TECHNOSTRESS AMONG CZECH UNIVERSITY STUDENTS: IDENTIFYING AT-RISK GROUPS

[a]KLÁRA DAŇKOVÁ, [b]IVANA MAŠKOVÁ

[a]*University of South Bohemia, Faculty of Education, Dukelská 245/9, 370 01 České Budějovice, Czech Republic*
[b]*University of West Bohemia, Faculty of Education, Univerzitní 2732/8, 301 00 Plzeň, Czech Republic*
email: [a]dankok04@pf.jcu.cz, [b]imaskova@kps.zcu.cz

Abstract: This study examines technostress among Czech university students and identifies groups that may be more vulnerable to technology-related strain. A sample of 420 students completed the six-dimension Technostress Scale. Inferential analyses revealed significant differences across several demographic and academic factors. Older students reported higher *Work–Home Conflict* as well as greater *Techno-Reliability* and *Techno-Sociality*, while women showed higher *Techno-Overload* than men. Psychology students reported higher *Techno-Reliability* and *Techno-Sociality* compared with several other fields, and part-time students reported lower *Techno-Reliability* than full-time students. Overall, the findings indicate that technostress varies meaningfully across student subgroups and should be considered when developing support for students' digital well-being.

Keywords: technostress, university students, information communication technologies

1 Introduction

Digital technologies play an increasingly central role in university life and beyond, with their daily use becoming unavoidable in the contemporary world. While these tools offer clear benefits, their intensive and often mandatory use in meeting academic requirements can also produce technology-related strain resulting from difficulties in adapting to technological demands. This strain is captured by the concept of technostress, which reflects the dynamic interplay between users and their digital environment and encompasses factors that may both diminish and support digital well-being. Understanding how different groups of students navigate this digital environment is therefore essential, especially as higher education continues to deepen its reliance on digital platforms. Such insights can inform the development of tailored support strategies aimed at promoting students' digital well-being.

2 Technostress

2.1 Definition of technostress

Technostress refers to stress arising from the prolonged use of information and communication technologies (ICT). The term was first introduced by Craig Brod (1984) to describe the negative consequences of the technological revolution for human health. In this paper, we draw on the following general definition: "Technostress is a negative psychological state resulting from an inability to cope with new or changing technologies in a healthy manner" (Brod, 1984). This definition aligns with the transactional model of stress and coping proposed by Lazarus and Folkman (1984), who conceptualized stress as a dynamic interaction between the individual and the environment. Stress occurs when people perceive situational demands as exceeding their capacity to manage them. From this perspective, reactions to technostress depend on how individuals appraise technology-related demands and the coping strategies they employ.

2.2 Technostress and its dimensions

Technostress is a multidimensional construct, with each dimension contributing to psychological strain in a distinct way. In this paper, we draw on the six validated dimensions proposed by Galvin et al. (2022), who demonstrated their relevance for understanding how ICT use influences mental health. The first dimension, *Techno-Overload*, refers to situations in which technology creates excessive informational and task demands. Moore (2000) showed that such overload is a significant risk factor for stress and burnout among IT employees. A second dimension, *Work–Home Conflict*, captures tensions that arise when professional responsibilities intrude into personal life and vice versa. According to Kreiner (2006), technology can either facilitate or complicate transitions between these roles. Both dimensions have been linked to heightened anxiety and depressive symptoms when not effectively managed (Galvin et al., 2022). The third dimension, *Techno-Ease*, concerns the perceived ease of using digital tools. When technology feels intuitive, it tends to enhance performance and reduce ICT-related stress. Moore and Benbasat (1991) demonstrated that perceived usability shapes technology adoption, while Galvin et al. (2022) found that students who feel competent with ICT report fewer symptoms of anxiety and depression. A fourth dimension, *Techno-Reliability*, focuses on the stability and dependability of technological systems. DeLone and McLean (2003) showed that reliable ICT infrastructure increases productivity and reduces stress by allowing users to trust that essential tools will function consistently. The fifth dimension, *Techno-Sociality*, addresses how technologies shape social interactions. ICT can enhance feelings of connectedness but may also create isolation or interpersonal strain, as Ayyagari (2011) found that technology can simultaneously facilitate communication and introduce new forms of social pressure. The sixth dimension, *Pace of Change*, reflects how individuals perceive the speed of technological development. Rapid technological shifts can cause frustration and uncertainty, particularly when organizations fail to provide adequate support or training. Weiss and Heide (1993) argued that fast-paced innovation can leave users feeling unprepared and overburdened. Together, these six dimensions underscore the multifaceted nature of technostress and illustrate how ICT may serve both as a vulnerability factor and a potential source of support for psychological well-being.

2.3 Technostress among university students

Technostress among university students can be shaped by several contextual and individual factors. One important source is the influence of distance learning. The combination of online instruction and study–family conflict can markedly increase technostress, as students often experience Techno-Overload due to constant ICT demands. Cataldo et al. (2023) showed that such overload during remote education reduces satisfaction with university life and negatively affects academic performance. Another important explanation is offered by the Person–Environment Misfit perspective. Wang et al. (2020) demonstrated that technostress does not arise solely from technology itself but primarily from mismatches between students' characteristics and the environments in which ICT is used. The Person–Environment Misfit model includes three types of misfit. Person–Organization (P–O) misfit occurs when institutional expectations regarding technology use (e.g., e-learning platforms, online testing) exceed students' abilities or resources. Person–Technology-Enhanced Learning (P–TEL) misfit refers to strain caused by students' direct interaction with technology, such as insufficient digital skills. Person–People (P–P) misfit captures the lack of social support from peers or instructors, which can heighten ICT-related stress. Research shows that all three misfit types significantly predict burnout, with P–O misfit—reflecting institutional ICT demands—emerging as the strongest predictor.

3 The present study

The aim of this paper is to identify which groups of university students in the Czech Republic are most affected by technostress. The study examines its associations with key demographic factors (age, gender) and academic characteristics, including study mode (full-time/part-time), international student status, field of study (six disciplinary categories), and type of study program (bachelor's, master's, doctoral). The main research question for this study was defined as follows:

RQ: What is the level of technostress across different groups of university students?

4 Method

4.1 Participants

The research sample comprised 420 students enrolled at higher education institutions in the Czech Republic (*M* age = 22.8 years, range 18–61), of whom 75.8% were women and 24.2% were men. Participants were recruited from eight universities: the University of South Bohemia, Masaryk University, Charles University, Czech Technical University in Prague, Palacký University, Czech University of Life Sciences, Technical University of Ostrava, and the University of Veterinary Sciences Brno. With respect to study program, 63.4% were enrolled in bachelor's studies, 31.1% in master's studies, and 5.5% in doctoral studies. International students made up 6.4% of the sample, and most participants studied full-time (85.6%). Fields of study were relatively evenly represented, with the largest proportion in STEM disciplines (26.4%), followed by psychology (21.6%), humanities (19%), economics (19%), education (10.8%), and health-related fields (3.1%).

4.2 Procedure

Data collection was conducted online using the Qualtrics platform. Participants were recruited through institutional email communication and supplementary channels, including social media. All participants provided informed consent prior to taking part in the study. Data were gathered between March and December 2022 using a non-probability sampling strategy.

4.3 Measures

The study employed the six-dimension Technostress Scale validated by Galvin et al. (2022). The dimensions were derived from prior conceptualizations: Techno-Overload (Moore, 2000), Work–Home Conflict (Kreiner, 2006), Techno-Ease (Moore & Benbasat, 1991), Techno-Reliability (DeLone & McLean, 2003), Techno-Sociality (Ayyagari, 2011), and Pace of Change (Weiss & Heide, 1993). The instrument comprises 17 items rated on a seven-point Likert scale, with three items per dimension except Techno-Sociality, which contains two. Internal consistency was satisfactory to excellent across subscales: Techno-Overload ($\alpha = 0.830$), Work–Home Conflict ($\alpha = 0.806$), Techno-Ease ($\alpha = 0.846$), Techno-Reliability ($\alpha = 0.821$), Techno-Sociality ($\alpha = 0.780$), and Pace of Change ($\alpha = 0.883$).

4.4 Statistical analyses

To address the research question, differences in the six technostress dimensions were examined across student groups defined by gender, age, study mode, field of study, study program, and international status. As visual inspection and the Shapiro–Wilk test indicated significant deviations from normality for all scales, nonparametric statistical methods were applied. In total, 36 tests were conducted, selected according to variable type: Spearman's correlation (age), Mann–Whitney U tests (gender, study mode, international status), and Kruskal–Wallis tests (field of study, study program). Statistical significance was evaluated at $\alpha = 0.05$, as adjusting the threshold for multiple testing would have been overly conservative. Data were processed using Jamovi statistical software.

5 Results

Across the six dimensions, the highest mean score was observed for Techno-Ease (*M* = 16.14, *SD* = 3.35), followed by Techno-Reliability (*M* = 14.16, *SD* = 3.33). Moderate values were recorded for Techno-Sociality (*M* = 11.72, *SD* = 2.31) and Pace of Change (*M* = 11.65, *SD* = 4.21). The lowest mean scores appeared for Work–Home Conflict (*M* = 10.49, *SD* = 4.64) and Techno-Overload (*M* = 10.26, *SD* = 4.50). Regarding differences among student groups, statistically significant effects were identified for the dimensions Techno-Overload, Work–Home Conflict, Techno-Reliability, and Techno-Sociality. Differences were non-significant for the remaining scales. The results are reported in Table 1.

Table 1: Results of Statistical Tests for Technostress Dimensions Across Student Groups

Scale	Age	Gender	Study mode	Intern. student	Field of study	Study progr.
T-O	-0.011 (0.817)	11342 **(0.001)**	9639 (0.214)	4050 (0.235)	6.62 (0.251)	0.95 (0.622)
W-HC	0.122 **(0.013)**	14375 (0.203)	10691 (0.983)	4909 (0.528)	5.49 (0.359)	9.14 **(0.010)**
PC	-0.006 (0.897)	15193 (0.625)	10095 (0.475)	4896 (0.514)	6.77 (0.239)	2.68 (0.262)
T-R	0.106 **(0.030)**	14999 (0.499)	8754 **(0.030)**	5168 (0.838)	16.50 **(0.006)**	3.95 (0.139)
T-S	0.113 **(0.021)**	15681 (0.985)	9506 (0.154)	5008 (0.634)	12.50 **(0.028)**	2.84 (0.242)
T-E	0.027 (0.581)	14466 (0.234)	9844 (0.314)	5008 (0.634)	5.07 (0.408)	0.02 (0.989)

Note. Values represent test statistics with corresponding *p*-values in parentheses. For age, Spearman's rank correlation coefficients (ρ) are reported. For gender, study mode, and international student status, Mann–Whitney *U* statistics are reported. For field of study and study program, Kruskal–Wallis χ^2 statistics are reported. T-O = Techno-Overload; W–HC = Work–Home Conflict; PC = Pace of Change; T–R = Techno-Reliability; TS = Techno-Sociality; T–E = Techno-Ease.

5.1 Techno-Overload

The most pronounced difference emerged in the Techno-Overload dimension with respect to gender. Women (*M* = 10.73, *SD* = 4.38) reported significantly higher levels of Techno-Overload compared with men (*M* = 8.68, *SD* = 4.51), and this effect was statistically significant
($U = 11342$, $p < 0.001$).

5.2 Work-Home Conflict

Within the Work–Home Conflict dimension, significant differences were found for age and study program. Age showed a weak but significant positive association with Work–Home Conflict ($\rho = 0.122$, $p = 0.013$), indicating a slight increase in perceived conflict with increasing age. Study program was also significant ($\chi^2(2) = 9.14$, $p = 0.010$), with doctoral students reporting the highest scores, followed by master's students, and bachelor's students the lowest. Post hoc analysis (Dwass–Steel–Critchlow–Fligner; DSCF) indicated that only the comparison between doctoral and bachelor's students reached significance ($p = 0.016$).

5.3 Techno-Reliability

The Techno-Reliability dimension showed significant differences across three variables. Age was positively associated with perceived reliability ($\rho = 0.106$, $p = 0.030$), indicating that older students viewed technologies as slightly more dependable. Study mode also showed a significant effect ($U = 8754$, $p = 0.023$), with part-time students reporting lower reliability scores than full-time students. Field of study further differentiated students' perceptions ($\chi^2(5) = 16.5$, $p = 0.006$). Psychology students reported the highest mean score (*M* = 15.3), followed by those in health-related fields (*M* = 14.7), while other disciplines ranged between *M* = 13.7 and *M* = 14.0. Post hoc DSCF tests showed significant differences between psychology students and students in economics ($p = 0.008$), STEM ($p = 0.019$), and the humanities ($p = 0.017$). No other pairwise differences reached significance. The mean values across fields of study are presented in Table 2.

Table 2: Means and Standard Deviations for Techno-Reliability and Techno-Sociality Across Fields of Study

		Techno-Reliability		Techno-Sociability	
Field of study	*n*	*M*	*SD*	*M*	*SD*
Economics	79	13.7	3.14	11.1	2.54
Education	45	14.00	3.00	12.1	1.95
Psychology	90	15.3	3.13	12.3	1.73
STEM	110	13.8	3.50	11.6	2.57
Humanities	79	13.9	3.28	11.4	2.46
Health	13	14.7	4.21	12.6	1.19

5.4 Techno-Sociality

For this dimension, significant associations were identified with age (ρ = 0.113, p = 0.021) and field of study ($\chi^2(5)$ = 12.5, p = 0.028). Post hoc analysis (DSCF) showed a single significant pairwise difference: psychology students reported higher Techno-Sociality scores than students in economics (p = 0.028). The mean values across fields of study are presented in Table 2.

6 Discussion

The results of this study suggest that technostress is a meaningful and measurable construct among university students in the Czech Republic. Dimensions generally regarded as protective in the context of technology use (Techno-Ease, Techno-Reliability, Techno-Sociality) showed higher mean scores, whereas dimensions associated with greater psychological risk (Pace of Change, Work–Home Conflict, Techno-Overload) were rated lower. Significant differences across student groups further enabled the identification of subgroups that appear more vulnerable, as well as those potentially less affected by technostress. Age emerged as one of the most consistent correlates of technostress. Older students reported higher scores in Work–Home Conflict, Techno-Reliability, and Techno-Sociality. This pattern aligns broadly with findings by Upadhyay and Vrinda (2021), who observed elevated technostress levels among students aged 23–28 compared with younger cohorts. However, the interpretation differs across dimensions. Higher scores in Techno-Reliability and Techno-Sociality likely reflect more positive or confident engagement with technology—such as greater trust in its functionality and more frequent technology-supported social interaction—rather than increased strain. In contrast, the meaning of Work–Home Conflict is more straightforward: this dimension captures the extent to which technology blurs boundaries between study-related demands and personal life. Older students, who are more likely to have additional responsibilities such as employment or caregiving, may experience greater difficulty maintaining these boundaries. This interpretation is further supported by the significant association between Work–Home Conflict and study program, with doctoral students reporting the highest conflict levels. Given that average age increases across study levels, higher scores among doctoral students likely reflect the cumulative effect of age, role complexity, and competing obligations that must be balanced alongside academic tasks. Study mode also emerged as a relevant factor. Part-time students reported lower scores on Techno-Reliability, which may be attributable to their reduced day-to-day engagement with university technologies. Less frequent exposure to institutional platforms and digital tools may limit opportunities to develop familiarity and trust in their functionality, resulting in lower perceived reliability. Field of study showed significant associations with several technostress dimensions, particularly Techno-Reliability and Techno-Sociality. Students in psychology and health-related disciplines reported the highest scores in both dimensions, suggesting a more adaptive integration of technology into their everyday routines. This pattern may also reflect broader psychosocial resources: higher perceived reliability of technology and greater use of digital tools for social interaction can indicate more effective coping strategies and stronger overall well-being. Such tendencies have been repeatedly documented among students in medicine and related health disciplines (e.g., Erekson et al., 2022; Mašková, 2023), who often demonstrate better mental health and more adaptive responses to academic demands. It is therefore plausible that these adaptive approaches extend to technology-related demands as well.

The findings underscore the need for universities to actively address technostress as digitalization becomes increasingly central to academic life. Strengthening students' digital competencies—particularly in areas associated with higher technostress—should be a priority. Practical steps may include targeted workshops on efficient use of study technologies, digital organization, and strategies for maintaining healthy boundaries between academic and personal life. Such initiatives could help mitigate the negative effects of technological overload while simultaneously reinforcing protective factors that support students' well-being.

This study has several limitations that should be considered when interpreting the findings. Its cross-sectional design precludes causal inferences, and the use of purposive sampling limits the generalizability of the results to the wider student population. In addition, p-values for multiple tests were not adjusted, increasing the risk of Type I error. The sample was also unevenly distributed across study groups: bachelor's and full-time students were strongly overrepresented, whereas doctoral and part-time students were included only marginally. This imbalance may have influenced the subgroup analyses. Therefore, the findings should be viewed as preliminary, and future research should aim to replicate them using a more balanced and representative sample.

Literature:

1. AYYAGARI, R., GROVER, V., PURVIS, R. Technostress: Technological antecedents and implications. *MIS Quarterly*, 2011, 35(4), pp. 831–858.
2. BROD, C. Technostress: *The human cost of the computer revolution*. Reading, MA: Addison-Wesley, 1984.
3. CATALDO, A., BRAVO-ADASME, N., ARAYA, P., ORMEÑO, V. Why university students are technostressed with remote classes: Study-family conflict, satisfaction with university life, and academic performance. *Telematics and Informatics*, 2023, 80, Article 101982.
4. DELONE, W. H., MCLEAN, E. R. The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 2003, 19(4), pp. 9–30.
5. EREKSON, D., SCHMUCK, D., LYNN, A., TOTH, L., HOSKIN, J. M., MORRISON, S. The relationship between declared major, therapy utilization rates, and psychological functioning among college students. *Journal of College Student Psychotherapy*, 2022, 36(4), pp. 318–334.
6. GALVIN, J., EVANS, M. S., NELSON, K., RICHARDS, G., MAVRITSAKI, E., GIOVAZOLIAS, T., KOUTRA, K., MELLOR, B., ZURLO, M. C., SMITH, A. P., VALLONE, F. Technostress, coping, and anxious and depressive symptomatology in university students during the COVID-19 pandemic. *Europe's Journal of Psychology*, 2022, 18(3), pp. 302–318.
7. KREINER, G. E. Consequences of work-home segmentation or integration: A person–environment fit perspective. *Journal of Organizational Behavior*, 2006, 27(4), pp. 485–507.
8. LAZARUS, R. S., FOLKMAN, S. *Stress, appraisal, and coping*. New York: Springer, 1984.
9. MAŠKOVÁ, I. Work-related coping behaviour and experience patterns in university students: A review of 20 years of research. *Frontiers in Psychology*, 2023, 14, Article 1062749.
10. MOORE, G. C., BENBASAT, I. Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, 1991, 2(3), pp. 192–222.
11. MOORE, J. E. One road to turnover: An examination of work exhaustion in technology professionals. *MIS Quarterly*, 2000, 24(1), pp. 141–168.
12. UPADHYAYA, P., VRINDA, V. Impact of technostress on academic productivity of university students. *Education and Information Technologies*, 2021, 26(2), pp. 1647–1664.
13. WANG, X., TAN, S. C., LI, L. Technostress in university students' technology-enhanced learning: An investigation from multidimensional person–environment misfit. *Computers in Human Behavior*, 2020, 105, Article 106208.
14. WEISS, A. M., HEIDE, J. B. The nature of organizational search in high-technology markets. *Journal of Marketing Research*, 1993, 30(2), pp. 220–233.

Primary Paper Section: A

Secondary Paper Section: AN, AM