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A Model for Analysing Technological Stress Creators- Study on Teaching and Non Teaching Staff

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I. Introduction

Stress can be explained as psychologically or emotionally upsetting situation which occur due to adverse external influences and affects our physical health by increasing heart rate, increase in blood pressure, muscular tension, irritability, and depression. Technostress was defined by Wang, et. al is a ‘‘reflection of one’s discomposure, fear, tenseness and anxiety when one is learning and using computer technology directly or indirectly that ultimately ends in psychological and emotional repulsion and prevents one from further learning or using computer technology.’’ She determined the relationship between technology and stress to find out stress related issues and the extent it affects an individual’s life and to have an understanding of the consequences of using too much technology. Her results revealed that thirty-eight percent of the respondents feel anxiety when their cell phones are not around, and 58% always check their cell phone the moment they receive a notification. It was also found that “blur boundaries” exists between the work and home environments. On the whole, her results confirmed that the phenomenon known as “technostress” exists.

Salanova, et. al, gave a definition of technostress experience at work. According to her stress is a ‘‘negative psychological state associated with the use or threat of ICT use in the future. They found that a technostress experience can be related to feelings of anxiety, mental fatigue, skepticism and inefficacy’’ (p. 1).

Brod [5], reported that employees at all levels of the organization experience some level of stress related to the use of information and computer technologies (ICT) at work. Other studies have showed that the type of techno-stress experienced vary and include data smog, multitasking madness, computer hassles, burnout, techno-addiction, and techno-strain (Salanova, et. al and Brillhart .

So, in previous researches conducted by various authors on the topic technostress, the work environment or the general environment was examined. The present study is made of Teaching and Non Teaching staff working in colleges in and around Chandigarh

Technology In Education

Technology in education relies on encompassing both material objects, such as machines and networking hardware, and also broader aspects of education such as organizational systems, learning methodologies and techniques, and skills assessments. At the graduate level students in the social sciences and in business administration are already making use of computers in a variety of ways, ranging from the large-scale analysis of data to the simulation of an industry. The time is rapidly approaching when a high percentage of all university graduates will have had some systematic training in the use of computers; a significant percentage of them will have had quite sophisticated training.

According to **Al-Fudail and Mellar** in the past decade, teachers have become exhibiting technostress because of the application of technology in their schools.

In higher education the use of technology has been becoming important. All the work is becoming online with the coming of the concept of e learning. Teachers are also required to maintain all the record and teach in smart class rooms with the advent of technology. With the more and more use of technology stress levels among the academicians has also increased which has lead to the necessity of the study of the symptoms of stress level and ways of coping it. Previous studies have shown that information communication technologies may be related to stress, but the specific kinds of stress related issues have not been fully researched.

II. Literature Review

Technostress according to **Brod (1984)** manifests itself in two distinct and related ways: in the struggle to accept computer technology and in the more specialized form of over identification with computer technology.

Kupersmith, (1992) says that the internet is probably becoming the major causes of technostress due to the fact that many of new information site with no standard to how they are designed, maintained and updated. Dealing with the information overload is a real problem.

Arnetz and Wiholm, (1997) says that in the 21st century, most jobs require some type of technological interaction whether it be in an office or in the field. Interaction with computer systems is inevitable and can create technostress that can lead to ineffectiveness in the workplace as well as health problems. These health problems lead to missed work, absents and loss in productivity. Organizations need to understand these issues and implement solutions.

Kupersmith, (2003) in his survey discovered that information overload, networking problems, security issues, computer hardware and software, ergonomics and vendor-produced databases as leading causes of technostress for them. Common symptoms of technostress may include: feelings of isolation and frustration; negative attitudes toward new computer based sources and systems; indifference to users' computer-related needs; self depreciating thoughts or statement about one's ability to cope; an apologetic attitudes toward users; and a definition of self as not a computer person. All these may result in the poor job performance by the library and information science professionals which would in turn lead to low library users' satisfaction.

Brillhart, (2004) says that stress has been a major issue for organizations, and employers must deal with it in order to be productive at work. The anxiety and tension can also come from the inability to use the technology that leads to a disadvantage over other workers who do use the technology effectively. The non-users become less competitive compared to their counterparts.

Strang, (2004) It is possible for these factors to be influenced by management, but this idea was not addressed in the literature. These factors were more associated with work-related stress and not technostress, specifically.

Scott and Timmerman, (2005) viewed that stress is most industry in the informational technology field. These IT professional learn how to cope with the technostress by identifying the root cause of the stress and implementing coping strategies such as learning the functionalities and increasing training on the technology to help mitigate the technostress.

Tarafdar et al., (2007) explains that technology factors such as techno-overload, techno-invasion, techno-complexity, techno insecurity and techno-uncertainty can have affect on technostress. These six factors have been shown to have a strong relationship with technostress, but one area that was not addressed in the literature is the role of management influence.

Thomee et al. (2007) demonstrates that technostress can cause depression and sleeping issues. This in turn can affect many other aspects of life such as work and family. Technostress can also affect work performance.

Al-Fudail and Mellar, (2008) conducted their study in educational field. According to him in the past decade, teachers have become exhibiting technostress because of the application of technology in their schools. Knowing that technology can have an adverse effect on the teachers, schools have implemented processes to aid the teachers in reducing technostress. This includes more technology training, practicing before using the technology, changing teaching styles, and classroom management training.

Tiemo, Pereware Aghwotu and **Ofua, Justice Owajeme, (2010)** in their paper **"**Technostress: Causes, symptoms and coping strategies among Librarians in University libraries" examine the causes, symptoms and coping strategies of technostress among librarians in university libraries. Their study revealed that majority of the librarians experienced technostress as a result of technological changes. And to cope with technostress in their various working places, they agreed to the various coping strategies and plans.

Barley, Meyerson and Grobal (2010) In the article, *Email as a Source and Symbol of Stress* review the increasing volume of email and other technological communications that are regarded as a growing source of stress in people's lives. Research suggests that this new media provides people additional flexibility and control by enabling them to communicate anywhere at any time. However, the authors' research builds theory that unravels this contradiction. Instead, email and other forms of communication led people to feel overwhelmed and unable to cope with the stress.

Objectives of the study

The objectives of the study are:

1. To outline the sources/causes of technostress among college teaching and non teaching staff working in Government Colleges, Private Colleges and Management Institutes.
2. To derive various factors required in techno stress creators.

Tarafdar, Tu, Ragu-Nathan, and Ragu-Nathan in their study identified into five main components and for checking the validity and reliability Factor Analysis and Cronbach's Alpha will be applied on the sample collected in our study.

Tarafdar, Tu, Ragu-Nathan, and Ragu-Nathan explains technostress as a problem of adaptation and inability to cope with technology. They have identified five components of technostress, which are:

Techno-overload: Techno overload describes that the use of technologies forces people to work more as well as faster. Employees feel overloaded when they are given more tasks then they can accomplish. They feel stressed when are instructed to work more rapidly and in rigid schedules. Employees encounter stress symptoms when they have to do more work than they can handle, and are forced to adapt to new technologies.

Techno-invasion: Techno invasion is a situation where employees are enforced to be constantly connected with technology irrespective of place and time. It becomes impossible for an employee to have privacy and their personal life is being invaded due to technology. The regular work-day is extended and office work is done at odd hours. It includes increase in workload due to complex technologies and lesser time to spend with family due to increased challenges. Further, employees had to be in touch with the superiors even during vacations and sometimes have to sacrifice their holidays to keep in touch with new technologies.

Techno-complexity: Techno complexity is a situation where employees to enhance their competence are forced to spend recourses in learning and development. Due to insufficient technical knowledge, they feel stressed while using technology. Some of them face difficulty in understanding and using technology and in sparing enough time to study and upgrade their technological skills. Some employees feel that fresher's are better versed with latest technology.

Techno-insecurity: Techno insecurity is a situation where people feel insecure about their jobs. They feel that other employees are well equipped with new tools and techniques. It is associated with situations where people feel threatened from other people who have a better technical knowledge. So, they have to constantly update the skills to avoid being replaced.

Techno-uncertainty: Techno uncertainty deals with a situation where users feel uncertain due to constant change in technology. There is a need to upgrade the technology frequently due to short life span of computer systems. Continuing changes and upgrades do not give people a chance to experience at a particular system. People find this stressful as their knowledge becomes outdated and they are required to update it very rapidly and often.

III. Problem Formulation

Universities all over the world are among the major organizations where Information and Communication Technologies are being used on a large. However, in spite of various benefits of Technology, it is also true that the adoption and utilization of technology have brought about a number of demands and challenges such as technostress and job burnout into workplace.

In the field of education the use of technology have been increasing. Nowadays after the trend of E learning in various universities academicians need to provide notes to students through internet and attendance and assessment are also made online in various colleges and universities. Further due to the change in teaching methods like teaching in smart classrooms they had to cope up with the technology. Non teaching staff had also to use lot of technology for which they had to spend long hours before computer and other technologies like mobiles, fax etc. So an attempt will be made to study the causes or factors of stress among teaching and non teaching staff working in colleges

IV. Research Methodology

4.1 RESEARCH PROBLEM

The research problem is to study all the aspects related to Techno stress and devise various coping strategies for the same for which statement of problem would be :-

- Causes of technostress among college professionals
- To check the reliability and validity of these factors
- To determine main factors causing techno stress using Factor Analysis

RESEARCH DESIGN

The research type will be **exploratory** research because the entire research is based on questionnaire and analysis. There will be detailed description in the research, so this will be descriptive design.

SAMPLING UNIT and SAMPLING SIZE

The sample for the present study would comprise of around 300 employees which comprise of 200 employees at Teaching level and 100 at Non teaching level. The participants would be selected using probability method i.e. **stratified sampling** technique, wherein the strata would be of only the Teaching

employees and Non teaching employees, and the selection of sufficient subjects would be done randomly from these stratums, which would be the exact representation of the population. The participants would be Teaching and Non Teaching staff working in Colleges and Management Institutes in Chandigarh Region.

DATA SOURCES:

The research plan can call for gathering secondary data as well as primary data. Secondary data consists of information that already exists somewhere having been collected for another purpose. It will be collected from books, magazines , Journals, periodicals and libraries. Information will also be collected through various websites Primary data consists of original information gathered for specific purpose. **.** To collect primary data the questionnaire will be developed to measure the level of techno stress, causes of techno stress and ways of coping techno stress..

In this study, to collect primary data the questionnaire will be developed to measure the level of techno stress, causes of techno stress and ways of coping techno stress among the Teaching and Non teaching staff working in Government colleges, Private colleges and Management Institutes. The five core questions will be measured by statements using seven 5 points of Likert Scale. The seven 5 points is explained below.

1 = Strongly Disagree
2 = Disagree
3 = Moderate
4 = Agree
5 = Strongly Agree

SAMPLING TECHNIQUE

In this study we specifically include the academic and Non Academic staff of Government colleges, Private colleges and Management Institutes in our research.

The hypothesis will be formed and tested using various methods like Cronbach's Alpha and Factor Analysis.

Reliability

Case Processing Summary

		N	%
Cases	Valid	298	99.3
	Excluded[a]	2	.7
	Total	300	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.798	21

Reliability is a technique of assessing the superiority of the measurement procedure used to collect data in a research. The results from a study are suitable if the measurement procedures applied in research are reliable. Cronbach's Alpha is the used to check the reliability of the data collected i.e. to check how closely the set of items are as a group. It is also termed as coefficient alpha, Hoyt method and KR-20.

It is denoted as alpha which is viewed as the expected correlation of two tests that is determined from the same construct. So, it is implicit that the average correlation of a set of items is an precise estimate of the average correlation of all items in a certain construct. It is the average covariance between pair if items, and the variance of the total score.

In our present study the reliability measure comes out to be 0.798 which is considered quite reliable as is greater than 0.7.

All these 21 items computed above are reduced to 5 main components :-

1. Techno Overload
2. Techno Invasion
3. Techno Complexity
4. Techno Insecurity
5. Techno Uncertainty

FACTOR ANALYSIS FOR DIMENSION REDUCTION

Factor Analysis for Techno stress Creators

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.791
Bartlett's Test of Sphericity	Approx. Chi-Square	437.028
	df	10
	Sig.	.000

Anti-image Matrices

		Techno_overload	Techno_invasion	Techno_complexity	Techno_insecurity	Techno_uncertainity
Anti-image Covariance	Techno overload	.532	-.269	-.064	-.080	-.073
	Techno invasion	-.269	.522	-.081	-.099	-.039
	Techno complexity	-.064	-.081	.642	-.221	-.108
	Techno insecurity	-.080	-.099	-.221	.615	-.097
	Techno uncertainty	-.073	-.039	-.108	-.097	.819
Anti-image Correlation	Techno overload	.753[a]	-.511	-.110	-.140	-.110
	Techno invasion	-.511	.751[a]	-.139	-.176	-.059
	Techno complexity	-.110	-.139	.817[a]	-.351	-.149
	Techno insecurity	-.140	-.176	-.351	.815[a]	-.136
	Techno uncertainity	-.110	-.059	-.149	-.136	.888[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

	Initial	Extraction
Techno overload	1.000	.626
Techno invasion	1.000	.636
Techno complexity	1.000	.556
Techno insecurity	1.000	.590
Techno uncertainty	1.000	.347

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.756	55.122	55.122	2.756	55.122	55.122
2	.769	15.371	70.493			
3	.664	13.282	83.776			
4	.463	9.268	93.044			
5	.348	6.956	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix

	Component
	1
Techno overload	.791
Techno invasion	.798
Techno complexity	.746
Techno insecurity	.768
Techno uncertainity	.589

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Tarafdar, Tu, Ragu-Nathan, and Ragu-Nathan described technostress as a problem of adaptation and inability to cope with or to get used to Technology. They have identified five components of technostress, which are: Techno Overload, Techno invasion, Techno Complexity, Techno Insecurity and Techno uncertainty. In the present research minor changes were made in the statements. Hence, Factor analysis was again applied and the results were as follows:

1. Sampling Adequacy:- For checking the sampling adequacy Kaiser Meyer Olkin Measure is applied. This measure varies between 0 and 1 and the values close to 1 are better. Suggested minimum value is 0.6. In the present study KMO measure was found to be 0.791 which is closer to 1 and better than suggested. So, we can say that sample was adequate.

2. Barlett Test Of Sphericity:- In this test, correlation matrix is an identity matrix in which all the diagonal elements are 1 and all off diagonal elements are 0 and we need to reject this null hypothesis at 1% level of significance. P value in the present study is 0.000 which is good and indicates that the correlations are not near zero.
3. Communalities: Communalities are the proportion of each variable's variance that can be explained by the factors denoted as h square or sum of squared factor loadings for the variables. In this study sum of squared factor loading are Techno overload (0.626), Techno invasion (0.636), Techno complexity (0.556), techno insecurity (0.590) and techno uncertainty (0.347).
4. Total variance explained: Initial eigenvalues are variance of the factors. In this we assume that each factor has variance 1 and the number of rows is the number of factors retained. We keep those principal components whose eigenvalues are more than 1. In the present study, principal component retained is 1.
5. Component Matrix: Component matrix contains the component loadings, which are the correlations between variables and the component. As these are correalations, so possible values ranges from -1 to 1 and the value less than 0.03 is meaningless. In this research all the values are more than 0.5. So, all the components are meaningful.

After applying Factor analysis, we found that the components identified by Tarafdar and Raghu Nathan were same as identified in our research. So, we will divide the components of techno stress creators into five heads: - Techno overload, Techno invasion , Techno complexity , techno insecurity and techno uncertainty.

V. Conclusion

Technology in education relies on encompassing both material objects, such as machines and networking hardware, and also broader aspects of education such as organizational systems, learning methodologies and techniques, and skills assessments. In higher education the use of technology has been becoming important. All the work is becoming online with the coming of the concept of e learning. Teachers are also required to maintain all the record and teach in smart class rooms with the advent of technology. With the more and more use of technology stress levels among the academicians has also increased which has lead to the necessity of the study of the symptoms of stress level and ways of coping it. So, the present research outlined the sources/causes of technostress among college teaching and non teaching staff working in Government Colleges, Private Colleges and Management Institutes and derives various factors required in techno stress creators. For Analysis and Interpretation, Cronbach's Alpha is applied for checking reliability and data reduction is done using Factor Analysis. Results revealed that the components identified by Tarafdar and Raghu Nathan were same as identified in our research. So, we will divide the components of techno stress creators into five heads: - Techno overload, Techno invasion, Techno complexity, techno insecurity and techno uncertainty. For reliability analysis**,** reliability measure comes out to be 0.798 which is considered quite reliable as is greater than 0.7.

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