THE EFFECTS OF TECHNOSTRESS ON HIGHER EDUCATION FROM THE PERSPECTIVE OF UNIVERSITY STUDENTS AND LECTURERS – COMPARATIVE ANALYSIS BY AGE GROUPS

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Abstract

Nowadays in addition to family, friends and work relationships, education is also largely determined by technology, as thanks to modern devices, almost everyone is available twenty-four hours a day. The proliferation of digital devices in academic circles is showing an ever-increasing trend, forcing both students and lecturers to conduct all of their academic activities using technology. The aim of our research is to provide a comparative analysis that provides a comprehensive picture of the effects of technostress on higher education. Our research is primarily a theoretical study, with the help of which we present the most significant consequences. The methodology is mainly based on the analysis of literature sources, however, in order to form an even more comprehensive picture of the studied area, we use the results of a previous research as a sample. In the case of our study, it was found that age greatly influences the development of technostress, and the statement that the coercive effect of technology plays a role in the development of technostress in students' lives also holds true for teachers working in higher education.

Key words: technostress, higher education, comparative analysis

JEL Code: D83, I20, I23

Introduction

Higher education institutions around the world are eager to innovate learning and education through new information and communication technologies (ICT). (Li & Wang, 2020)
Since the early 1970s, along with Internet technologies, the way ICT learning and teaching has changed. Thanks to continuous innovation, development has taken place from technology that supports individual learning to collaborative learning. Information and communication technology supports learning and teaching in higher education in many ways. Advance tools and techniques used in a collaborative environment promote and share meaningful content,

encourage socio-emotional communication, monitor and support ongoing interaction, and provide optimal feedback among community members. (Jena, 2015)

There is no doubt that these efforts can be commendable and potentially beneficial for students. At the same time, they can also put increased pressure on university lecturers, who often have less understanding of technology than their students, but need to continually adapt to the ever-required university requirements associated with use, exacerbated by rapid change and development in technology. (Wang & Li, 2019)

One of the biggest challenges we face in the age of digital acceleration is to maximize the opportunities offered by information and communication technologies in personal and professional life without compromising our own health. This duality partly facilitates the assimilation of technology, but can also lead to overload, which can cause technostress. (Gonzalez-Lopez et al., 2021)

In 1984, Brod defined the concept of technostress as a modern adaptation disorder resulting from a failure to cope healthily with new technologies. (Brod, 1984)

This type of stress can manifest in both physical and psychological symptoms. It influences the organizational results, employee satisfaction and commitment, and changes people's thinking, work, and learning. The role of technology in all aspects of professional and personal life is defined and constantly changing. The higher education system has been greatly influenced by technological developments, especially in collaborative education, learning and research. As a result, those involved in higher education need to find ways to adapt to technological change. (Jena, 2015)

According to studies such as Hwang and Cha (2018), Marchiori et al. (2019), and Ragu-Nathan et al. (2008), technostress can be divided into the following five categories: techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty. In addition, they propose three technostress inhibitors to counteract the effects of technostress: promotion of literacy, providing technical support, and facilitating participation. (Li & Wang, 2021)

Specifically, the promotion of literacy deals with programs aimed at increasing the knowledge and skills of university lecturers, such as professional development programs, teamwork and knowledge sharing related to the use of ICT in education. Technical assistance plays a key role in helping university lecturers solve problems and challenges in the use of ICT. Finally, facilitating participation refers to the commitment of university lecturers at all stages of ICT integration. (Li & Wang, 2021)

Overall, technostress reflects insecurity, fear, tension, and anxiety in cases where one directly or indirectly learns and uses computer technology, which ultimately leads to psychological and emotional repulsion and prevents further learning or use of computer technology. (Booker, Rebman & Kitchens, 2014)

It also negatively affects people's intention to continue using ICT and reduces people's organizational commitment and work performance. As a result, the issue of technostress deserves serious attention from academia, policy makers and stakeholders in higher education institutions. (Li & Wang, 2021)

Nowadays, people need to master the management of more and more technological tools, which has a number of negative consequences, regardless of age, including technostress, defined as a new type of public disease. The motivation of our research is mainly given by the fact that the occurrence of the topic in the field of education is no less outstanding than in the business sector. Based on this, the aim of our study is to examine the role of technostress in higher education for university lecturers and students. As the first step of our research, we study the role of technostress in the lives of university students, after which we examine the perspectives of lecturers in higher education. Our study is a comparative analysis that aims to draw a parallel between the effects of technostress on university students and teachers.

1   Technostress in the lives of university students

It is now common for students to make extensive use of the Internet in both their academic and personal activities. (Alvarez-Risco et al., 2021)

Students, like all other users, have been greatly affected by the diversification of technology in personal, professional, and social settings. Undergraduates are an important part of the population for learning technostress, as they have to do a lot of technology-based work as part of the academic curriculum, as university courses often require special technologies. (Rolón, 2014)

While ICT brings significant, tangible and intangible benefits to higher education institutions, including greater access, flexibility and convenience for students, and better quality of the educational experience gained online or otherwise, increased use can increase the stress experienced by users. (Boyer-Davis, 2020)

In education, technostress can cause problems such as dissatisfaction with learning, frustration, insufficient commitment to learning, and declining performance. (Wang, Tan & Li, 2020)

Student technostress can place a greater burden on higher education institutions through declining productivity, dropouts, and deviations from academic work. Therefore, the prevalence of technostress among students and its consequences need to be examined. (Upadhyaya & Vrinda, 2021)

Prensky (2007) stated that students insist on using these new technologies as part of their education, partly because these students have already mastered and used them in their daily lives, and partly because they recognize their potential and the benefits they provide. Ragu-Nathan and colleagues (2008) argued that technostress decreases with age, so higher education institutions need to plan and schedule academic work so that there is enough time to complete academic work and lead a balanced lifestyle. Higher education institutions can reduce the impact of techno-complexity by selecting user-friendly, well-known educational technology and appropriately training students.

Lepp et al. (2013) believed that the increasing digitization of everyday routines made the use of smart devices in everyday activities a cultural norm. This is due to the fact that it is widely seen among students with higher education and can also be used for educational purposes. The advent of smart devices has led to a paradigm shift in the conduct of many educational activities, thus paving the way for newer approaches, concepts and challenges. Of the many ICT challenges introduced by smart devices, technostress is critical.

Cerretani et al (2016) argued that students use ICT for personal, entertainment, and leisure purposes rather than academic purposes, and found that higher use of ICT leads to better academic performance. Hauk and colleagues (2018) concluded that the older age group experienced greater difficulties in using the technology than the younger ones, especially due to techno-overload and techno-complexity, which require complex cognitive abilities and physical condition.

In 2019, Qi hypothesized that the creators of technostress are inversely related to students' academic performance. Consistent with their prediction, they came to the conclusion that technostress creators reduce students' academic performance. (Qi, 2019)

Students in the current generation have different characteristics and habits. By 2020, the new generation will enter the business world and be called digital natives. These students are born in an Internet-connected world and ICT is a part of their lives. Digital natives are accustomed to accessing instant and autonomous information, multitasking, nonlinear learning, and dynamic graphics. The current generation of students have a technological receptivity that is accompanied by an easier understanding of new technological requirements. Higher education institutions can administer technostress among students in order to identify high-risk students

and advise them to reduce technostress, thereby improving their academic performance. Students who experience a higher level of technostress can be assigned a student mentor from the peer group in order to improve the student's confidence in using the technology. Employers also need to provide adequate ICT training for newly hired workers to reduce burnout. As there are many types of ICT applications, there is constant pressure to develop technical skills. Students also need adequate time to transition from their academic life to their professional lives. (Upadhyaya & Vrinda, 2021)

2   University lecturers in higher education and technostress

Educators play a key role in integrating successful technology into education. Their knowledge, attitudes and experience in the use of ICTs are essential for the successful integration of ICT in the educational environment. Changes in learning and teaching processes, teaching roles, teaching practices and work requirements caused by information and communication technology are placing increasing stress on university teachers, who are forced to devote more time and energy to adapting to these changes. Thus, examining and addressing the technostress experienced by educators working in higher education is not only critical to maintaining the well-being of university teachers, but also contributes to the realization of the higher education agenda. (Li & Wang, 2020)

However, from the point of view of integration, we cannot go without a word of proper preparation, as many factors influence technological integration. Without wishing to be exhaustive, such factors are teachers' beliefs, knowledge, skills, time, workload, and attitudes toward technology and pedagogy, which bringing the concept of technostress to the fore. Technostress is an important issue for the teaching profession. Teachers experience technostress, especially when integrating new technologies, which is often the case with digital technologies. The constant pressure of technological integration on the part of both institutions and society contributes to the development of technostress due to the lack of knowledge and support. (Çoklar, Efilti & Şahin, 2017)

Technostress is thus not only a health issue for university teachers, but also a management issue for higher education institutions. (Li & Wang, 2020)

As higher education is gradually digitized, there is no doubt that ICT will bring some benefits to the work of university lecturers. It allows teachers to work from anywhere, anytime, conveniently access information, and update their educational curriculum. On the other hand, however, information and communication technologies pose challenges to a person's physical

and psychological well-being as well as work performance. For example, ICT forces university teachers to work faster (techno-overload) and also affects their personal lives (techno-invasion). Frequent replacement and updating of software and hardware often causes them additional difficulties (techno-uncertainty). In addition, rapid technological development can also jeopardize the safety of their workplaces (techno-insecurity). As a result, university lecturers may feel exhausted, anxious, and stressed. (Wang & Li, 2019)

In fact, academics spend a lot of time understanding information and communication technology in order to ensure that what is taught in a collaborative learning environment is relevant and applicable in the labor market. (Jena, 2015)

Nevertheless, there is a consensus on the possible consequences of technostress in different areas. Technostress can negatively affect people's productivity and innovation in their jobs, leading to decreased work performance and reduced job satisfaction. (Wang & Li, 2019)

3   Methodology

In preparing our study, our primary goal was to examine the role of technostress in higher education from the perspective of university lecturers and students. In the course of our study, we studied the role of technostress in the life of university students with the help of secondary data collection, after which we reviewed the relationship between lecturers and technostress in higher education. Our research is a comparative study, for which we use a Hungarian analysis as a sample. Our study is based on five technostressors identified by Tarafdar et al. (2008).

Techno-overload refers to situations where technology educators are forced to do more work by technology than they are able to handle, and when they feel they need to sacrifice their free time to keep up to date with new technologies. Techno-invasion affects situations when educators do not have enough time to learn and develop their technological skills, or when they feel that technology is being applied to their personal lives as well. Techno-complexity describes situations when it is too complex for educators to understand and apply new technology, or refers to situations when there are new technological developments in the life of the organization that are applied in the company. Techno-insecurity refers to situations when educators, on the one hand, feel threatened by staff because of their newer technological skills and, on the other hand, feel that they need more time to understand and use new technologies. Finally, techno-uncertainty describes situations in which software and hardware are constantly changing in the organization.

In 2020, we conducted a survey in Hungarian higher education institutions with the help of a questionnaire. The subjects of our study were employees of Hungarian higher education institutions. Our survey included 48 questions that, in addition to demographic information, covered, among other things, employee satisfaction, treatment, security, motivation, appreciation, information provision, relationship with technology, and our their experience with ICT technology. The questionnaire was sent to the institutions in the form of "direct mail", it was available to all employees, and it was completed anonymously. The willingness to complete was not very high, with about 11% of the questionnaires sent back. Number of responses that can be used and evaluated for the analysis are 237. Based on the results of the secondary data collection and the research conducted in Hungary, we formulated our conclusions.

4 Research results

With the help of our Hungarian sample, we examined the relationship between age and technostress. Using the SPSS 25 program, we performed a Chi-square test, during which we examined age and techno-overload (coercive effect of technology + sacrifice of leisure time), and age and techno-complexity (complexity of understanding new technology + continuous technological development). A significance level of 5% was determined during the analysis.

Tab. 1: Relationship between age and techno-overload

Variables examined	Pearson's Chi-square Asymp. sig. value
Age – The coercive effect of technology	0.000
Age – Sacrifice of leisure time	0.000

Source: Primary data collection based on self-editing

Based on the results on the relationship between age and techno-overload presented in Table 1, we conclude that the two variables examined are related, as our results obtained during the Chi-square test are smaller for both factors related to techno-overload than the specified 5% significance level. Our finding suggests that the older generation feels that technology is forcing them to do more work than they can handle, and they often feel that they have to sacrifice their free time in order to stay up-to-date on new technologies. The next step is to examine the relationship between age and techno-complexity, the results of which are illustrated in Table 2.

Tab. 2: The relationship between age and techno-complexity

Variables examined	Pearson's Chi-square Asymp. sig. value
Age – Complexity of understanding new technology	0.000
Age – Continuous technological development	0.000

Source: Primary data collection based on self-editing

The results of our study in this case are also lower than the determined significance level, as a result of which we come to the conclusion that overall age is related to techno-complexity. The finding suggests that it is often too complex for the older generation to understand and apply new technologies and that they have difficulty in continuous technological development within the company.

In the last part of our research, we examined whether the coercive effect of technology (techno-overload) on educators working in higher education is related to the other four components that ultimately contribute to the increase in technostress. Our results are illustrated in Table 3.

Tab. 3: The relationship between techno-overload and other technostress components

Variables examined	Pearson's Chi-square Asymp. sig. value
Techno-overload – Techno-invasion	0.000
Techno-overload – Techno-complexity	0.000
Techno-overload – Techno-insecurity	0.000
Techno-overload – Techno-uncertainty	0.000

Source: Primary data collection based on self-editing

Our results suggest that for educators working in higher education, the coercive effect of technology and the sacrifice of their free time because it is related to techno-invasion, techno-complexity, techno-insecurity and techno-insecurity as a whole contributes to the development of technostress, ie for university lecturers who are heavily influenced by the coercive effect of technology and who have to sacrifice their free time in order to keep up to date with new technologies, these factors lead to an increase in technostress.

Discussion and Conclusion

The development of information and communication technology has made it possible for all human efforts to take over the use of ICT for specific and diverse purposes. To meet the

flexibility and ability of ICT, it has encouraged teachers to integrate it into education. (Oladosu et al., 2020)

Today, higher education institutions around the world are enthusiastic about modernizing education systems using ICT. (Aziz, Yazid, 2021)

The ubiquitous use of information technology has positive and negative consequences for both individuals and organizations. (Nisafani, Kiely & Mahony, 2020)

Longman (2013) argued that pressures on technology integration in education from both the institution and society, as well as a lack of knowledge and support, can lead to technostress among both students and lecturers. (Longman, 2013)

As mentioned earlier, Hauk et al., in their 2019 study, suggest that age is positively related to levels of technostress, particularly due to techno-overload and techno-complexity, which require complex amounts of cognitive activity. (Hauk et al., 2019)

With the help of our Hungarian sample, we examined the correctness of the statement from the point of view of university lecturers. Contrary to the conclusion stated by Ragu-Nathan et al. (2008) that technostress decreases with increasing age, our results support the claim of Hauk et al. (2019) that age is positively related to technostress. The finding suggests that the older generation is experiencing greater difficulty in applying the technology. Lee et al. (2014) argued that the forced use of smart devices aggregates the psychological and biological stress among students. (Lee et al. 2014)

In this case, too, an examination was performed. Based on the analysis, we concluded in this case that as a result of the coercive effect of technology, the effect of technostress increases for both university students and their lecturers, which Salem (2018) formulated as information and communication technology that elicits undesirable cognitive and psychological reactions and attitudes among students in higher education.

It is important to involve workers in the process of integrating ICT, to provide them with the opportunity to communicate and receive information on the implementation of technologies, to receive training in order to develop their knowledge and skills, and to take part in specialized training. (Estrada-Muñoz et al., 2021)

Facilitating digital literacy would mitigate the negative effects of exhaustion and stressors such as techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-unceartinty. The ability to incorporate technology into the curriculum, as well as technical and social school support, has a positive effect on reducing technostress for teachers and influences the need to use technology. (Estrada-Muñoz et al., 2021)

As such, the issue of technostress deserves due attention from researchers, ICT developers and decision-makers in organizations, including higher education institutions. (Wang & Li, 2019)

The novelty of our study lies in the fact that in addition to examining the effects of technostress on both lecturers and university students, we were able to draw a parallel between the two age groups, as our results support that age is positively related to technostress levels and the coercive effect of technology, in addition to influencing the level of technostress in students, also affects the lives of university lecturers.

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