuo, L.H., Chen, L.M., Yang, H.J., Yang, H.H., Hu, W.C. Assessing and Managing Mobile Technostress. April 2009, WSEAS Transactions on Communications, 4(8).