Technostress Level of Teachers in Higher Education with Reference to Socio-Demographic Variables

Paper Submission: 10/11/2020, Date of Acceptance: 26/11/2020, Date of Publication: 27/11/2020

Abstract

The digital technologies of the 21st century have made tremendous contributions in simplifying our lives. At the same time, technology has added risk of physical, social and mental health problems. The present research study aimed to find out technostress among teachers in higher education. A questionnaire is used to measure the technostress on five dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. Teachers of central universities constitute the population of the study and a sample of 258 teachers was chosen by using multistage cluster sampling technique. The study found differences in the mean scores of technostress inhibitors and technostress creators among higher education teachers with respect to their age. A difference in the mean scores of technostress inhibitors among higher education teachers was observed on the basis of their designation. The results show that there are significant influences of age with respect to technostress inhibitors and technostress creators, significant influences of designation with respect to technostress inhibitors, and the relationship between technostress inhibitors and technostress creators. On the other hand, technostress has no impact on gender and designation with respect to technostress creators, subject stream, and year of teaching experience of higher education teachers.

Keywords: Technostress, Technostress creators, University Teachers, Higher Education

Introduction

The use and integration of technology for education is one of the primary focuses of the National Education Policy (NEP) 2020. The policy stresses the Digital India Campaign that is helping to transform the entire nation into a digitally empowered society and knowledge economy. Education and technology will play a symbiotic role to improve existing educational processes and outcomes (NEP, 2020). The higher education institutions worldwide are enthusiastically innovating learning and teaching via new information and communication technologies (ICT), for instance, implementing flipped classroom, advancing massive online open courses, and promoting technology-enhanced learning (Joo et al., 2016; Markowitz et al., 2018). ICT holds promise to improve learning and teaching and on the other hand, the demands for skills and knowledge from university teachers in higher education to effectively use ICT are likely to increase at the same time. Changes in learning and teaching processes, instructors' roles, teaching practices, and work requirements caused by the use of ICT impose increasing levels of stresses on university teachers, who are compelled to spend more time and effort to adapt to these changes (Jena, 2015; Syvanen et al., 2016).

The term "Technostress" was first coined by clinical psychologist, Craig Brod (1984) defined as "Technostress is a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner. It manifests itself in two distinct but related ways: in the struggle to accept computer technology and in the more specialized form of over identification with computer technology". Within the limited number of studies in this field, even few investigated the issue of technostress among university teachers in higher education, where constantly emerging ICT are transforming learning and teaching (Ortagus et al., 2018) and teachers are under great pressure to work faster or

Aarti Yadav

Assistant Professor, School of Education, Central University of Haryana, Mahendragarh, Haryana, India



Ataur Rahaman Research Scholar, School of Education, Central University of Haryana, Mahendragarh, Haryana, India

differently and to update their knowledge and skillets continually (Al-Fudail and Mellar, 2008; Jena, 2015).

According to studies such as Hwang and Cha, 2018; Marchiori et al., 2019 and Ragu-Nathan et al., 2008), the various factors causing technostress across different fields can be organized into five categories: techno-overload, techno-invasion, technocomplexity, techno-insecurity, and techno-uncertainty. In addition, technostress inhibitors have been proposed to counter the effects of technostress techtools facilitation.

Without proper understanding of technostress inhibitors and creators, it would be difficult to develop solutions to improve the effectiveness of technostress inhibitors and minimize the negative influence of technostress creators on university teachers. Therefore, this paper studies technostress and also examines the relationship between technostress inhibitors and technostress creators among teachers in higher education. Technostress creators are factors that create technology-related stress among higher education teachers. Technostress creators are further identified with the following five factors: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty in higher education (Ahmad and Amin, 2012). Tarafdar, Tu, and Ragu-Nathan (2007) described technostress as a problem of adaptation due to a person's inability to cope with or to get used to the technology. They identified five components of technostress as follows:

- 1. Techno-overload: A situation where technology (ICT) users are forced to work faster and longer.
- Techno-invasion: A situation where technology (ICT) users felt that they can be reached anytime or constantly "connected" which caused a blurring between work and personal contexts.
- Techno-complexity: A situation where technology (ICT) users feel that their skills are inadequate due to the complexity associated with the use of technology. As a consequence, they are forced to spend time and effort to learn and understand various aspects of technology.
- Techno-insecurity: A situation where technology (ICT) users feel threatened. They felt that they will lose their job either being replaced by the technology or by other people who are better in technology compared to them.
- Techno-uncertainty: A situation where technology (ICT) users feel uncertain and unsettled since technology is continuously changing with time.

Technostress inhibitors

Technostress inhibitors are factors that reduce the effects of technostress. The technostress inhibitors used in the present study are proficiency in using tech-tools like hardware, software, and webtools.

Review of related literature

This study attempts to explore the technostress creators and technostress inhibitors and relationship between technostress creators and technostress inhibitors of higher education teachers. Li & Wang (2020) studied on 312 university teachers in higher education. It was found that the relationships

among specific technostress inhibitors (literacy facilitation, technical support provision, and involvement facilitation) and creators (technooverload, techno-complexity, techno-insecurity, and techno-uncertainty) and their impacts on university teachers' work performance in higher education. The findings provide evidence-based support for policy makers and information and communication technology (ICT) providers in higher education. Efilti and Coklar (2019) studied teachers' technostress levels of 228 teachers at different school level in the academic year of 2016-2017. It was found that teachers had a medium level of technostress. Wang & Li (2019) studied technostress among 343 teachers in higher education from universities in China. It was found that university requirements related to the use of ICT and the suitability of ICT for university teachers' work were critical factors affecting their job performance. Coklar, Efilti & Sahin (2017) developed a Likert-type scale called as "Teachers' Technostress Levels Defining Scale (TTLDS)" intended for defining teachers' technostress levels. The data were collected from 395 teachers. Validity and reliability studies resulted in a 28 item, five factor ("Learning Teaching Process Oriented", "Profession Oriented", "Technical Issue Oriented," "Personal Oriented," and "Social Oriented") scale. For reliability coefficients, Cronbach Alpha was calculated as 0.917, and Spearman Brown was calculated as 0.845. Krishnan (2017) examined the individual differences in 'technostress creators of 322 full-time employees in India through online survey. The findings of the study contributed to the knowledge base of technostress by understanding the linkages of personality and culture with technostress creators. Coklar, Efilti, Sahin & Akcay (2016) studied technostress levels of 370 teachers who were included in technology integration processes. The findings obtained in the research, general technostress 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 technostress, and low level profession oriented and personal oriented technostress. Jena & Mahanti (2014) studied technostress among 116 academicians in various universities and colleges across India using an online questionnaire. Researchers have identified five components of technostress, which are: technooverload, techno-invasion, techno-complexity, technoinsecurity, and techno-uncertainty. The study concluded that technostress has significant effect on gender, age, technology awareness and tenure of academicians.

The present COVID-19 situation has increased dependency of educational institutions on technology and therefore; a study to understand the technostress among teachers will present current situation of stress caused by use of technology and will also reveal the factors causing technostress. In this regard, the researcher was interested to study the technostress of teachers in Indian conditions. So, the researcher decided to study the technostress among teachers in higher education. The study was conducted in the Central Universities established in

2009 under the Central Universities Act, 2009 which is perhaps the first in this regard. Knowing the current technostress situation of higher education teachers will be beneficial for the teachers and other stakeholders to take necessary steps for further improvement.

Objectives of the study

The objectives of the study are as follows:

- 1. To study technostress inhibitors among higher education teachers with respect to sociodemographic variables.
- To study technostress creators among higher education teachers with respect to sociodemographic variables.
- 3. To study relationship between technostress inhibitors and technostress creators among higher education teachers.

Hypotheses of the study

Hypotheses of the study formulated based on the objectives of the study as follows:

- Ho1. There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their gender.
- Ho2. There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their age.
- Ho3. There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their designation.
- Ho4. There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their subject stream.
- Ho5. There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their year of teaching experience.
- Ho6 There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their gender.
- Ho7. There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their age.
- Ho8. There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their designation.
- Ho9. There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their subject stream.
- Ho10. There is no significant difference in the mean scores of technostress creators among higher udecation teachers with respect to their year of teaching experience.
- Ho11. There is no significant relationship between technostress inhibitors and technostress creators among higher education teachers.

Methodology of the study

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The researchers adopted survey research design for conducting the study. The study intended to find out technostress among higher education teachers of central universities established in 2009 under the Central Universities Act, 2009. A selfconstructed questionnaire was used for the purpose of data collection. The questionnaire was developed by researchers on the basis of available literature on the topic, and designed according to the objectives of the study. The next step was to adopted an appropriate sampling technique for deriving sample from population. Later, structured questionnaire is share/distributed among higher education teachers of central universities. The data so collected was analyzed, tabulated and was tested statistically by using appropriate statistical tests for testing the formulated hypotheses of the study for accepting or rejecting of null hypotheses. The data was scored by the researchers and analyzed through SPSS-22 software.

Population of the study

In this study, all higher education teachers teaching in the central universities established in 2009 under the Central Universities Act, 2009 are considered as population.

Sample of the study

The sampling method used for the study is two-stage cluster sampling technique. In the first stage, the researchers selected three clusters by simple random sampling (Ahmed, 2009). The selected clusters were: Central University of Kerala, Central University of Punjab and Central University of Haryana. Thereafter, the researchers collected email of teachers of selected clusters from their University websites. The Central Universities chosen in the firststage of cluster sampling were again sampled in the second-stage using simple random sampling (see Ahmed, 2009). The researchers randomly selected 306 teachers from the selected three universities and sent them an online questionnaire (Google form) on their emails. Finally, the researchers received replies from 258 higher education teachers who filled the complete questionnaire. They represented all the selected independent variables namely gender, age, designation, subject stream, and teaching experience. **Statistical Techniques**

The researchers used descriptive and inferential statistical techniques for the present study. The data was analyzed through percentage, mean, standard deviation, t-test, ANOVA and relationship between technostress inhibitors and technostress creators. The results of the study are discussed as under.

Data analysis and interpretation Objective- 1

To study technostress inhibitors among higher education teachers with respect to sociodemographic variables.

Null hypothesis- 1

There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their gender.

P: ISSN No. 2231-0045

E: ISSN No. 2349-9435

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Table - 1

Difference in the mean scores of technostress inhibitors among higher education teachers with respect to their gender

Gender	Ν	Mean	SD	df	ʻt' value	ʻp' value	Remarks at 0.05 level
Male	155	47.61	11.347	256	1 725	0.086	Not Significant
Female	103	45.11	11.481	200	1.725	0.000	Not olymnoant

The above table clearly shows that the calculated 't' value (t = 1.725, p = 0.086) of male and female teachers in higher education is not significant at 0.05 confidence level. So, the results fail to reject the null hypothesis. It can be said that there is no significant difference in the mean scores of

technostress inhibitors between male and female teachers in higher education.

Null hypothesis- 2

There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their age.

Table - 2

Difference in the mean scores of technostress inhibitors among higher education teachers with respect to their age

Source of Variation	Sum of squares	df	Mean square	'F' value	'p' value
Between Groups	2731.65	2	1365.825	11 261	0.00
Within Groups	30927.81	255	121.286	11.201	0.00
Total 33659.46		Significa	ant at 0.05 level		

It is clear from the above table that the calculated F value (F = 11.261, p = 0.00) of higher education teachers with respect to their age is significant at 0.05 confidence level. Therefore, the null hypothesis is rejected. Hence there exists a significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their age. Thus, the higher education

teachers mean scores of technostress inhibitors levels do differ with respect to their age what was divided by the researcher in three groups on the basis of ages i.e. below 35 years, 35-50 years, and above 50 years. **Null hypothesis - 3**

There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their designation.

Table - 3

Difference in the mean scores of technostress inhibitors among higher education teachers with respect to their designation

Source of Variation	Sum of squares	df	Mean squares	'F' value	ʻp' value
Between Groups	898.946	2	449.473	2 400	032
Within Groups	32760.516	255	128.473	3.499	.032
Total	33659.461	Significant at 0.05 level			

It is clear from the above table that the calculated F value (F = 3.499, p = 0.032) of higher education teachers with respect to their designation is significant at 0.05 confidence level. Therefore, the null hypothesis is rejected. Hence there exists a significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their designation. Thus, the higher education teachers mean scores of technostress inhibitors levels do differ with respect to their

designation who were divided by the researcher in three groups on the basis of designation i.e. professors, associate professors, and assistant professors.

Null hypothesis- 4

There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their subject stream.



Difference in the mean scores of technostress inhibitors among higher education teachers with respect to their subject stream

Subject Stream	Ν	Mean	SD	df	ʻt' value	ʻp' value	Remarks at 0.05 level
Arts	146	46.20	11.776	256	- 656	512	Not Significant
Science	112	47.14	11.026	200	.000	.012	Not Olgrinourit

The above table shows that the calculated 't' value (t = -.656, p = 0.512) of arts and science teachers in higher education is not significant at 0.05 confidence level. So, the results fail to reject the null hypothesis, and it can be said that there is no significant difference in the mean scores of

technostress inhibitors between arts and science teachers in higher education.

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Null hypothesis- 5

There is no significant difference in the mean scores of technostress inhibitors among higher education teachers with respect to their year of teaching experience

Table - 5

Difference in the mean scores of technostress inhibitors among higher education teachers with respect to their year of teaching experience

	and your of tonoring experience							
Ex	perience	Ν	Mean	SD	df	't' value	'p' value	Remarks at 0.05 level
Be	low 5 years	85	48.08	11.170	256	1 452	147	Not Significant
Ab	ove 5 years	173	45.88	11.540	200	1.400	.147	Not Significant
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The above table clearly shows that the calculated 't' value (t = 1.453, p = 0.147) of below 5 years and above 5 years experience teachers in higher education is not significant at 0.05 confidence level. So, the results fail to reject the null hypothesis, and it can be said that there is no significant difference in the mean scores of technostress inhibitors between below 5 years and above 5 years experience teachers in higher education.

Objective-2

To study the technostress creators among higher education teachers with respect to sociodemographic variables.

Null hypothesis- 6

There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their gender

Table - 6

Difference in the mean scores of technostress creators among higher education teachers with respect to their gender

Gender	N	Mean	SD	df	ʻt' value	ʻp' value	Remarks at 0.05 level
Male	155	80.09	26.990	253.200	1.150	.251	Not Significant
Female	103	76.73	19.898				C C

The above table clearly shows that the calculated 't' value (t = 1.150, p = 0.251) of male and female teachers in higher education is not significant at 0.05 confidence level. So, the results fail to reject the null hypothesis, and it can be said that there is no significant difference in the mean scores of

technostress creators between male and female teachers in higher education.

Null hypothesis- 7

There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their age.

Table - 7

Difference in the mean scores of technostress creators among higher education teachers with respect to their age

Source of Variation	Sum of squares	df	Mean square	'F' Value	'p' value
Between Groups	10026.364	2	5013.182	0.005	0.00
Within Groups	143238.260	255	561.719	0.925	0.00
Total	153264.624	Significant at 0.05 level			

It is clear from the above table that the calculated F value (F = 8.925, p = 0.00) of higher education teachers with respect to their age is significant at 0.05 confidence level. Therefore, the null hypothesis is rejected. Hence there exists a significant difference in the mean scores of technostress creators among higher education teachers with respect to their age. Thus, the higher education teachers mean scores of technostress

creators levels do differ with respect to their age what was divided by the researcher in three groups on the basis of ages i.e. below 35 years, 35-50 years, and above 50 years.

Null hypothesis- 8

There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their designation.

Table - 8

Difference on the mean scores of technostress creators among higher education teachers with respect to their designation

Source of Variation	Sum of squares	df	Mean square	'F' Value	'p' value
Between Groups	1414.843	2	707.422	1 1 0 0	207
Within Groups	151849.781	255	595.489	1.188	.307
Total	153264.624	Not Signifi	cant at 0.05 level		

The above table shows that the calculated F value (F = 1.188, p = 0.307) is not significant at 0.05 confidence level. Therefore, the results fail to reject the null hypothesis. Hence there is no significant difference on the mean scores of technostress creators among higher education teachers with respect to their designation. Thus, the higher education teachers mean scores of technostress creators levels do not differ with respect to their

designation who were categorised by the researcher in three groups on the basis of designation i.e. professors, associate professors, and assistant professors.

Periodic Research

Null hypothesis- 9

There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their subject stream.

Table - 9

Difference in the mean scores of technostress creators among higher education teachers with respect to their subject stream

Subject Stream	Ν	Mean	SD	df	ʻt' value	ʻp' value	Remarks at 0.05 level
Arts	146	80.27	24.387	256	1 1/17	253	Not
Science	112	76.76	24.430	230	1.147	.255	Significant

The above table clearly shows that the calculated 't' value (t = 1.147, p = 0.253) of arts and science teachers in higher education is not significant at 0.05 confidence level. So, the results fail to reject the null hypothesis. It can be said that there is no significant difference in the mean scores of

technostress creators between arts and science teachers' in higher education.

Null hypothesis -10

There is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their year of teaching experience.

Difference in the mean scores of technostress creators among higher education teachers with respect to their year of experience

Experience	N	Mean	SD	df	ʻt' value	ʻp' value	Remarks at 0.05 level
Below 5 years	85	82.27	21.589	256	1 620	104	Not
Above 5 years	173	77.02	25.579	250	1.023	.104	Significant

The above table clearly shows that the calculated 't' value (t = 1.629, p = 0.104) of below 5 years and above 5 years experience teachers in higher education is not significant at 0.05 confidence level. So, the results fail to reject the null hypothesis. It can be said that there is no significant difference in the mean scores of technostress creators between below 5 years and above 5 years experience teachers' in higher education.

Objective- 3

To study the relationship between technostress inhibitors and technostress creators among higher education teachers.

Null hypothesis- 11

There is no significant relationship between technostress inhibitors and technostress creators among higher education teachers.

Table - 1	1
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Relationship between technostress inhibitors and technostress creators among higher education teachers

Variable	Ν	r	df	'p' value	Remarks at 0.05 level
Technostress inhibitors	258	.379**	256	.000	Significant
Technostress creators	258	.379			

**Correlation is significant at the 0.01 level (2tailed)

The above table shows that there is a significant low positive relationship between technostress inhibitors and technostress creators. Since the value of p = .000 < .01 that is less than the significance level $\alpha = 0.01$ or 0.5, so the null hypothesis is rejected.

It can be said that there is a low positive relationship between technostress inhibitors and technostress creators among higher education teachers.

Findings of the study

The study attempted to find the technostress among higher education teachers. From the above results, it is found that technostress among higher education teachers didn't vary by gender. According to the results from the study of Coklar, Efilti, Sahin, and Akcay (2016), technostress levels of teachers' didn't vary by gender, and the female and male teachers had similar and medium level technostress. Some of these studies reported contradictory results such as Shepherd (2004) and Tarafdar et al. (2011) reported that gender had a significant effect on technostress, while some others (Wang, Shu & Tu, 2008) reported that it didn't Ragu-Nathan et al. (2008) found that females experienced technostress more than males. Jena and Mahanti (2014) reported that gender has a major influence on technostress i.e. men academicians experience more technostress than women academicians. There is a significant difference in the mean scores of technostress inhibitors and technostress creators among higher education teachers with respect to their age. The teachers in the age group of below 35 scores more in technostress inhibitors and in technostress creators in

comparison to other categories 35-50 and above 50. The above statement shows that the more usage of technology (technostress inhibitors) by teachers of age group below 35 doesn't help in reducing their technostress creators score. The scores of below 35 age group scores are highest in both technostress creators and technostress inhibitors.

This clearly shows that inhibitors (usage of technology) of technostress are not helpful in reducing creation of technostress (techno-overload, technoinvasion, techno-complexity, techno-insecurity, and techno-uncertainty). This study also shows that there is significant difference in the mean scores of technostress inhibitors among higher education teachers based on their designation. On the other hand, there is no significant difference in the mean scores of technostress creators among higher education teachers with respect to their designation. The study shows that there is no significant difference in the mean scores of technostress inhibitors as well as in technostress creators among higher education teachers with respect to their teaching subject and year of teaching experience. Another finding of the present research shows that there is a low positive relationship between technostress creators and technostress inhibitors. It shows that technostress inhibitors and technostress creators are weakly related and it can further be interpreted that more usage of technology has poor contribution in reducing technostress creators.

Conclusions

The presumption of training teachers in usage of technology for reducing their techno stress is not supported in the present study. Teachers' proficiency in using technology for their better functioning doesn't contribute in reducing their stress related to technology which is measured. This clearly indicates that the educational institutions have to introduce new measures besides providing techno training to work upon the technostress among teachers. There is a need to frame clear guidelines regarding the use of technology for teaching, security in using technology, time restrictions for using technology to contact teachers for official work. It is further necessary to provide training to administrators, heads of departments to strictly adhere to the guidelines. The technology should not trespass the work life balance of teachers. The present research opens a platform for discussion on technostress which is emerging as a new challenge due to the steep increase in use of technology during COVID. Given the fast changing ICT trend and an increasingly faster paced stressful work environment, it seems reasonable to develop effective techno-usageguidelines; training and wellness programs to decrease higher education teachers' technostress. It is also suggested to conduct further research in the the role of factors understanding creating technostress and the suitable measures to reduce it. References

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