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A Contrastive Analysis into the prevalence of Technology induced Stress among students in academic domain.

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Abstract

Technology related stress is quite prominent phenomenon. Various reports and literatures have chronicled issues related to stress and its relationship with technology. Psycho-somatic discomforts like feelings of anxiety, depression, perplexity burnout, blood pressure issues, headaches and nerve related problem are some of the common problems. Intervention of technology in academics have brought about sea change. In a study conducted by Upadhyaya and Vrinda (2021) reported the unregulated use of digital devices in academics by students. In higher education. Overindulgence in technology by students have become a matter of concern dure various detrimental effect among students. Academic performance was found to deteriorate due to stress induced by technology.**Objective**: This study was an endeavour to find out presence of stress induced by technology or Technostress among students at the tertiary level of education. Additionally, existence of significant difference across certain demographic attributes was also another objective set for the study.**Hypotheses:** Null hypotheses were constructed as per the objectives undertaken in the study. **Research Design:** Descriptive survey type research design was adopted for carrying out the study. **Participants or sample**: The undergraduate students from tertiary level of education were the participants. **Sample size**: The number of participants randomly chosen for participating in the survey was One hundred and twenty-one (n=121). **Analysis**: As per requirement and suitability descriptive and Inferential statistics were implemented. **Tools and Instruments**: Standardised tool/ questionnaire on 'stress due to technology' was used. **Result:** The result outcome in the study showed results that were statistically tested. Result outcome helped to understand the scenario in academics students face due to use of technology and prevalence of stress induced by technology.

Keywords: Technostress, undergraduates, academics.

Introduction

Ever since the outbreak of the pandemic due to Covid-19 every sector across the globe has been facing inevitable difficulties. Sectors especially like health, medicine, transportation have been tremendously affected. In this context 'Education' is another worst hit sector. Even though much struggle and endeavour have been put in to uphold the right standards of education at primary, secondary and tertiary level through the usage of ICT (Information Communication Technology). Too much emphasis on technology has taken toll on mental, emotional and physical well-being of students. Students have faced enough scourge due to sudden intervention of ICT and digital devices for education. Virtual platforms and faceless communication between teachers and students in academia did create distress. Besides, academic performance and academic satisfaction have also been found to be affected. Immoderate dependency on technology was found to be in sheer vogue among students for academic purpose. The prolonged use of computers, mobile phones and other similar devices was found to create technostress among the students. The term technostress was first found in Craig Brod's book (Brod, 1984) titled *Technostress: The Human Cost of the Computer Revolution*. The term describes to one's inability to cope with technology that results in distress. Technostress was found among millions of people across the world but students who were somewhat compelled to study and appear for exams on online mode were found to report of stress and anxiety. The technostress was found to create negative life valence. Despite the adverse effect of technology KarrWisniewski& Lu (2010) had opined technology as an 'Organisational actor' rather than being just a simple resource; workers wholly depended on it to reach set goals, perform varied tasks, renew work patterns and form works maps and overall helped one to be more competitive. Even though, we are gradually heading towards offline methods of conducting classes and imparting lesson, ICT use will undoubtedly remain in extensive use. The blended method of teaching learning transaction will support both the offline methods online mode for proper academic and administrative functioning.The present study undertaken would delve into certain aspects of technostress effects and expound on the factors that hinders performance satisfaction among undergraduate students due to stress and anxiety caused by technology.

The present study holds immense important and interdisciplinary relevance. As per the title of the research problem has been framed, it evidently reflects the interconnected of various area like physiology, psychology and socio- demographic aspects. As the study progresses various other fields like pedagogic science, information and communication technology (ICT) and as sociological (socio- cultural and socio-economic) perspective will be covered. The study will help us understanding the problems or the benefits of technology use in academics and unfurl the pros and cons of blended learning methods.

Review

A study conducted in Spain by Risco et al, (2021) that stress due to extensive use of technology deteriorated the health conditions of students. It affected their concentration level, created anxiety and led to poor attention in academics. Even though academics asserts use of technology in forms of ICT devices, the effect of it is detrimental. As mentioned earlier during and post COVID era, use of technology in various field especially in academics prevailed extensively and intensively. Longer time of smartphones usage or using social-networking service usage passively caused internet addiction and psychological stress in among Japanese students (Goto et al., 2020). Communication and social overload were found among adolescents and adults were stress due to technology. Cases where usage of smartphones and laptops were mandatory exhibit instances of irritability, anxiety and panic. Stress due to overs use of technology led to immense mental and physical exhaustion(Mejia&Marc. A, 2021). Heightened technostress was found among university students. The technology dependence had detrimental effects on psychosomatic aspects of students. Prolong use of digital / devices/gadgets was found to be counterproductive (Ebeheakey et al., 2021). Another study divulged the fact that stress occurred more among students at the higher education level rather than the students studying at the primary or secondary level of education. ICT use is academics was found to be helpful but entails various hazardous aftermath. High stress due to high technology incorporation in work produceddamaging consequences. It not only triggered health problems, it generated apathy towards work (Wang& Bo Li, 2014). A gender-based study reported that too much of technology use, especially for entertainment and academic purpose created Habit of skipping breakfast, mental health morbidity, deficient social support; and neurotic personality characteristics were profoundly found among male students. An investigation into technology use conducted by Upadhyay and Acharya (2021) came up with the fact that the impact of technostress on the academic productivity of students was fatal. Students experienced high levels of technostress. In the same line, Technostress and stress due to digital gadgets use had a negative impact on the academic productivity of students. To some extent evaluation saturation led to pathological conditions. Headaches, nausea, migraine, burnout and cognitive fatigue were certain were conspicuous manifestation of stress (Upadyaya&Vrinda, 2020). Excessive use of technology affected various personal and social aspects of an individual's life adversely. The inability to cope up with technological advancement also created stress among professionals and non-professionals. The kind of generation we are lining in, where life comes standstill without the help of digital gadgets even in the kitchen and living room, academics is an unpreventable domain where technology and use of digital gadgets are sine qua non.

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There have been several other overseas and Indian studies on technostress among students. Additionally, various kinds of factors / variable also have been worked on. The innumerable study projects that technostress is a worldwide problem, where students are one of the vulnerable sufferers. Active and extensive use of technology either for social communication or academic purpose has proven to be detrimental to health. Therefore, it is important to further investigate every possible variable that could be associated to with technostress. Intensive researchers need to be conducted to see the minute details that could be used as a tool to combat technostress. Hence, the present study significantly strives to delve into the factors and measures and evaluates variables that could be contributing factors of technostress among students. It is important to find out the significant level of the correlated factors that catapults technostress and affects academic performance, academic satisfaction as well as psychological and physiological well -being.

The objectives of the study are as follows:

1. To find out prevalence of technology induced stress or Technostress among Undergraduates from various stream of formal education (Science and Social science).
2. To find out significant difference among Undergraduates in reference to their schooling background (Public and Private schools)
3. To find out significant difference among Undergraduates in reference to their gadget possession status andtechnology induced stress or Technostress (Students have personal access to like Desktop, Laptop, Tablets and Smart phone).
4. To find out significant difference among Undergraduates in reference to their stream of Study and technology induced stressor Technostress (Science, Commerce and Social Science).

Hypotheses

Null hypotheses were framed as:

Stress induced due to technology will be functionally used as '*Technostress*' henceforth.

$H_0$1: There is no prevalence of Technostress among the Undergraduates.

$H_0$2: To find out significant difference among Undergraduates in reference to their schooling background and Technostress (Public and Private schools.)

$H_0$3: To find out significant difference among Undergraduates in reference to their digital device possession status and Technostress (Undergraduates who have and Undergraduates who do not have personal access to digital gadgets like Desktop, Laptop, Tablets and Smart phone)

$H_0$4: The is no significant difference among Undergraduates in relation to their stream of study and Technostress (Science, Commerce and Social Science).

Hypothetical inferences would have been indecorous. Therefore, a pilot study followed by thorough survey was executed. The following sections of 'Method' and 'Result' would provide the elaboration of the study conduction and conclusion.

Method

The study was executed in the manner of a descriptive survey study.In the opinion of Kraemer (1991),survey research quantitatively describes the specific aspects of a given population. This kind ofresearch design unleashes a scope to collect data directly from the people or the target population. It has a subjective outlook. This kind of study helps to understand people's opinion about a particular object or phenomenon. Additionally providing scope toanalyse the participants' mind set regarding the same. Hence, helping to establish a generalisationabout the population too. As per McIntyre (1999) survey research also assists in gathering informationon demographic data which otherwise would be difficult to predict via mere observation or assumption.

Functional Definition

- **Technostress:** This term was used in this study to refer stress induced due to technology. According to Salim, Malik and Chikhaoui (2024) "Technostress is a term used to describe the negative psychological and physiological impacts that individuals may experience because of their use of technology, including digital devices and online platforms. Technostress can affect students' cognitive processes, including attention, memory, and learning ability."
- **Schooling Background:** In this study this variable refers to the type of schooling one received before joining college/undergraduate course of study. Here, Private Schools and Public or Government schools have been considered.
- **Status of Digital Device possession:** Here, this variable refers to students who has access and owns gadgets or digital devices like smart phones, laptops, personal computers and tablets. In this study, two categories of Undergraduate students have been identified i.e. The ones who have their own digital devices/gadgets and accessibility to digital devise/gadgets and the other group pf Undergraduates who do not have access and do not possess any digital device or gadget.
- **Stream of Study:** This variable refers to the undergraduate stream of course at the tertiary level for formal education which a student is pursuing. Three streams of study i.e. Science, Commerce and Social Science were taken under purview in this study.

Sample and Data collection

The sample of the study consisted of participants studying at the tertiary level of education in different colleges of the Southern districts of West Bengal. The participants were the Undergraduates taking formal education in different streams (Science; Commerce, Social Science). The sample size was kept to one hundred and twenty-one (n=121).

Data was collected through random sampling method with the help of standardised questionnaires. The ethical rules were followed beforeadministering the instruments to the participants.

Tools

A standardised questionnaire was used to pool data from the participants. The tool was constructed by Wang, X., Tan, S. C., & Li, L. (2020) which fundamentallymeasured university students' technostress (Stress induced due to technology) in technology-enhanced learning. The scale consisted of eight items. The latent traits that the scale measured were *Abilities and Demand Misfit* that created stress among the University students and second was the *Needs supply Misfit*. The scale was overall and Unidimensional scale, and all the 8 items demonstrated robust psychometric properties. Even though the scale had high internal consistency and validity, Cronbach Alpha was again applied to test the reliability of the scale because it was once again applied on different sample population. The reliability value was as high as 0.87.The tool had two parts specifically named as Part A and Part B. Part A consisted of questions related to demographics and Part B consisted of the standardised tool on technostress.

Variables

The variables in this study are provided in the table below:

Table1: Details of Variables

Dependent Variables	
Stress due to technology or Technostress (TS)	This detects both constructs i.e. Ability and Demand; Need and Supply related stress caused due to technology.
Independent variable	
Stream of Education	Science Commerce Social Science
Schooling Background	Public School Private School
Gadget possession status	One owns Personal Computer, Tablet, smart phone One does not own Personal Computer, Tablet, smart phone.

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Delimitation: The study was conducted with certain delimitations. The sample size was restricted to a certain number of participants.Certain colleges situated in south of West Bengal was taken under the purview. Many other demographic and dependent variable could also have be taken.

Result and Analysis: The tables below explain the statistical outcomes.

Table 2: Normality of the Distribution

Statistics implied	Explanation
Kolmogorov Smirnov test	The distribution was found to be **normal** as because the significance value was more than 0.05 (p>0.05) here 'p' value was 0.054. Therefore, parametric test was implied.

Table 3: Result outcome of Significant Differences outcome among variables.

Variables		N	Mean	SD	t-test	Sig
Background of Schooling	• Public Schooling	68	0.398	0.129	3.814*	0.010
	• Private Schooling	53	0.320	0.084		
Status of Personal Digital device possession	• One owns Personal Computer, Tablet, smart phone	63	0.387	0.133	2.296*	0.024
	• One does not own Personal Computer, Tablet, smart phone	58	0.339	0.948		
Stream of Undergraduate course	• Science	33	0.402	0.143	3.556*	0.032
	• Commerce	42	0.371	0.120		
	• Social Science	46	0.331	0.086		

* Significant at 0.05 level

Table 3 demonstrates there is presence of significant difference among Undergraduates in relation to technostress. In terms of schooling background Undergraduates with private schooling and Undergraduates with public or government schooling background shows marked difference, where $p < 0.05$ level of significance. The same is displayed in case of Undergraduates with status of personal digital device possession.

In terms of stream of Undergraduate course of study, since there were three different group means , the Student-Newman-Keuls (SNK) test was applied. This post-hoc procedure was implied after ANOVA to identify which specific sample means differ. The test helped to detect the significant differences between pairs. Table 4 shows the differences between pairs.

Table 4: Comparison of all Pairs of Means via Student-Newman-Keuls (SNK) test

Stream of Undergraduate Course	N	Subset for Alpha = 0.05	
		1	2
Science	33	0.331	
Commerce	42	0.370	0.370
Social Science	46		0.401
p		0.041	0.036

Table 4 clearly shows that significant differences in-between pairs exist. There is difference between Science and Commerce Undergraduates in terms of technostress, where $p < 0.05$ level of significance ($p=0.041$), in same manner Commerce and Social Science Undergraduates show difference in technostress because p ,0.05 level of significance ($p=0.036$).

Interpretation

An investigation on technology induced stress projected that information overload and technology related abilities was found to be robust source of stress among students even at the tertiary level of education. Learning dissatisfaction was high among students who suffered from technostress.Online learning also produced stress among university students Conrad et al. (2022) . Students were also found to be unsatisfied with virtual class room teaching and learning (Zia et al.,2023). Especially in case of practical training, skill training and clinical practices virtual classroom teaching was an impediment for proper learning experiences.A study reported thatpeople who experienced technostress faced difficulty in processing information, suffered from lack of concentrate, and diminished information retention capacity. This had negative effect on their work performance negatively impacting their overall performance (Tarafdar et al., 2015).

College students were found to suffer high anxiety and depression due to technostress. A similar study showed that adaptability to new technology and skill acquisition often created stress among students (Torales et al., 2022).It was also found that technostress was significantly associated with adverse psychophysical effects on college students. High stress due to technology was directly linked to low academic achievement along with reduced quality of learning.

In support to the result outcome of the present study significant differences among students from different stream of studyan investigation reported that students in the social sciences experienced higher levels of 'techno-complexity' compared to students of counterparts in engineering and natural sciences (Wang, X et.al, 2021).According to another studyconducted by Hill (2016) social science students exhibited more stress due to technology than science and engineering students. A study in during the COVID-19 periodWang et al., (2020) examined significant presence of technostress among engineering and humanity students.However, a study outcome showed that engineering students suffered from more technology induced stress because of new lesson learning and skill acquisition. Even though social science students did use technology extensively but more communication purpose unlike science students for whom it was a compulsion(Saleem F, Chikhaoui E, and Malik MI,2024).

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
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Table 5: Final conclusion on Hypotheses

Hypothesis	Status of Hypothesis Acceptance	Explanation
H_01: There is no prevalence of Technostress among the Undergraduates.	*Not Accepted*	Kolmogorov Smirnov test proved normal data distribution.
H_02: To find out significant difference among Undergraduates in reference to their schooling background and Technostress.	*Not accepted*	t-test and ANOVA showed significant difference among groups at 0.05 level of significance
H_03: To find out significant difference among Undergraduates in reference to their digital device possession status and Technostress	*Not accepted*	
H_04: The is no significant difference among Undergraduates in relation to their stream of study and Technostress.	*Not accepted*	

Discussion

Stress due to technology quite a relatable phenomenon. Research in the field of technology and its advancement have impacted everyone across the globe. Apart from academic purpose digital devices supported by internet connection are extensively used by individuals. Sometimes excessive dependency on technology and digital devices produces unfavourable outcomes. Addiction to gadgets and technological devices have led to behavioural disorders. Uncontrollable Dependency and inability to withdraw from the uses of digital gadgets have various behavioural adverse manifestation. Terms like 'Nomophobia' and 'Scrolling Syndrome' have become quite prevalent.Moreover,life impairment tendencies like ignoring work, personal relation and physical social networking is taking place due to digital device addiction. From the perspective of students and their academic life, teaching - learning has now become a process much dependent on digital devices and internet accessibility. Availability of study materials, online assessment tools including rubrics and other forms of online academic activities have escalated. The quality of good interactive education has made teaching-learning affair much more engaging.

In reference to this present study, the result outcome projected significant differences among various variable groups. This leaves rooms for further research and grounds for analysis or reflection. The existence of differences set off causes for further investigation contemplation on issues faced by students. Technology and its use are undeniably and integral part of teaching-learning but its stress causing aspect is debilitating for the well-being of students. Therefore, measures to help students combat with stress induced due to technology has to be designed and implemented.

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