The digital aspects of the wellbeing of university teachers

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Introduction: In the past few decades more and more studies have put the mental health and wellbeing of university lecturers in the limelight, especially considering the fact that lecturers' scope of responsibilities have been significantly transformed and expanded as a result of the massification and diversification of and structural changes in higher education. These changes intensified the workload, already rather high, thus negatively affecting lecturers' wellbeing. It is worth investigating how the increasingly marked presence of digital technologies affects the characteristics of teachers' workload. In this study, we intend to investigate the impact of digitization on the various areas of workload and work activities of university lecturers at a large university with many faculties, on the one hand, and teachers of institutions teaching in minority languages, on the other.

Methods: The online questionnaire compiled and based on the findings of our previous qualitative study was completed by teachers at one of Hungary's biggest universities, the University of Debrecen, and lecturers at other institutions of higher education providing for the Hungarian ethnic minority across borders and affiliated with the University of Debrecen, altogether 596 people. The database created obtaining the data was named Central and Eastern European Teachers in Higher Education (CEETHE, 2023), IBM SPSS 29 software was used to analyze the data.

Results: Digital technology plays a basic role in lecturers' work. Its importance is shown by the fact that the majority of respondents (54%) experiences significant or very severe stress in connection to technological problems. The majority of time spent with digital devices is included in working hours, so these technologies play a prominent role in dissolving the boundaries between professional and private life. Furthermore, many people find their use more exhausting than mental work performed without relying on them.

Conclusion: By continuously developing the digital competency of university lecturers it is possible to mitigate the stress triggered by technological problems as well as reduce screen time. It is necessary to ensure that institutions of higher education introduce policies that ensure work-life balance for teachers.

KEYWORDS

wellbeing, university instructors, digital technology, comparative research, online survey

1 Introduction

People have always worked hard to live well, to live happier. How to make this a reality, however, the answer is unclear, since one can think about happiness in many ways, it has just as many definitions. In order to define the term, various authors multiple times stretched back all the way to Aristotle, who had already differentiated between two definitions of happiness –hedon and eudaimonia (Aristotle, 1975). Since then, the concept of happiness has generated many debates (Besser, 2020; Greve, 2023) and can be classified as "chaotic concepts" (Renz, 2021), the only consensus being that it is a multidimensional concept. However, the number and content of the dimensions vary greatly between authors (see Haybron, 2000; Seligman, 2011), sometimes with conspicuous differences.

Such diversity might also be owing to the fact that the number of surveys and studies on happiness has increased by leaps in past decades. The concept and interpretation of happiness has become even more diverse in the professional literature, further complicating the traditional view; for instance, some authors often identify happiness with subjective wellbeing (Veenhoven, 2004; Jayawickreme et al., 2012), despite the fact that they are two different concepts. Nonetheless, this link already shows that wellbeing – just like happiness – does not have a widely accepted definition. According to authors Kun and Szabó, wellbeing is a complex umbrella concept, which has many measurable elements. "Each of these elements is a component of wellbeing, but none of them can define it alone" (Kun and Szabó, 2017, p. 282). The confusion is further exacerbated by the fact that the authors use the terms wellbeing, quality of life and welfare as synonyms on more than one occasion (Weijers, 2020; Ciziceno, 2022). It is no surprise therefore that studies investigating the quality of life resulted in more than 1,200 measurement tools by the mid-1990s (Stone et al., 2020). This relatively high number is in part attributable to fact that many of these researchers had not developed their own theoretical or empirical frameworks for their research (Claes et al., 2012), but only reinterpreted a previous approach. As a result of all this, Schalock and Alonso already identified more than 200 definitions related to wellbeing and quality of life in 2002 (Schalock and Alonso, 2002), and the number has increased significantly since then.

Perhaps the most renowned definition of subjective wellbeing is attributed to Diener (1984), who defines the concept of wellbeing by three factors: life satisfaction (LS), positive affect (PA), and negative affect (NA). In this sense, in addition to a general satisfaction with life, wellbeing requires a high level of positive emotions and a low level of negative emotions. Based on this approach, several measurement tools were created (e.g., The Satisfaction With Life Scale – Diener et al., 1985; The Scale of Positive and Negative Experience, The Flourishing Scale – Diener et al., 2010) that mark various components of subjective wellbeing. Measures with good psychometric properties related to the scales are mostly based on the frequency of the different emotions experienced. In our ever-accelerating world, these feelings often alternate at the speed of light, and the concept of wellbeing is less and less linked to a single specific situation (Wright and Cropanzano, 2000), but is rather characterized by a dynamic, fluid state (Robertson and Flint-Taylor, 2008). Digital technologies play a crucial role in these rapid changes, as they can trigger very high and very negative emotions almost at the same time. That is why in this study we provide a very broad interpretation of the concept of wellbeing. Starting out from Dodge et al.'s definition, according to which wellbeing is "the balance point between an individual's resource pool and the challenges faced" (Dodge et al., 2012, p. 230). Based on this, a state can be considered a stable state of wellbeing where the individual has the psychological, social and physical resources they need to meet a given challenge, so resources and challenges are in balance.

1.1 Teacher wellbeing

One of the most quintessential parts of wellbeing studies is looking into workplace wellbeing. Not only is this because employees spend approximately one third of their day at their workplace, but also the emotional and social experiences they collect while on the job later have an effect on them (Kun and Gadanecz, 2022). It is for this reason that we must get to know the characteristics of workplace wellbeing, for it helps us understand the ingredients that influence their health, job execution and work performance.

Every employer must be aware of the fact that their employees' mental health and wellbeing are integral factors in the performance and success of the institution (Page and Vella-Brodrick, 2012). Workers with lower wellbeing level are less productive, they more often make bad decisions, are more often absent from work, and they contribute to the institution's performance in a decreasing amount (Price and Hooijberg, 1992). Those with higher wellbeing better handle the stressful results (Wood and Joseph, 2010), are more easily motivated, have more positive workplace relationships, and are more satisfied with their work (Salas-Vallina et al., 2021). Beyond this, there is a clear tie between workplace wellbeing and performance, which is particularly true of such complex, demanding, and creative work, like teaching and researching (Krekel et al., 2019).

Empirical evidence shows that in school teachers are the most important factors that help along student success, satisfaction, and performance (Stronge et al., 2004; Barber and Mourshed, 2007). Therefore, teachers' workplace happiness and wellbeing are critical factors for a positive classroom environment and successful instruction. We read in the 24th point of the Council of the European Union's document regarding Europe's future teachers that: "The wellbeing of teachers and trainers influences their job satisfaction and enthusiasm for their work, and has an impact on the attractiveness of their profession, and subsequently on their retention in the profession. It is an important factor in quality and performance, correlating with their own motivation and with the motivation and achievements of their learners." (Council of the European Union, 2020, p. 16).

Appropriate to the significance of the topic, the wellbeing of teachers is set at the center of researchers' tests at an ever-increasing rate, where these researchers, in a multitude of ways, focus on teachers' personal, environmental, and relational factors (Brouskeli et al., 2018). The varied approaches almost naturally entail diverse definitions of teacher wellbeing. In the interest of harmonizing these definitions and being able to execute international studies on the topic, the OECD took up the task of forming an overarching model and concept framework about teacher wellbeing. In the document published in 2020, teacher wellbeing was defined as "teachers' responses to the cognitive, emotional, health, and social conditions pertaining to their work and their profession" (Viac and Fraser, 2020, p. 18). In this paper, we start from this definition.

The framework of teacher wellbeing formed in the course of the work laid out four critical areas: (1) cognitive wellbeing, (2) subjective wellbeing, (3) physical and mental wellbeing, and (4) social wellbeing (Viac and Fraser, 2020). Cognitive wellbeing refers to the set of skills and abilities that teachers need to work efficiently. Included in this is a particularly important factor: the extent to which teachers are able to learn new information and the extent of their self-efficacy and belief in their performance abilities. These beliefs influence how much energy they invest in their work, how persistent they are, and how much stress they take up. All of these have an impact on their educational practice, enthusiasm and commitment (Dreer, 2021; Bardach et al., 2022; Shu, 2022). OECD defined subjective wellbeing based on Diener's work as follows: "Good mental states, including all of the various evaluations, positive and negative, that people make of their lives and the affective reactions of people to their experiences" (OECD, 2013, p. 10). Teachers make contact with other persons on countless occasions: their students, the parents of those, their colleagues, the school management, different professionals, etc. Social wellbeing refers to the frequency, quality and depth of these interactions. The characteristics of keeping contact with others can have positive and negative impacts on the wellbeing of teachers. The conduct of students, an enjoyable session of further education, the support of colleagues and the management or, conversely, the lack of those things, have great influence on the practice of teachers and their work satisfaction (McCallum et al., 2017).

Of the four areas, the physical and mental wellbeing are where most of the problems lie, particularly that teachers suffer from more psychosomatic disorders than other groups (e.g., sleep-or memory impairment) (Scheuch et al., 2015), and stress caused by school was also measured to be high. The former is in no way a surprise, after all, teaching has been for a long time been counted among the most stressful professions (e.g., Travers and Cooper, 1993; Johnson et al., 2005). What is more, the stress factors hardly change, among the most substantial problems were and still are great workloads, lack of balance between work and private life, restricted autonomy, and excessive administrative commitments (Mercer and Gregersen, 2020). Based on the Wray and Kinman (2021) study carried out in higher educational institutions, the fact that the majority of those asked (71%) held that the wellbeing of the staff is not a priority for the university (71%) could play a role in mental overloaded-ness, what is more, three quarters of respondents thought that asking for help as a result of stress or mental health problems would directly impact their careers in a negative way (Wray and Kinman, 2021). In light of all this, it comes as so surprise, the stress level of teachers is continuously rising. According to one study, 72% of respondents said that they have experienced some sort of mental health problem in the past year (Savill-Smith, 2019).

The outbreak of the COVID-19 pandemic at the start of 2020 caused the situation to further deteriorate, the transition to the emergency distance learning practically caused the stress-and anxiety of teachers to drastically rise (Besser et al., 2020; Li et al., 2020). The pandemic completely changed the relationship teachers had with digital technology as well. Independent of prior attitudes and individual practices, this blight made the intensive application of technology mandatory for everyone. With the cessations of closing schools, the need to use tech stopped, but the expectation to use digital solutions in in-class (contact) teaching rose to a level beyond that of earlier. The effects of this process of change on teachers' wellbeing are

not yet known, but it seems doubtless that digitization has a double impact on mental, physical, social and emotional health (Passey, 2021).

In the past decades more and more studies focused on the mental health and wellbeing of university lecturers, especially since the responsibilities of teachers have changed due to the massification of higher education and its shift toward the service industries (Kinman, 2014). The development of new training curricula as well as the related assessment systems, including the new challenges involved in lecturers' performance evaluation, increased teachers' already high workload. This is a significant problem because, as former investigations into university lecturers' overload have shown, overload at the workplace has several deteriorating effects (Kinman and Johnson, 2019). For instance, it has a negative connection to teachers' performance (Janib et al., 2021), it is a significant risk factor for psychological health (Hobson and Beach, 2000), has a negative impact on work-life balance (Franco et al., 2021) and is a predisposing factor for a negative perception of wellbeing (Pace et al., 2021).

The appearance and swift spread of digital technologies presented teachers with new challenges. Many forecasted that new technologies will alleviate teachers' workload because they will facilitate a quicker completion of repetitive, time-consuming tasks and fasten communication and cooperation (Potter et al., 2022). However, today we have accumulated empirical evidence to show that rather than alleviating workload digital technologies are prone to increase them (Facer and Selwyn, 2021). On the one hand, they extend the timeframe of work, thereby increasing the amount of work to be done (Pollock and Hauseman, 2018). On the other hand, the deployment of new devices and programs continuously require teachers to acquire new knowledge and skills, which also increases workload (Haleem et al., 2022). To sum up, the continuous spread of digital technologies plays a role in both decreasing and increasing teachers' workload (McCallum et al., 2017).

As researchers of the Centre for Higher Education Research and Development (CHERD-H) at the University of Debrecen, we set ourselves the goal of getting to know the characteristics of the wellbeing, working conditions and productivity of university lecturers. Since the balance point between an individual's resource pool and challenges faced (Dodge et al., 2012) easily tilts, in our study we examined many factors related to the wellbeing of teachers, from sports habits to cultural consumption, from issues of higher education and pedagogy to stress factors. In this study, we intend to investigate the impact of digitization on the various areas of workload and work activities of university lecturers at a large university with many faculties, on the one hand, and teachers of institutions teaching in minority languages, on the other. Differences between genders and age groups are also mapped, because the findings related to groups formed according to these criteria are often contradictory. Certain studies (e.g., Guillén-Gámez et al., 2021) prove that there are no differences between the use of digital technology by male and female university lecturers, but other studies (e.g., Bandrés et al., 2021) identify several deviations. Findings based on respondents' age groups are also not clear, because in some previous research projects no differences were found between younger and older respondents (e.g., Inamorato dos Santos et al., 2023); however, other studies (e.g., Mora-Cantallops et al., 2022) measured a significant difference between the characteristics of teachers of different age groups.

We asked questions regarding each of the four areas of teacher wellbeing (Viac and Fraser, 2020). For the most problematic area,

physical and mental wellbeing, we examined workload and work-life balance. In terms of cognitive wellbeing, we inquired about methodological development. Regarding subjective wellbeing, we examined the perception of activities performed with digital tools. In terms of social wellbeing, we investigated different aspects of digital communication.

2 Methodology

2.1 Data and procedure

In the first phase of our research, in 2022, we conducted seven focus group interviews online with Hungarian-speaking teachers from higher educational institutions in Hungary, Transylvania, the Partium, Transcarpathia, the Uplands and Vojvodina ($N = 41$). The interviews investigated a broad scope of factors influencing the work of the lecturers, the various stressors and the available resources. Among the findings, it stands out that the institutional environment, appropriate infrastructure, including functioning technology, and continuous and efficient communication are key factors in terms of teachers' productive work and wellbeing (Kovács et al., 2024). In order to investigate the various factors more keenly using a broader sample, after analyzing and processing the interviews we compiled the online questionnaire that forms the basis of this research[1].

Basically, the questionnaire formulated closed questions, primarily 4- or 5-point Likert scale questions, but we also used nominal or ordinal scale questions. We created different question groups, examining the workload of the lecturers (5 questions, Chronbach's $\alpha = 0.723$), and how much they consider different activities (e.g., research, publishing) as their responsibilities in addition to teaching (14 questions, Chronbach's $\alpha = 0.803$). The wide scope of activities also raises the question of how it is possible to establish and maintain the a work-life balance, which was also examined through several questions (10 questions, Chronbach's $\alpha = 0.883$). The performance of various tasks very often requires digital communication (3 questions, Chronbach $\alpha = 0.704$) and an increasingly intensive use of digital tools (7 questions, Chronbach $\alpha = 0.737$). Therefore, we investigated these areas, too.

The research focused on teachers at one of the biggest universities in Hungary, situated in a disadvantaged region, the University of Debrecen, on the other hand, we intended to examine the teachers of minority Hungarian higher education institutions across borders linked to the University of Debrecen, too. The idea behind this was to map any differences that might be detected in the characteristics of target groups despite the common basis of the mother tongue.

In order to ensure that the study yields representative data, we strove for a sampling rate of at least 10% per institution, but in the case of the University of Debrecen, the target was the same value per faculty. We sent the link to the online questionnaire to all lecturers of the institutions under survey in the spring of 2023 after obtaining permissions from the heads of the institutions, thus ensuring probability sampling. Each institution was sent two letters of invitation, but institutions with a proportion of respondents under

10%, a third letter was sent out to the lecturers of the relevant faculties. Such a letter was only necessary in the case of two faculties at the University of Debrecen, but in the end here as well the target percentage was reached, and final completion rate for the entire institution amounted to 16%. We achieved much higher rates in the minority higher education institutions across the border, which was primarily due to the fact that the staff of certain institutions was rather low, in several cases under less than 50 people. The database created obtaining the data was named Central and Eastern European Teachers in Higher Education (CEETHE 2023). IBM SPSS 29 software was used to analyze the data, employing Chi-Squared test, Mann Whitney test, Wilcoxon test and One-way ANOVA test.

2.2 Participants

After completing the questionnaires, the responses of 596 respondents were included in the database created for data cleaning. The greatest amount of responses ($n = 356$) came from the largest institution, the University of Debrecen. In the case of Hungarian minority higher educational institutions across the border, the numbers and institutions were as follows: Romania's Babes-Bolyai University, Emanuel University, Nagyvárad State University, Partium Christian University and Sapientia Transylvanian Hungarian University ($n = 113$); Serbia's Technical College of Subotica and the University of Novi Sad ($n = 40$); Slovakia's University of Eperjes and János Selye University ($n = 35$); and Ukraine's Ferenc Rákóczi II Transcarpathian Hungarian College and Ungvár National University ($n = 52$).

Throughout the course of the data processing, not only in area did we divide our respondent pool into two subgroups (those from Hungary and those across the border), but also we took into account gender and age. At the University of Debrecen and the cross-border institutions, the gender division of teachers was quite varied. Among respondents from Debrecen, the ratio of the two genders was practically identical (50.1% men; 49.9% women), while, among foreigners, women were significantly overrepresented (39.6% men, 60.4% women). This disproportion is first of all due to the fact that the cross-border institutions involved in the study were usually engaged in some level of teacher training program, which based on the type of training (similar to public education) had markedly more women participating as teachers. Our respondents were separated into three subgroups according to age (average age 45.25 years; SD = 10.25), since it was often possible to show generational differences regarding the use of digital technology. These three age groups were as follows: younger than 40: (187 persons- 32%), 40–49 year olds (206 persons – 35.2%), and older than 49 years (192 persons – 32.8%).

3 Results

First, we examined the workload of university teachers (Table 1), which, based on more research, belongs among the basic sources of stress. During our study, based on the answers of the respondents, they are undoubtedly overburdened, with only 25% of them stating that on an average week they work for about 40 h of work (the official amount of hours to be worked). Everyone else testified of higher working hours than this, a quarter of respondents saying that they

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1 https://evasys.unideb.hu/evasys/online.php?p=5EZUT

TABLE 1 The weekly workload of respondents.

Hours		University of Debrecen	Foreign	Man	Woman	Total sample
36–40	Person	70	78	48	96	148
	%	19.7%	32.9%	17.7%	30.5%	25.0%
41–45	Person	82	72	73	80	154
	%	23.1%	30.4%	26.9%	25.4%	26.0%
46–50	Person	93	41	61	73	134
	%	26.2%	17.3%	22.5%	23.2%	22.6%
51–55	Person	51	30	52	29	81
	%	14.4%	12.7%	19.2%	9.2%	13.7%
56–60	Person	38	9	19	27	47
	%	10.7%	3.8%	7.0%	8.6%	7.9%
>60	Person	21	7	18	10	28
	%	5.9%	3.0%	6.6%	3.2%	4.7%
Total	Person	355	237	271	315	592
	%	100%	100%	100%	100%	100%

Source: CEETHE 2023 database.

work 50 h a week. Men respondents work significantly ($p < 0.001$, Cramer's $V = 0.224$) more (mean = 47.3 h at mean intervals) than women (mean = 45.4), and teachers at the University of Debrecen (mean = 47.4) are more burdened with workload ($p < 0.001$, Cramer's $V = 0.222$) than their colleagues across borders (mean = 44.6). At the same time, among the various age groups, there is no difference in this regard.

One of the important jobs of teachers in higher education is teaching. Due to changing expectations and circumstances, it is needed to continuously try and implement new and innovative teaching methods. Our respondents understand these expectations, the majority (85.9%) completely or for the most part see this development as their job. Women identify with this task far more (89.9%) than men (80.1%) ($p < 0.001$, Cramer's $V = 0.226$), and it is also a noticeable difference among the age groups ($p < 0.003$, Cramer's $V = 0.130$): in contrast to the general assumption, the oldest age group (those above 50) consider it their job to try out the new teaching methods (90.5%).

In this renewable process, digital devices and solutions play an ever-increasing role which can appear in every type of class. The majority of our respondents use digital devices in every or almost every class they hold. After examining the subgroups, it was only among the Debrecen and cross-border respondents that we found the question significant ($p = 0.005$, Cramer's $V = 0.264$), and difference (Table 2), more frequent than the Debrecen teachers' use of devices during lectures. In other types of classes, the level of technology use was already lower, but, almost a quarter of teachers doing field training (24.2%) utilize digital devices in every class type.

The problems connected to digital devices that appear during teaching can cause quite unpleasant moments for the teacher, especially, if these devices play an integral role in the make-up and the execution of the class. It is for this reason that we asked our respondents, to what extent they consider the moment stressful when their devices do not work as expected? Most of those who filled out the survey (54%) considered such times significantly or very heavily

TABLE 2 How often do they use digital devices during lectures?

		University of Debrecen	Foreign	Total
I do not use digital devices at all	Person	4	3	7
	%	1.2%	1.3%	1.2%
Rarely	Person	7	17	24
	%	2.1%	7.3%	4.3%
In half the classes	Person	9	13	22
	%	2.7%	5.6%	3.9%
In most classes	Person	57	48	105
	%	17.2%	20.7%	18.7%
All the time	Person	254	151	405
	%	76.7%	65.1%	71.9%
Total	Person	331	232	563
	%	100%	100%	100%

Source: CEETHE 2023 database.

stressful. Of the subgroups, only the men and women gave differing statements ($p = 0.037$, Cramer's $V = 0.233$), the total of women experienced these happenings in a more negative way (Table 3.).

One of the special modes of the teaching application of digital solutions and of information and communication technologies (ICT) is online teaching. Near two thirds (64.2%) of respondents view the planning and creation of a learning-teaching environment as their job, though it is possible to see significant difference between the subgroups ($p < 0.001$). The cross-border teachers (73.1%, Cramer's $V = 0.223$), as well as the women (69.8%, Cramer's $V = 0.221$) consider this task more to be their own, than the teachers of the University of Debrecen (58.2%), and the men (56.9%). Among the three age groups,

TABLE 3 To what extent do you consider stressful the situation when digital devices do not work in class?

		Man	Woman	Total sample
It does not stress me at all	Person	21	17	38
	%	8.0%	5.4%	6.6%
It does not stress me so much	Person	50	38	88
	%	18.9%	12.0%	15.2%
It does and does not stress me	Person	65	76	141
	%	24.6%	24.1%	24.3%
It stresses me	Person	105	141	246
	%	39.8%	44.6%	42.4%
It is very distressing	Person	23	44	67
	%	8.7%	13.9%	11.6%
Total	Person	264	316	580
	%	100%	100%	100%

Source: CEETHE 2023 database.

however, the middle group (40 year-olds) members identify most (68.2%) with the task. It is worth highlighting that at our respondents' workplaces their full-value work in distance learning with digital support is only recognized to a small extent (35.5%), thus, these percentages can be seen as expressly high.

Digital devices are naturally not only used in the classroom by respondents, but for other purposes as well. As a result, this is a rather frequent activity for 75.2% of respondents to use their devices for at least 5 h a day on average. Furthermore, 22.8% of those who filled out the survey partake in this activity for more than 8 h per day. Thus, the average time spent using technology is 5.9 h. In fact, there is no difference in the length of time of usage for employees in other countries, neither among men and women, nor among age groups. This value is equally high for all subgroups. Regarding using technology during the week, difference only appears between Debrecen and cross-border respondents in that the time spent in front of a screen for work is far higher in the previous group. Altogether 53.4% of people from Debrecen, 43.2% of respondent cross-border citizens stated that ($p = 0.013$, Cramer's $V = 0.257$) three quarters of the time spent with digital devices was used to carry out tasks for work. This changes when it comes to the weekend, and not just in the fact that our respondents spend a good 2 h less (3.8 h) in front of the computer. The screen time of men on the weekend (4.1 h) is on average a half hour more than that of the women ($p = 0.041$, Cramer's $V = 0.241$), while the women sit down to the computer for work in a greater ratio than the men ($p = 0.044$, Cramer's $V = 0.140$). Among the three age groups variation was also found: on the weekend, the oldest group spends far more time with digital technology for work, than with the younger group ($p = 0.004$, Cramer's $V = 0.150$). While 34.3% of those above 49 years of age spend three quarters of their screen time with work, this ratio of doing work is typical of only 16.2% of the younger group (younger than 40).

For university teachers, doing work not only refers to teaching. An equally important expectation of them is publishing in ever-increasingly prestigious journals and with highly listed publishers. The

youngest group ($p = 0.04$, Cramer's $V = 0.106$) feels that this is a rather overwhelming expectation (51.1%), the same, for the older generation, is not such a frustrating feat (37.7%). The difference between the genders, however, shows that more teachers from the University of Debrecen (46.2%) feel greater pressure ($p = 0.007$, Cramer's $V = 0.187$) to publish than the cross-border teachers (42.6%). The interiorization of external expectations, however, varies in amount and direction in these two groups. The Debrecenians (59.9%) consider it more their job than the cross-border teachers (43.5%, $p < 0.001$, Cramer's $V = 0.211$) to publish in Q/D-level journals and in international foreign language volumes. Regarding publishing in the mother or state tongue, however, the situation is flipped ($p < 0.001$), with the foreign teachers identifying in greater number (49.4%) with the task than Hungarians (39.8%).

Digital technology also has an impact in this area. Our respondents in large part (57.2%) or fully agree with the statement that with the help of digital technology they can more easily meet scientometric expectations. Of the 596 respondents only 19 (3.2%) disagree with this postulate, the majority of whom work in the natural sciences or medical departments.

Using digital technology for work (as we previously saw with the majority of our respondents) has advantages, first, if the work done with the help of technology is less cumbersome than its traditional form. A third of our respondents (34.6%) think this, and many (39.5%) cannot decide if there really are any positive impacts on work. However, 30.7% of cross-border teachers hold that activities conducted through technological tools is more exhausting than doing the intellectual work without them. In contrast, among the Debrecen respondents significantly fewer ($p = 0.015$) teachers share this opinion (22.6%).

The amount of time spent working and using devices shows that the work and private lives of our respondents have to some extent blurred together. And we examined what role, according to opinion and testimony, tech devices have to play in this. According to a third of the teachers (32.7%), there is no such relationship, or the effect is only minute. Another (neigh) third (30.6%) said that the tie is doubled, that is unclear. The third of respondents (36.7%), however, stated that digital devices play a significant role in the amalgamation of work and private life. It may come as somewhat of a surprise, but among the subgroups formed by gender or age there is no difference in the judgment of the examined effect. Yet, the foreign respondents, more than the employees of the University of Debrecen, consider the role of devices in the blurring of work and private life more significant ($p = 0.012$, Cramer's $V = 0.248$) (Table 4).

Taking into consideration the long screen time and the aforementioned analyzed role of digital technology, the question arises, to what extent can our respondents easily find the balance between offline and online activities? Nearly a quarter of interviewees (26.8%) think that this is not too difficult a task, a third (34.2%) say that it is not at all or not very easy. Though there is no difference between the age groups as regards the amount of time devices are used, for the oldest group creating a balance is somewhat easier ($p = 0.036$, Cramer's $V = 0.219$), among them 32.4% either completely agree or simply agree with the statement.

Using these devices greatly sped up and intensified communication. There is no need to wait for days or even weeks for a reply letter to be sent by post, as was the custom several decades ago. What is more, there is no need to wait for in-person meetings, any thoughts and happenings can be shared with friends through a chat

or short text message. It is not entirely necessary to respond to these messages or received emails right away, especially in a very stressful situation, where it would be better to respond more thoughtfully and calmly at a later date. For our respondents, however, only 31.9% agree with the statement that digital technology's asynchronous communication makes solving the problem more thoughtful, thus decreasing stress levels. Though the cross-border teachers and those over 50, in considerably greater numbers, think this way (35.1%, $p = 0.04$, Cramer's $V = 0.230$; also 37.6%, $p = 0.032$, Cramer's $V = 0.221$), altogether this does still mean that the interviewees do not feel the stress-lowering effect in connection with asynchronized digital communication.

During the course of our previous interview test, many vocalized, regarding the communication effect of digital technology, that multiple times they receive emails that are content-wise incomplete, and stylistically inappropriate. In contrast, our respondents' majority

(47.2%) said that students are able to communicate digitally with teachers in the appropriate manner. Almost a third of those asked (30%) could not clearly convey their opinions on the question, and only a fifth (22.8%) think that student communication is inappropriate. What is surprising is that while 30.8% of the youngest respondent age group (those under 40) are dissatisfied with student digital communication, 21.9% of 40 year-olds and 15.9% of 50 year-olds share this feeling ($p = 0.003$).

Among the effects of digital communication is the phenomenon that not only students, but also colleagues and leaders can more easily and more quickly reach teachers in higher educational institutions. However, this continuous availability can be bothersome to them, 49%, almost half, of respondents considered this irritating, and only a few (5.8%) viewed it as no problem at all.

Finally, we posed an overarching question to the teachers regarding using digital technology in higher education. Almost all of those asked thought that they could not imagine higher education without digital technology. However, interestingly, four persons (from separate fields) completely rejected the statement. Their answer was especially surprising because they personally used this technology several hours a day, while, with the exception of one colleague (from the music faculty), most also used it in their classes. Regarding the subgroups (Table 5), it can be said that the teachers of the University of Debrecen ($p < 0.001$, Cramer's $V = 0.277$), and men ($p < 0.013$, Cramer's $V = 0.148$) agreed with the tested statement in greater numbers than the cross-border teachers and women.

4 Discussion

Using digital tools and solutions is not only an opportunity for teachers but also somewhat of a requirement, a compulsion even. As a result, they have to transform and modernize their previous solutions and methods, on the one hand, and on the other, they have to launch a permanent learning process, given that digital tools are constantly changing, developing, and new inventions and programs appear, while knowledge of these can only be achieved through continuous self-education. Many people tend to forget that even though these new tools provide their users with countless new

TABLE 4 The amount of agreement with the statement: "the blurring of work and private life is decidedly thanks to digital devices."

		University of Debrecen	Foreign	Total
I completely disagree	Person	64	28	92
	%	18.1%	11.9%	15.6%
I disagree	Person	67	34	101
	%	19.0%	14.4%	17.1%
I neither agree nor disagree	Person	106	74	180
	%	30.0%	31.4%	30.6%
I agree	Person	83	83	166
	%	23.5%	35.2%	28.2%
I completely agree	Person	33	17	50
	%	9.3%	7.2%	8.5%
Total	Person	353	236	589
	%	100%	100%	100%

Source: CEETHE 2023 database.

TABLE 5 The amount of agreement with the statement: "I cannot imagine higher education without digital technology."

		University of Debrecen	Foreign	Man	Woman	Total sample
I completely disagree	Person	0	4	3	1	4
	%	0.0%	1.7%	1.1%	0.3%	0.7%
I disagree	Person	7	6	7	6	13
	%	2.0%	2.5%	2.6%	1.9%	2.2%
I neither agree nor disagree	Person	31	31	31	31	62
	%	8.8%	13.1%	11.6%	9.8%	10.5%
I agree	Person	77	72	49	97	149
	%	21.8%	30.5%	18.4%	30.6%	25.3%
I completely agree	Person	239	123	177	182	362
	%	67.5%	52.1%	66.3%	57.4%	61.4%
Total	Person	354	236	267	317	590

Source: CEETHE 2023 database.

opportunities, their use can have not only benefits, but also negative consequences, as much as to threaten the wellbeing of users (Viac and Fraser, 2020). In our research, we wanted to examine the impact of digitization on the various aspects of university lecturers' workload and work activities.

Previously more studies proved that for teachers one of the most severe stress factors was a large workload (Garland et al., 2020; Iyaji et al., 2020; Mercer and Gregersen, 2020). The university instructors we examined also testified of this high workload and from their answers it was also found that digital technology plays a big part in doing their work. When starting from generational theories, we examined the data from the direction of various age groups. Neither were we able to show generational differences in frequency of use, nor in the stress-generating effects of technical issues [in contrast to the Mercader and Gairín (2020) pair]. We were, however, able to discover that our respondents use digital tools in class rather often, especially for lectures. The lower usage value regarding all the other class types, along with the results of other studies (e.g., Marín-Díaz et al., 2020) it has become clear that in lectures it is only the demonstration portion that restricts the use of ICT. Due to its basic function, it is particularly critical that during these classes the tools for demonstration work well, thus, it is no surprise that for our respondents technical problems that occur mean substantial (techno)stress situations (Brod, 1984), for women in particular. Apart from this area, however, in the in-class use of ICT itself and the frequency thereof, we found such gender differences as Bandrés et al. (2021), who found multiple variations between men and women, specifically regarding stance and attitude. According to their results, female teachers see greater potential in using and applying ICT in teaching, but we did not address this question in this study.

Another serious stress factor for teachers was the blurring of work and private life (Garland et al., 2020; Fetherston et al., 2021), and according to our respondents digital technology weighs in very heavily in this process. On one hand, technology makes it possible to work from anywhere, thus some of those working hours are spent within the four ways of the home. Often the teachers themselves encourage this, because one's own personal space is calmer, more comfortable for certain tasks (for instance, the majority of publications are born out of the studies and offices in the home). On the other hand, digital technology changes not only the places of doing work, but also the time as well, in short, a new task can be sent out or given at any time. Continuous availability truly is one of the greater negative aspects of digital communication (Bordi et al., 2018; Potter et al., 2022), which bothers a significant number of our respondents, what is more, it irritates them. In this regard, in particular, the boss or supervisor at the workplace is greatly responsible. If they would not send urgent emails demanding immediate response, not only once but many times, and if the teachers' mobile phones would not ring because of question from the workplace, then peaceful rest and regenerating process would not cease. These results ring true for Czerniak-Swędzioł et al.'s findings as well, according to which teachers feel that digital technology is useful in their work, but their private life pays the price (Czerniak-Swędzioł et al., 2021). It is not surprising that various companies have now in policy regulated after-work emailing, that they might promote the switch to offline mode and to rest. On the other hand, no such example could be found in the field of higher education, in spite of the fact that as early as 2007 Grawitch et al. proposed the

need to include restrictions ensuring teachers' work-life balance in deeds of higher educational institutions (Grawitch et al., 2007).

Other significant stressors in the lives of university lecturers include the pressure to publish (Barton et al., 2023). This is a particularly severe factor for anxiety, since the failure to meet publication expectations often results in the loss of one's job (Urbina-Garcia, 2020). From among our respondents the young and the University of Debrecen instructors feel that the pressure on them to publish is ever-increasing. The respondents understand that it is one of their tasks, but their answers varied regarding this expectation. The Debrecenians, in step with the international trend (Nicholls et al., 2022), see publishing in Q/D-level journals and international foreign language volumes as their job, while cross-border teachers view publishing in their mother tongue (or the state language) to be their priority. The difference springs from the fact that cross-border respondents are the teachers of Hungarian-speaking, minority institutions. Their mother tongue is not the same as the state language, therefore, they need to ensure that their proficiency in the state language is high as well, for this is the only way that they would be able to organically integrate into the professional life of their country.

In order to convey academic results one must already have many thousands of professional journals at his disposal, likewise, these without exception must be available in digital format (as well) and in most cases the publishing process itself must be manageable online (Demeter and Istratii, 2020). Certainly these play a part in the majority of our respondents thinking that, with the help of digital technology, the scientometric expectations are more easily fulfilled. The ease not only means an increase in opportunities due to simpler access, but also it points out that work done with the help of technology is less straining than its traditional form. In summary, a little more than a third of our respondents think this, but almost one third of cross-border teachers think that this type of activity is more exhausting than conducting intellectual work without the use of digital tools. Those who think this, when they can afford to, clearly excuse themselves from work using ICT.

5 Conclusion

The wellbeing of the individual is today indisputably connected to the world of online information, and with those digital tools and technologies that create interface with that world (Burr et al., 2020). However, the expectations coming from the digital world are continually changing, increasingly new technical tools and software appear, thus the scale of challenge-resource (Dodge et al., 2012) is repeatedly tipped out of balance. In order to overcome a new challenge, an individual tries to mobilize new assets, and, if successful, a new balance can be achieved. Nevertheless, this new state will still differ from the previous place of rest. The state of wellbeing, therefore, is not static but dynamic, able to maintain with intervention, some small, some great. The online sphere that sprung up beside the offline world and has an ever-growing role made it necessary to intervene, for, digital technologies constantly generate new challenges. The shifting power field transforms the work and activities of the university teachers, so, the characteristics of their wellbeing constantly change. In our study, we attempted to get a grasp on these characteristics.

There is no question that newer significant waves will upset the balance of wellbeing, after all, the post-COVID new norms have not even formed, and artificial intelligence (A.I.), for example, is already

here, the arrival of which has already brought on quite a few new challenges. Despite all the arguments and uncertainty, however, the applicability of A.I. in the teaching process is unquestionable. Applied directly to teaching, it can be used in at least 10 different ways (Yufei et al., 2020). Since the limits of applying artificial intelligence cannot be predicted in either the school, work, or private life, it necessary to give the youth in today's education system such dynamic, improvable knowledge which, once in their possession, will make them able to compete, and collaborate with A.I.

All of this must, of course, be actualized without having digital technology rule both the teachers' and the students' every day, because, if it is technology dominated, their wellbeing will most certainly swing out of balance. In our modern, ICT tool-networked world, one of teachers' important jobs should be to provide and help students in forming and maintaining the balance in their wellbeing. For this, they must first start a „digital detox" (Syvertsen and Enli, 2020), they must learn the conscious use of ICT tools and their resources in such a way that they can form the balance between their online and offline lives. In order that this may be realized, institutions of higher education need to develop training programs in two directions rather urgently. One direction aims at the continuous development of digital competencies, because with suitable preparation instructors can save a lot of time and energy, and their confidence in the use of tools can also reduce their anxiety about technological problems. The other group of training programs wishes to support a more conscious device use and provide assistance in finding a healthy work-life balance.

6 Limitations and suggestions for future research

Our research has certain limits due to its analytical nature. The questionnaire covered several partial areas, so completing the entire material was quite time-consuming. This may have reduced the number of respondents, but at the same time it created a framework for drawing a complex picture, which still needs to be carried out. To do so, another brief questionnaire should be compiled - in addition to background questions -, which is specifically related to the use of digital technology, and which could cover specific digital options available to and also needs of the individual fields. For example, there can be a significant differences between the characteristics of a university instructor who teaches the use of some notation or composition software for music and another one that teaches the design of a smart home control system.

Differences resulting from the various sizes and organizational cultures of the different institutions (the University of Debrecen and minority Hungarian higher education institutions not based in Hungary) may have had an impact on the responses of the lecturers. In a new study it would become possible to compare the characteristics of institutions of similar sizes and a similar range of training programs. For the comparison to be made, researchers need to disclose the characteristics of organizational cultures, house rules and procedures related to the use of digital technologies, and all available internal training programs.

Another limitation is that current experiences with digital technology can distort the picture. Respondents are more prone to mark negative values if they have had a major technical problem with a device or program in the period immediately prior to completing the questionnaire. The answers may also be influenced by the individual level of digital competencies, but the size and length of the questionnaire did not accommodate other questions related to this. In a more recent study, however, educators' digital competencies might be explored, for example, by using the European framework for the digital competence of educators (DigCompEdu).

Data availability statement

The data that support the findings of this study are available from the corresponding authors, but restrictions apply to their availability. These were used under license for the current study, and, so, are not accessible by the public. Data are however available from the corresponding authors upon reasonable request and with permission of the School Ethics Committee of Doctoral Program on Educational Sciences at the University of Debrecen.

Author contributions

AB: Writing – original draft, Writing – review & editing. KK: Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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