

Original Research Article

Relationship between Techno stress and Academic Performance of University Students

Abstract

A modern adaption disorder called techno stress is described as being caused by inability to use modern computer technologies. The aim of the study is to determine the relationship between techno stress and academic achievement of university students of Gangadhar Meher University, Sambalpur. Descriptive correlation method was adopted for this study. The sample consists of 273 post-graduation students selected through stratified purposive sampling. The data was collected through techno stress scale developed by Upadhya & Vrinda(2021). The obtained data were analyzed through mean, standard deviation, t-test, & correlation. The results revealed that there is a negative relationship between techno stress & academic achievement of university students. It is also found that there is no significant difference between techno stress between boys & girls.

Introduction

Technology has revolutionized many aspects of contemporary society, including communication, transportation, education, health care and many more. It has also altered the way we live our daily lives & increased our quality of life. More, we can assert that technology has improved global connectivity & brought people together. Technology has a huge impact on every aspect of life, but it is most noticeable in education. It has significantly altered how students & teacher interact during the teaching & learning process. The more frequent usage of modern education has been significantly impacted by Information & Communication technology (Higgins, Xiao & Katipatari 2012; Henderson et al. 2015). University around the world have advanced with highly developed Information & Communication technology, such as those that support online learning, blended learning, & flip classroom (Wang & Li, 2019).

For professor as well as students using information and communication technology is no longer optional but a need. Almost all state and central college's already use the zoom & google meet platform to provide online lectures material, accept assignment & acquire document & hold online exam. But when stakeholders cannot keep up with modern technologies', they become anxious & it interferes with their daily lives. It is known as techno stress. The term "techno

stress” which also refers to psychological & emotional response, has been coined to describe mental stress associated to technology.

Academic success is one of the most important results in the setting of universities according to Ortega Maldonado&Salvano(2018). The educational objective to be attained is academic performance by a student, teacher or institution over a predetermined length of time is evaluated (Narad&Abdullha, 2016). According to previous studies (Nonsida, Adam et al. 2010, Praveeni&Heirath 2020), there are several variable’s that can affect academic performance, including gender, marital status, learning skill, home surrounding & academic stress. Techno stress is another factor that has a deter mental effect on academic performance (Upadhyia&Vrinda 2021). University students reportedly claimed that they are continually preoccupied with the remaining tasks after each presentation is in line with the current framework, according to Natrees et al, (2020). In additional to difficulties, pupils faced numerous difficulties with remote learning, such as poor internet connection, trouble accessing a device, difficulty with online exams,&faculty – students interaction may increase technologies stress / techno stress correlate with students academic achievement.

Techno stress: A double-edged Sword

Techno stress has been described as a “double -edge sword” by researcher. According to Qi (2019) techno stress can have both good & harmful effects on people & their organization. In 2019, Tarabdar et al. presented an updated information system design approach for techno stress& techno-distress. The framework considers both the positive & negative effects of technological stress. According toSchalchter et al. (2018) use of ICT makes a task more portable and accessible, which improves employee performance. Ayyagiri et al. (2001) discovered that constant connectivity to ICT speeds up work & as result, improve productivity & quality of life for each individual.

Techno stress on the other hand, is the negative side of technology use, Numerous studies have already examined the effect of techno stress on organization behavior & psychological stress (Iarafedar et al. 2011). According to Hung et al. techno stress, has negative effect on organization behavior, including employee productivity. Additionally, several researches have shown how techno stress might affect an employee’s psychological results, such as strain (Raghunathan et al. 2008). Other behavioral effects of techno stress include burnout (Mahapatra&Pati ,2008) & physical health effects include headaches, blood pressure & recurrent eye strain.

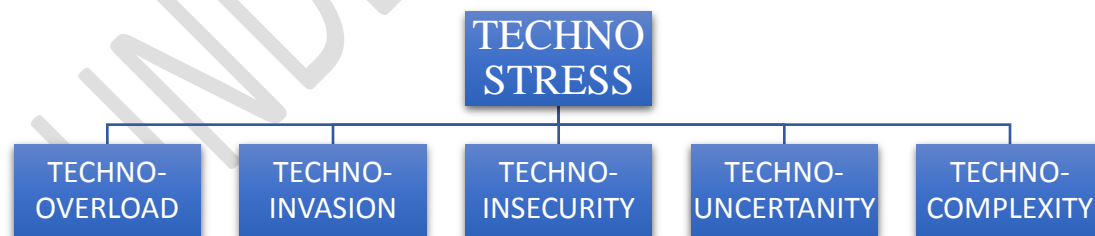
Samaha &Hawi (2016) discovered that there is a considerable negative influence of students addiction to mobile technology on their academic performance. Numerous studies on student have documented the beneficial impact of ICT on academic success. According to Qi (2019), the use of mobile devices improves student’s academic performance. According to Moris&Moris (2010), technology driven assessment in the classroom improves student’s academic achievement. According to Moris&Moris (2010), Technology driven evaluation in the classroom has been show to improve students’ academic achievement.According to Insuaetal(2010) students are more likely to use ICT for personal enjoyment & leisure than for academic purposes

with academic achievement. According to a study by Jena (2015) technology enhanced learning leads to burnout decreased participants in learning & poor academic performance.

Background of the study

In 1984, Craig Brod was the first to coin the term “techno-stress” which he described a modern adoption problem brought on by the capacity problem brought on by the capacity to use modern computer technologies. Techno stress, according to Berger et al (2016) is the sensation of stress brought on by the use of technology. Techno stress is a typical adoption issue that may arise if the user is unable to adopt or utilize ICT properly (Raghunathan et al. 2008).

Tarafdar, Tu & Raghunath (2007) proposed five dimensions that are connected to technological use & are grouped as stressors related to technological use. These stressors are as follows, i.e. (a) **Techno-overload**: According to Hauk et al. 2019 & Marchiori et al. (2019) techno -overload is a condition where an ICT user feels pressure to work harder & longer, (b) **Techno -invasion**: When there are no distinction made between the personal & professional context of ICT users while learning new technology this is known as techno-invasion, the ICT users constantly use new technology at the expense of their personal life (Hauk et al.2019; Tarafdar et al.2010, 2011, Marchori et al. 2019, Hwang & Cha 2018; Hauk et al.2019), (c) **Techno- Complexity**: Techno-complexity refers to a scenario where technology (ICT) users feel that their skills are insufficient due to the complexity connected with using technology, as a result people are compressed to put in more time & effort to become familiar with many facts of technology (Tarafdar et al 2000, (d) **Techno – Insecurity**: Techno-insecurity is a type of stress in which an ICT user doubts the level of technology expertise they currently possess. They are unsecured that someone with stronger technological skills may replace them in contrast to them (Juskaite, 2017), (e) **Techno- Uncertainty**: Techno -Uncertainty is a condition in which an ICT user feels uneasy & anxious since technology is constantly evolving & changing (Qi, 2019).



Review of related literature

The findings related to Techno stress and academic achievement are contradictory to each other because some researcher has found that there is no negative effect of techno stress on academic achievement. (Qi,2019; Juskaite 2017) but other researcher found that the techno stress have a significance effect on academic achievement. (Upadhya& Vrinda 2021; Wang et al.2020). With reference to girls it is found that girls have high techno stress as they have less ICT competency (Upadhya& Vrinda ,2021; Deepa sethi et al.). Existing research on techno stress has mainly focused on employees, teachers & librarians and few researchers have focused on techno stress in university students. (Tarafdar et al. 2007; Wang et al.2008). It also found from the literature mostly university students experience high techno stress as they use smart devices (NurYuhains ab. Wahab et. al, 2022). Previous research has looked on how student's academic performance is impacted by techno stress. Considering this Cao & Sun (2018) investigated the relationship between students academic, performance & students poor performance is strongly indicated by their behavior & their use of mobile social networking sites. Similar finding were made by Upadhyaya + Vrinda (2020), who discovered that technological stress had a negative impact on university students academic output. Qi (2019) looked into the impact of technological stress in the context of university stress in the context of university students using their mobile device for academic purpose. The results showed that techno stress had no significant impact on academic achievement.

Rational of the study

Now a days, technology & the internet are frequently used by students for both personal & academic purpose & social networking sites consumes a significant portion of their day. Researcher from the past has revealed that techno stress can have impact on academic performance of teacher & students. The majority of the existing study on techno stress has been on employees, teacher & librarians & just a small number of academic have university focused on techno stress in university students. The majority of studies were done in western nations, while there were fewer studies done on the Indian perspective. The researcher is interested in learning how techno stress& academic achievement is related with each other.

Therefore, this study will aid the policy maker's ability to assess the pupil's level of techno stress. And also it will assist the policy makers in offering the teacher adequate orientation programmes & faculty development programmes.

Objective of the study

1. To study the level of techno stress among university students.
2. To study the level of techno stress between boys & girls students.
3. To study the level of techno stress among arts, science & commerce students.
4. To find out the relationship between techno stress and academic achievement of the students.

Hypotheses

H₁: There exists significant difference between the level of techno stress in relation to their gender. (Upadhyaya & Vrinda 2020).

H₂ : There exists no significance difference of techno stress and academic achievement among the students in relation to their stream.

H₀: There exists no significant relationship of techno stress& student's academic achievement.

Operational definition of the variable

- **Techno stress-** The scores obtained by the students in Techno stress tool developed by Upadhya & Vrinda is considered as techno stress of the students.
- **Academic achievement-** The mark/grades obtained by the students in previous semester.

Delimitation of the study

1. The research study was delimited to the techno stress of post-graduate students with special focus on techno-overload, Techno-Invasion, Techno-Complexity, Techno-Insecurity & Techno-Uncertainty.
2. The present study was delimited to one university having Arts, Science & Commerce stream, i.e Gangadhar Meher University, Sambalpur.
3. The sample of the study is confined to 272 post-graduate students of arts, science & Commerce stream only from Gangadhar Meher University, Sambalpur.

4. The techno stress questionnaire developed by Upadhya & Vrinda (2021) was used for collecting data & mean, standard deviation, t-test, correlation was used for analysis of data.

Method of the study

The research was designed to study the relationship of techno stress & academic achievement. Descriptive correlation survey method was adopted by the investigator for this study.

Population of the study

The complete collection of human and non human entities having common attributes from a defined demography under study is known as population, all the post-graduation students of Gangadhar Meher University, Sambalpur district was considered as the population for the present study.

Sample & sampling technique

The sample refers to the representative fraction of the entire population in order to generalize the findings in a credible manner. A total number 272 of post-graduation students were taken as sample from this university through stratified-purposive sampling technique. This includes 114 arts stream, 122 from science stream & 46 from commerce stream.

Tools used

Techno stress Scale

The investigator used the standardised **Techno stress scale developed by** Upadhya & Virinda(2021) and culturally adapted the items in order to collect data. The scale has mainly five dimensions as *techno-overload*, *techno-invasion*, *techno-complexity*, *techno-insecurity*, and *techno-uncertainty*.

Academic Achievement Scale

The academic achievement is the core of wider term educational growth which represents the amount of knowledge obtains by the students in different subjects of study. It enables to the students to know where they stand. Academic achievement generally refers to the degree of competence acquired by the students in an academic context from different source of knowledge or the subject area. In the present study the academic achievement refers to previous semester marks obtained by the post-graduation students.

Statistical techniques used

The investigator used simple percentage to find out the level of techno stress of post-graduation students and descriptive statistics such as; mean, standard deviation and inferential statistics such as 't' test, Pearson's Product Moment Method of correlation.

Analysis & Interpretation

To find out the valid & consistent conclusion, the investigator used simple percentage for level of technostress of post-graduation students, at the same time for hypotheses testing data analysis were made employing descriptive statistics such as; mean, standard deviation and inferential statistics such as; Test of significance difference between two group Means (t-test), Pearson correlation.

Objective-wise analysis of the data

Table No. 1: *Level of Techno stress of Post-Graduation Students*

Sr.no	Level of Techno stress	No. of respondents	percentage
1	High	73	26.74%
2	Moderate	108	39.56%

3	Low	92	33.7%
4	Total	273	100%

The table no.1 represents the information about the level of techno stress of post-graduation students, which revealed that 26.74% students have High level of techno stress, 39.56% students have Moderate level of techno stress and 33.7% have Low techno stress. It shows that maximum numbers of students have moderate level of techno stress.

Figure no. 1: *level of techno stress of post-graduation students*

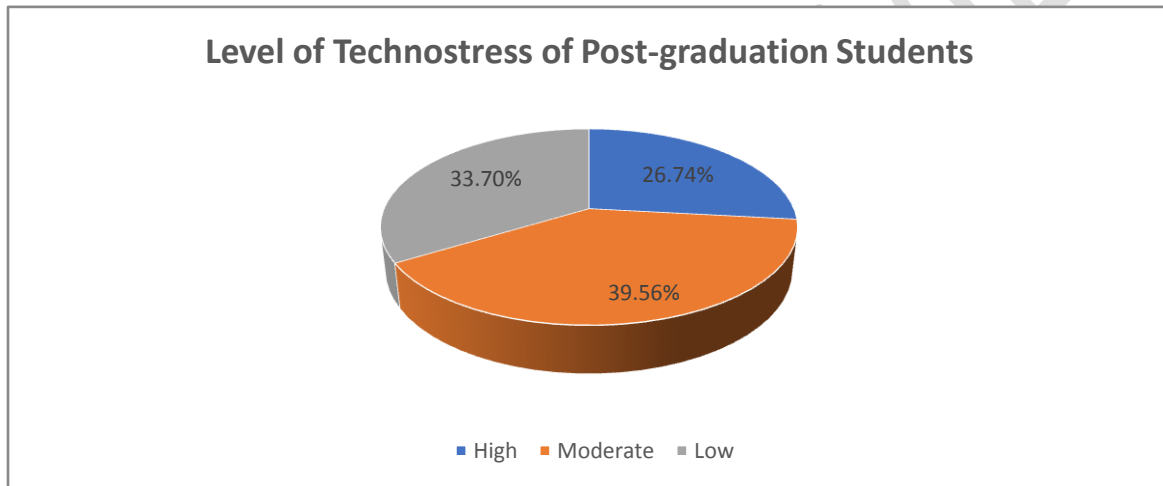


Table No. 2: *Level of Techno stress of Arts Students*

Sr.no	Level of Techno stress	No. of respondents	percentage
1	High	34	29.82%
2	Moderate	46	40.36%

3	Low	34	29.82%
4	Total	114	100%

The table no.2 represents the information about the level of techno stress of arts students, which revealed that 29.82% students have High level of techno stress, 40.36% students have Moderate level of techno stress and 29.82% have Low techno stress. It shows that maximum numbers of students have moderate level of techno stress.

Figure .No. 2:*Level of techno stress of Arts students*

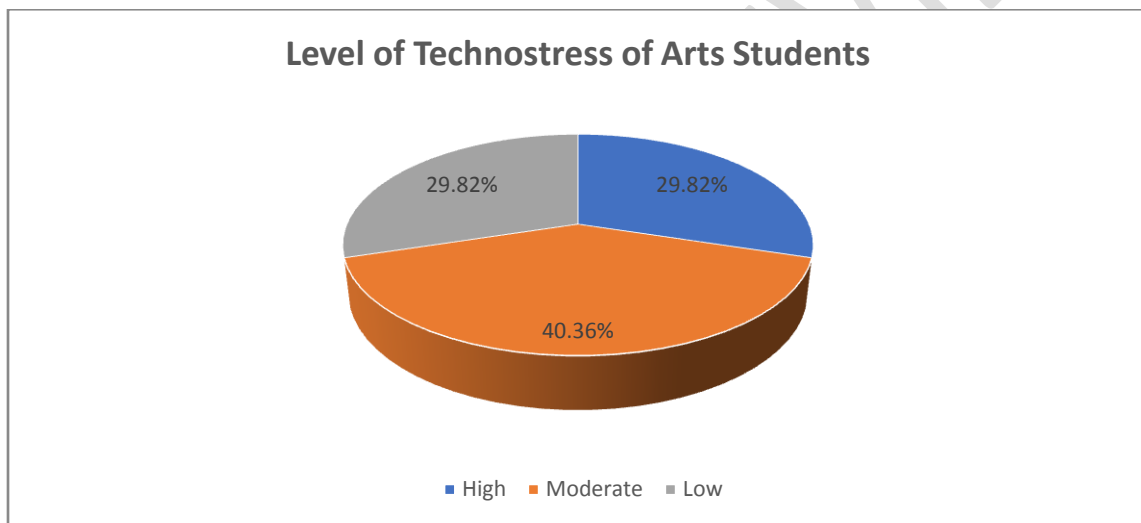


Table No. 3:*Level of Techno stress of Science Students*

Sl.No.	Level of Techno stress	No. of respondents	percentage
1	High	19	16.81%
2	Moderate	50	44.25%
3	Low	44	38.94%

4	Total	113	100%
---	-------	-----	------

The table no. 3 represents the information about the level of techno stress of science students, which revealed that 16.81% students have High level of techno stress, 44.25% students have Moderate level of techno stress and 38.94% have Low techno stress. It shows that maximum numbers of students have moderate level of techno stress.

Figure .No. 3:*Level of techno stress of science students*

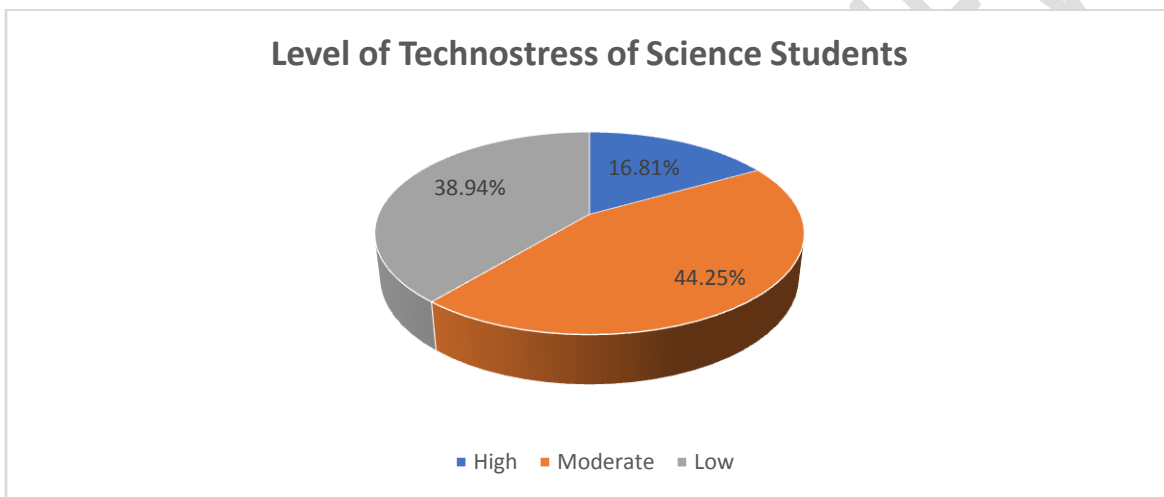


Table No. 4:*Level of Techno stress of Science Students*

Sl. No	Level of Techno stress	No. of respondents	percentage
1	High	20	43.46%
2	Moderate	12	26.09%

3	Low	14	30.43%
4	Total	46	100%

The table no.4 represents the information about the level of techno stress of commerce students, which revealed that 16.81% students have High level of techno stress, 44.25% students have Moderate level of techno stress and 38.94% have Low techno stress. It shows that maximum numbers of students have moderate level of techno stress.

Figure .No. 4:*Level of techno stressof Commerce students*

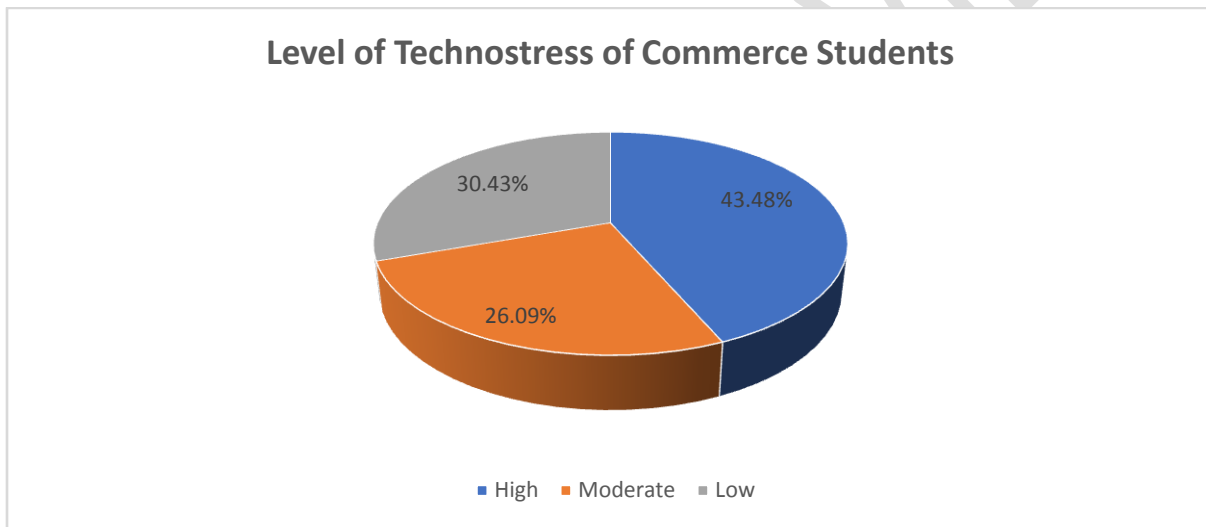
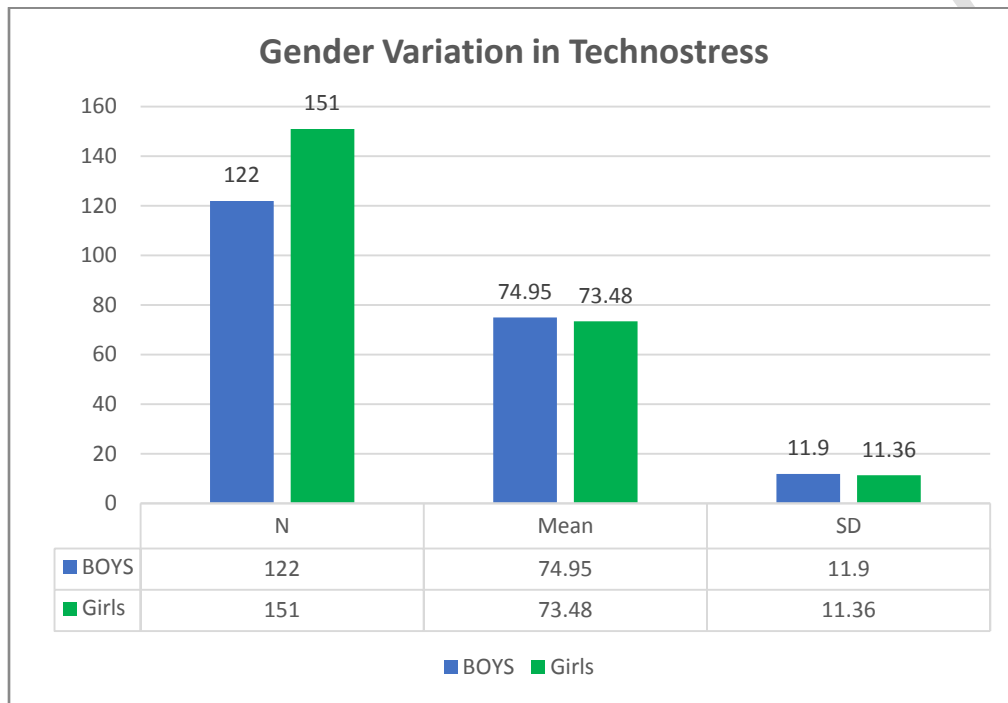


Table no. 5:*Gender Variation in Techno stress*

Gender	N	M	SD	't'-value	Remarks
Boys	122	74.95	11.90	1.03	Non-significant
Girls	151	73.48	11.36		

Table .5 presents that the mean value (74.95) of boys students is slightly higher than the girls students (73.48), and the SD value of boys students (11.90) is higher than the girls students (11.36). In order to test hypothesis, the investigator has computed 't'- value and figure 5 also supports the findings.

Figure No. 5: Gender Variation in Techno stress



The obtained 't' value(1.03) was non-significant at 0.05 & 0.01 significance level for the df 271. The table value for df271 is 1.97 & 2.59 at 0.05 and 0.01 level of significance respectively. Though 't' value is not significant, the null hypothesis i.e. "There is no significant difference in techno stress between boys & girls of post-graduation students." is accepted.

Table No. 6: Relationship between Techno stress and Academic Achievement

Variable	N	Correlation	Remarks
Techno stress	273	-0.10	Negative negligible correlation
Academic achievement	273		

The table. No .6 represents that the correlation between techno stress and academic achievement of post-graduation students. The r-value of techno stress& academic achievement is -0.10. It reveals that the negative negligible correlation between techno stress& academic achievement.

Table No. 7:*Relationship between Technostress and Academic Achievement of arts students*

Variable	N	Correlation	Remarks
Techno stress	114	-0.10	Negative negligible correlation
Academic achievement	114		

The table. No.7 represents the correlations of techno stress and academic achievement of arts students. The r-value of techno stress& academic achievement is -0.10. It reveals that the negative negligible correlation between techno stress& academic achievement.

Table No. 8:*Relationship between Techno stress and Academic Achievement of science students*

Variable	N	Correlation	Remarks
Techno stress	113	0.20	Positive negligible correlation
Academic achievement	113		

The table. No. 8 represents the correlation of techno stresses and academic achievement. The r-value of techno stress& academic achievement is 0.20. It reveals that the positive negligible correlation between techno stress& academic achievement.

Table No. 9:*Relationship between Techno stress and Academic Achievement of science students*

Variable	N	Correlation	Remarks
Techno stress	46	0.29	Positive negligible correlation
Academic achievement	46		

The Table. No 9 represents that the correlation of techno stress and academic achievement of post-graduation students. The r-value of techno stress& academic achievement is 0.29. It reveals that the positive negligible correlation between techno stress& academic achievement.

Major findings

1. The study Maximumstudents have moderate level of techno stress.
2. The study revealed that among all the students arts students have high techno stress& maximum science students have low techno stress.
3. The analysis of the result indicate their exist no significant difference between techno stress between boys & girls.
4. The study shows that negative negligible correlation between techno stress and academic achievement.
5. The study represents that science & commerce have positive correlation between techno stress and academic achievement and it also found that arts students have negative correlation.

Discussion

The findings related to Technostress and academic achievement are contradictory to each other because some researcher have found that there is negative effect of technostress on academic achievement. (Qi,2019; Juskaite 2017) but other researcher found that the technostress have a significance effect on academic achievement. (Upadhya&Vrinda 2021; Wang et al.2020). With reference to gender it is found that girls have high technostress than the boys as they have less ICT competency (Upadhya& Vrinda ,2021; Deepa sethi et al.). However basedon the analysis and interpretation of results, the findingsrevealed that there is no significant difference between the techno stress level of the students in relation to gender as all of them are well acquainted with technology but to its contrast findings revealed that male students experienced higher techno stress than female students (Tarafdar et. al 2014).It also found that arts students have negative correlation due to the introduction of online learning the students had to change their habits to adapt to online learning. The university

students faced stress due to frequent up gradation in online learning. They are facing difficulties with the complexity of online learning because of insufficient knowledge of technological skills, the difficulties like understanding & usefulness of online learning, using adequate knowledge about it (Nurul Nadia Abd Aziz & Nadiah Abu Yazid, 2021). Although it is found from the findings that technostress has negative relationship with academic achievement but to its contrast some research findings support that continuous use of smart phone & information overload are both positively associated with techno stress (Ni Yao & Qiong Wang, 2022).

Suggestion for further study

The study will help the further study to conduct the study in other metro cities and semi-urban areas. It is also recommended that further studies can be study with large sample as well as applying higher order statistical technique like ANOVA. The study can conducted at undergraduate level, higher secondary level and secondary level. The study focused on techno stress creators and did not include techno stress inhibitors such as support provision, literacy provision and involvement facilitation. (raghunathan et al.).

Educational implication

1. This study help to identify the factors of techno stress among the students.
2. The study help to make suitable policies to remove the level of techno stress from the studnts for policy makers..
3. The study encourage the students for usage of technological tools in proper way.
4. The study helpful for promoting technology oriented learning atmosphere without any stress.

Conclusion

Students experience a great deal of stress as a result of the introduction of new technologies in the educational field, which leads to lower academic performance. The study findings show a negligible relationship between techno stress and academic achievement. The present study has contributed to existing knowledge about measurement of the techno stress of university students.

References

- Brod, C. (1984). *Techno stress: The human cost of the computer revolution*. Reading: Addison Wesley Publishing Company. DOI: 10.1177/089443938600400428
- Berger, R., Romeo, M., Gidion, G., & Poyato, L. (2016). Media use and techno stress. In: 10th International Technology, Education and Development Conference. Valencia. DOI: 10.21125/inted.2016.1092
- Cao, X., & Sun, J. (2018). Exploring the effect of overload on the discontinuous intention of social media users: An S-O-R perspective. *Computers in Human Behavior*(2017), doi: 10.1016/j.chb.2017.11.035,
- Hayashi, R., Garcia, M., Maddawin, A., & Hewagamage, K. P. (2020). Online learning in Sri Lanka's higher education institutions during the COVID-19 pandemic.. *ADB Briefs*, 151. DOI: 10.22617/BRF2002602
- Henderson, M., Finger, G., Selwyn, N., & Aston, R. (2015). Students' everyday engagement with digital technology in university: exploring patterns of use and 'usefulness'. *Journal of Higher Education Policy and Management* 1-12. DOI: 10.1080/1360080X.2015.1034424.
- Hauk, N., Göritz, A. S., & Krumm, S. (2019). The mediating role of coping behavior on the age-techno stress relationship: A longitudinal multilevel mediation model *PLoS ONE*, 14(3), 1–23. <https://doi.org/10.1371/journal.pone.0213349>.

Hwang, I., & Cha, O. (2018). Examining techno stress creators and role stress as potential threats to employees' information security compliance. *Computers in Human Behavior*.81, 282–293. <https://doi.org/10.1016/j.chb.2017.12.022>

Higgins, S., Xiao, Z., &Katsipataki, M. (2012). The impact of digital technology on learning : A summary for the education endowment foundation. Digital Technology Available at: <https://eric.ed.gov/?id=ED612174.>,

Jena, R. (2015). Impact of techno stress on job satisfaction: An empirical study among indian academicians. *The International Technology Management Review*. 5(3), 117-124. DOI: <https://dx.doi.org/10.2991/itm.2015.5.3.1>

Marchiori, D. M., Mainardes, E. W., & Rodrigues, R. G. (2019). Do Individual Characteristics Influence the Types of Techno stress Reported by Workers? *International Journal of Human-Computer Interaction*, 35(3), 218–230.

Nafrees, A.C.M., Shibly,A., Kariapper, A.R., & Roshan, A.M.F. (2020). An investigation of Sri Lankan university undergraduates' perception about online learning during COVID-19: With superior references to South Eastern university. *Solid State Technology*.8829-8840. Available at: <http://ir.lib.seu.ac.lk/handle/123456789/5154>

Narad, A. & Abdullah, B. (2016). Academic performance of senior secondary school students: Influence of parental encouragement and school environment. *Rupkatha Journal on Interdisciplinary Studies in Humanities*8(2), 12-19. DOI: 10.21659/RUPKATHA.V8N2.02.

Norsida, H., Adam, M.B., Mustapha, N., & Midi, H. (2010). Statistical fact of students' background and academic achievement in higher educational institution. *Procedia - Social and Behavioral Sciences*.8(2), 12-19. DOI: 10.21659/RUPKATHA.V8N2.02

Aziz, N.N.A, & Yazid, Z.N.A (2021) Exploratory factor analysis of techno stress among university students, *international journal of academic research in progressive education & development* 10, 161-175.

Ortega-Maldonado, A. &Salanova, M. (2018). Psychological capital and performance among undergraduate students: the role of meaning-focused coping and satisfaction. *Teaching in Higher Education*.23(3), 390-402. DOI: 10.1080/13562517.2017.1391199

Qi, C. (2019). A double-edged sword? Exploring the impact of students' academic usage of mobile devices on techno stress and academic performance. *Behaviour and Information Technology*, 38(12), 1337–1354

Ragu-Nathan, T.S., Tarafdar, M., & Ragu-Nathan, B.S. (2008). The consequences of techno stress for end users in organizations: Conceptual development and empirical validation. *Information Systems Research*.19(4), 417–433. DOI: 10.1287/isre.1070.0165

Tarafdar, M., Tu, Q., Ragu-Nathan, B. S., & RaguNathan, T. S. (2007). The impact of techno stress on role stress and productivity. *Journal of Management Information Systems*.4(1), 301–328. DOI: <https://doi.org/10.2753/MIS0742-122224010>

Tarafdar, M., Tu, Q., Ragu-Nathan, T. S., & Ragu-Nathan, B. S. (2011). Crossing to the dark side: Examining creators, outcomes, and inhibitors of techno stress. *Communications of the ACM*, 54(9), 113–120.

Tarafdar, M., Tu, Q., & Ragu-Nathan, T. (2010). Impact of techno stress on end-user satisfaction and performance. *Journal of Management Information Systems*, 27(3), 303– 33

Upadhyaya, P. & Vrinda. (2021). Impact of techno stress on academic productivity of university students. *Education and Information Technologies*.26(2), 1647–1664. DOI: 10.1007/s10639-020-10319

Wang, K., Shu, Q., & Tu, Q. (2008). Techno stress under different organizational environments: An empirical investigation. *Computers in Human Behavior*24(6), 3002–3013. DOI: 10.1016/j.chb.2008.05.007.,

Wang, X., Tan, S.C., & Li, L. (2020). Techno stress in university students' technology-enhanced learning: An investigation. *Computers in Human Behavior*. , 105. DOI: 10.1016/j.chb.2019.106208

Wang, X.; Li, Z.; Ouyang, Z.; Xu, Y. The Achilles Heel of Technology: How Does Techno stress Affect University Students' Wellbeing and Technology-Enhanced Learning. *Int. J. Environ. Res. Public Health* 2021, 18, 12322. <https://doi.org/10.3390/ijerph182312322>.