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Online Teaching in the Times of COVID-19 and the Change in Work Time Distribution of Faculty Members

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Abstract

The COVID-19 pandemic and the emergency remote teaching it caused disrupted the academic life and caused the change of priorities for everyday faculty activities. Several prior reports indicate an increase of the overall work effort, and in particular the time spent on teaching activities at the expense of research activities. In this paper, we investigate this further, exploring how the time spent on respective faculty activity kinds actually changed, checking to what extent the change was general, and identifying factors which could explain any differences found among academics. The analysis is performed on data obtained in a survey answered by 172 respondents from 13 countries. While many findings from earlier reports are confirmed, several novel interesting observations are made. Two relevant directions for IS research are indicated.

Keywords

remote teaching effort, IT-enabled disruption, faculty overworking, pandemic consequences.

Introduction

The ongoing COVID-19 pandemic forced higher education institutions of the world to switch to online instruction (Watermeyer et al. 2021). Due to the pressing circumstances and abruptness of this change, its result is considered as *emergency remote teaching*, in contrast to well-planned online teaching (Hodges et al. 2020). In various countries, many of the faculty members were not prepared for this change – for instance, Watermeyer et al., who surveyed 1148 academics in UK, report that over 50% of their respondents answered they had not been prepared to deliver online learning, teaching and assessment (Watermeyer et al. 2021, p. 626). Preparing online courses requires time—according to Defelice, it takes on average 48 hours to develop a single unit of e-learning course even in its simplest (passive "page-turner") form (Defelice 2020). But it also requires skills, which many of the faculty members lacked—for instance, the Kuwaiti academics surveyed by Banna put inadequate instructor training (with 48% respondents who agreed) at the top of their list of technology-related impediments to online teaching (Banna 2022, p. 241)—and had no time to acquire.

What augments the problem is the faculty overworking, a long-known phenomenon—between 1972 and 2003, the share of faculty who work more than 55 hours a week has grown from 13 to 44 percent (Schuster and Finkelstein 2006). It reached alarming levels even before the appearance of COVID-19: according to Bothwell, who surveyed 2,379 higher education staff from UK, USA and Australia, 40% of university faculty worked 10 or more hours per weekday including weekends and holidays (Bothwell, 2018). The pandemic made the situation even worse: according to The Chronicle of Higher Education's survey of 1,122 American faculty members, 82% of female and 70% of male faculty members reported increased workload during the first months of the pandemic (The Chronicle of Higher Education 2020, p. 13). The discrepancy between sexes is confirmed by De Gruyter's survey, involving 4,150 academics from 103 countries, of which 53% women and 33% men declared that the hours they had to work after the

pandemic broke out had a severe impact on them (De Gruyter 2020, p. 13). The results of Kotini-Shah et al., based on 497 responses from faculty members, indicate that during COVID-19 pandemic women reported more stress than men with respect to scholarly productivity, teaching, and advising (Kotini-Shah et al. 2021). The increased levels of stress and anxiety are the first on the list of complaints caused by remote working, noted by Parham and Rauf who interviewed 122 academics from 21 countries of the world; the other reported problems were: headaches, eye stress and tiredness, backache and weight gain, which all can be attributed to the lack of movement and sitting behind a computer for a long time (Parham and Rauf 2020, p. 397).

The pandemic situation has severely impacted academics' work-life balance, understood as "a self-appraisal of how well one combines work with non-work roles" (Casper et al. 2018). According to the already quoted The Chronicle of Higher Education's survey, 74% of female and 63% of male faculty members declared that their work-life balance had deteriorated (The Chronicle of Higher Education 2020, p. 13). Moreover, 73% of respondents seriously considered retiring or leaving higher education since the start of 2020 (The Chronicle of Higher Education 2020, p. 11). Matulevicius et al. in their survey of 1186 medical, graduate, and health professional school faculty, point to women again as those more likely than men to consider both leaving or reducing employment to part time (Matulevicius et al. 2021).

As shown by AbuJarour et al., family-work conflict negatively affects researchers' productivity (AbuJarour et al. 2021). Among De Gruyter's survey respondents, 48% of female and 28% of male scholars had difficulty staying engaged and productive (De Gruyter 2020, p. 13). Krukowski et al. who surveyed 284 members of faculty in science, technology, engineering, mathematics, and medicine in the United States found out that women's self-reported article submissions decreased significantly during the pandemic whereas men's article submissions did not (Krukowski et al. 2021).

The data presented above raise a serious concern about well-being and work-life balance of faculty members in the times of COVID-19 and the emergency remote teaching it imposed. Regardless of how well the pandemic will be coped with in epidemiological terms, its consequences may last long unless properly addressed, possibly with a reduction or rearrangement of faculty duties. But for that, more clear image of the problem is needed, as not all of its aspects were addressed by prior studies.

In this paper, we investigate the change in work time distribution of faculty members which happened during the COVID-19 pandemic. As indicated by the results found in the reviewed literature, the forced switch to online teaching resulted in an increase of the total faculty work effort. It is not clear, however, how the respective kinds of work activity that most faculty members engage in were exactly affected. Was the increase caused solely by the extra time spent on teaching (and preparing online teaching materials), or, somehow, the time spent on other activity kinds was similarly extended? To what extent the increase was general, or what share of faculty members experienced decrease of their work time? And could such a difference be easily explained by academics' gender or age, as implied by some of the described studies? These form the basic research questions that we would like to answer in the following sections.

Research Method

An online questionnaire has been developed to collect data from faculty members, consisting of three sections, containing respectively: questions regarding time spending before and during the pandemic, questions regarding the impact of COVID-19 pandemic on time spending, and demographic questions. We distinguished three main forms of time spending: sleep, work (including commuting to workplace), and leisure. As for work time distribution, we followed the traditional distinction of teaching, research and service (Schuster and Finkelstein 2006, p. 77), however dividing the last one into organizational (services for the primary employer, such as helping with student recruitment, preparing administrative reports, and participation in internal meetings) and community activities (paid and unpaid services not for the primary employer, such as reviewing research works, editing journals, expertise for business and government, and work within professional associations).

The survey respondents were recruited by email invitation using our personal and professional networks. The invited faculty were primarily from the areas of management sciences (particularly IS) and computer science. During six weeks from 28 June to 10 August 2020, 174 answers were collected, from which 2 were removed as incomplete, giving a total of 172 usable questionnaires. The average recorded survey completion time was over 13 minutes. The collected data were analyzed using graphical analysis.

The respondents comprised 59% male and 39% female faculty members (the remaining 2% chose Other / Both / Prefer not to say) from 13 countries. Most of the respondents came from Poland (78%), then India (5%), Germany (4%), and Portugal (3%). The remaining countries with at least two received answers were: Australia, Czechia, Denmark, Lithuania, Romania, South Africa, and Sweden; only one answer was received from Canada and Malaysia.

The primary employer of 82.50% of the respondents was a public educational institution, 12.50% represented commercial educational institutions, and 5.00% non-profit institutions. Figure 1 presents the distributions of age (left) and job position (right) of the respondents.

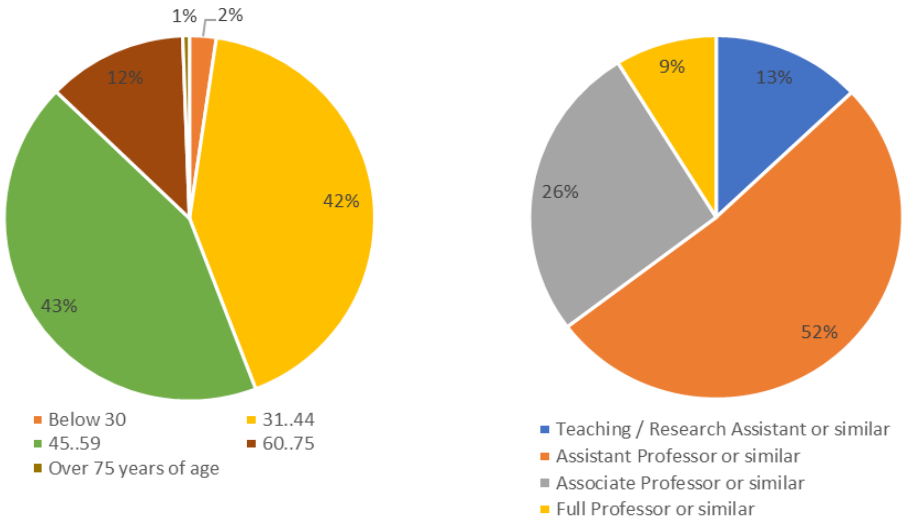

Figure 1. Age and Position of the Respondents

Faculty Time Distribution Before and During the Pandemic

Figure 2 shows how, on average, the pandemic changed the shares of time spent by the surveyed faculty members, respectively on work (Figure 2, left), sleep (Figure 2, center), and leisure (Figure 2, right)—the height of each column represents the share of respondents.

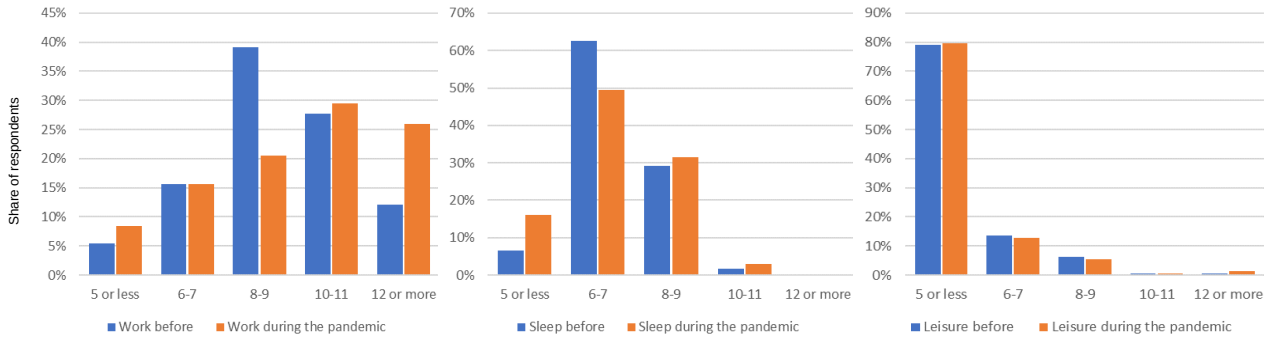

Figure 2. Change in Work, Sleep and Leisure Time (Hours/Day)

As the left chart on Figure 2 reveals, the number of faculty members working more than 12 hours have more than doubled (from 12% to 26%) after the pandemic broke out. There is a slight increase (2 percentage points) of those working 10-11 hours, and interestingly, also an increase of those working the least (3 p.p.), indicating that the new situation reduced the work time of a part of faculty, albeit a small one. The donor group are those working 8-9 hours per day, which was nearly halved. Note that this group

was the most frequent before the pandemic (39%), but during it, it has been surpassed by both "10-11" and "12 or more" groups (amounting together to 56%), indicating an increase of the typical length of academics' daily work time.

Looking at the leisure time chart (Figure 2, right), it seems that academics, on average, did not sacrifice their leisure, or, which seems even more probable, the change could not be measured with the instrument—as already before the pandemic, 79% of the respondents qualified to the bottom interval, spending less than 5 hours daily on leisure activities. The sleep time chart (Figure 2, center) suggests that the extra work time came mostly at the cost of shorter sleep duration: the share of those sleeping 6-7 hours daily dropped by 14 p.p. to 49%, whereas the share of those sleeping 5 or less hours increased by 9 p.p. to 16%. These numbers should raise serious concern, as those sleeping less than 7 hours are more likely to suffer from various difficulties, such as being unable to concentrate, and long-term sleep deprivation has a negative effect on mental and physical well-being (Centers for Disease Control and Prevention 2011).

Faculty Work Time Distribution Before and During the Pandemic

The distribution of faculty members' work time is shown in Figures 3 and 4. The left side of Figure 3 indicates that the share of academics doing little to none research work (less than 2 hours per week) doubled during the pandemic. Looking at the detailed data, the largest transfer to this group was from those who before the pandemic worked on research below 8 hours per week; overall, 30% of the respondents worked on research less than before the pandemic and 14% worked more. Looking at the right side of Figure 3, the number of those spending more than 30 hours per week on teaching and related activities rose from 10% to 24% during the pandemic. A decrease was observed for all remaining groups (the largest drop was reported among those who spent 5-8 hours per week on teaching activities before the pandemic) with the exception of the slight growth of the group teaching less than 2 hours per week (which may be related to the cancelation of certain types of classes during the pandemic, such as those requiring on-site teaching).

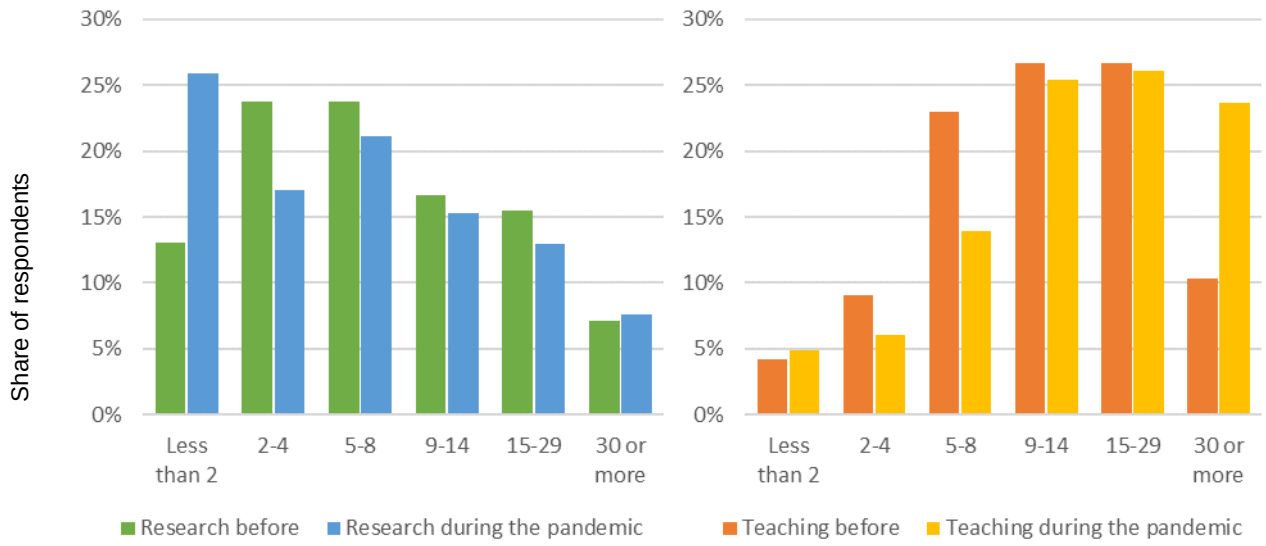

Figure 3. Change in Research and Teaching Time (Hours/Week)

The charts in Figure 4 are difficult to interpret, as movements in both directions happened. Many academics greatly reduced their time spent on services, both on behalf of their organization and to the outside world, which is illustrated with the large growth of those spending less than 2 hours per week on such activities. There are several causes that, combined, could explain this change. First of all, the involvement in services, especially to community, is to much extent voluntary, making it the activity class which it was easiest to reduce involvement in when more time was needed to spend on teaching-related activities. Secondly, a lot of services had no longer to be served or changed in their form; in particular, this

applies to various events and meetings that were canceled or turned online which significantly reduced the time effort needed for their organization and taking part in them. On the other hand, a growth of the number of academics spending 30 or more hours per week on both types of service work is clearly visible (and the growth in the group spending 15-29 hours weekly on organizational work is even stronger). We can suspect these are mostly the people carrying the burden of the change to the new conditions—on behalf of the organizations employing them or other parties as an element of community service.

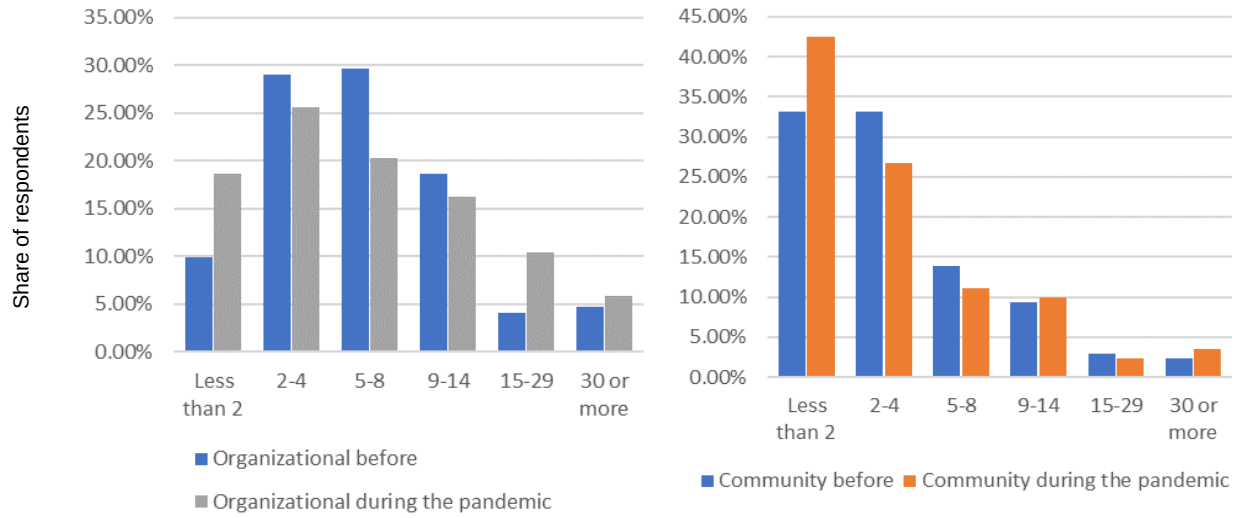

Figure 4. Change in Organizational and Community Service Time (Hours/Week)

The presented results support the expectation that it was the teaching that caused the total weekly work time to increase. The time spent on remaining activity types was reduced for most respondents.
The respondents were also asked to estimate the share of time allocated to six most typical activities for each kind of work before and during the pandemic. These results are shown in Figures 5 and 6.

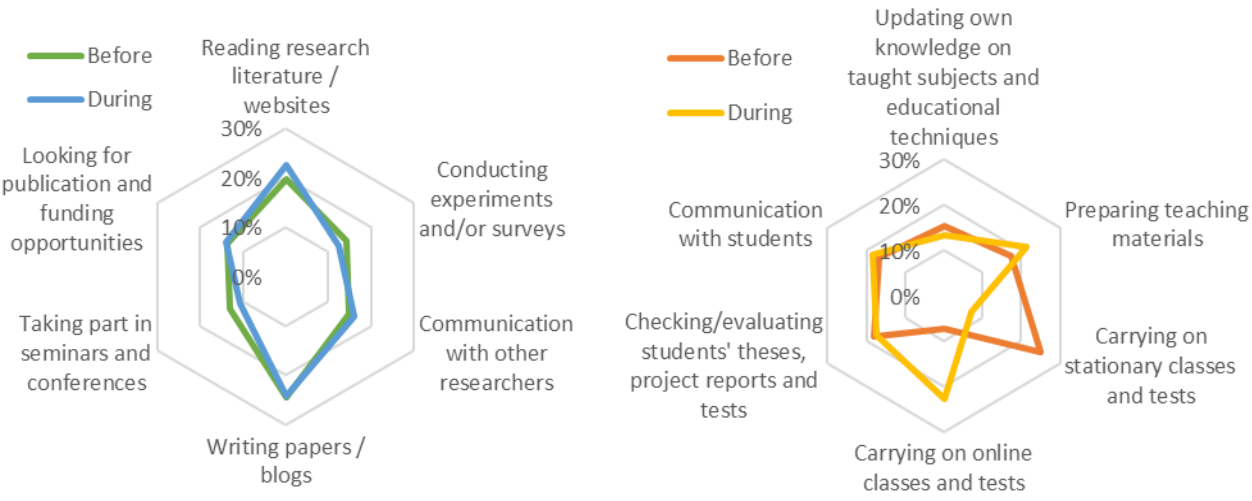

Figure 5. Share of Time Spent on Research and Teaching Activities (Hours/Week)

As for the research time allocation, the decrease in the share of devoted time has been observed for conducting experiments and/or surveys (which is understandable considering the difficulties of carrying on certain types of data collection during the pandemic) and taking part in seminars and conferences (which is also understandable considering that some events were canceled, and others were turned into online events, taking much less time to attend). The share of time saved in this way was spent on

acquainting with existing literature and other sources. As for the teaching time allocation, the switch from stationary to online classes is clearly visible. Another activity whose share increased was preparing teaching materials, which can be linked to the same cause, as online teaching often requires a different type of materials than the traditional one. It should be reminded that the increase in a time share spent on any teaching activity has a larger than proportional effect on the actual time devoted to it, as it is augmented by the increase of the overall time spent on teaching (in contrast to the decrease of the overall time spent on research).

Figure 6. Share of Time Spent on Service Activities (Hours/Week)

Among the organizational activities, with a similarity to the teaching time allocation, the most notable change is the switch from real-world to online meetings. Note also a much lesser decrease in the share of time devoted to student recruitment (including promotional activities), which can be linked to the reduction in the number of promotional events organized by educational institutions. With regard to community services, the respondents reported the largest decrease for educational activities aimed at non-students, which can also be explained by the cancelation of many such undertakings due to their on-site form. A smaller decrease was observed for the work within professional associations, which can be similarly linked to the reduction in the activity of many associations during the pandemic. What increased notably is the share of time devoted to the development of open content, which is understandable considering the switch to online teaching required new teaching materials, some of them published in open access. Less obviously, the share of time dedicated to peer-reviewing also increased, though to smaller extent; considering, however, that the overall time spent on community services decreased, the larger share may just mean that the actual time spent on peer-reviewing remained about the same.

Factors Affecting Change in Time Distribution

Figure 7 shows the net change in total time spending between before and during the pandemic, depending on age, gender, and position, measured as the difference in percentage points between the share of respondents who reported increase of time devoted to respective activity and the number of respondents who reported decrease of time devoted to the same activity. Note that only changes passing interval boundaries could be measured with the used instrument (e.g., if the respondent's work time increased from 8 to 9 hours, it was not captured, and was considered as having remained at its pre-pandemic level). The categories with less than 5 responses ("below 30" and "over 75 years" of age, and "other / both / prefer not to say" in gender) were omitted in the respective charts.

Looking at the left side of Figure 7, all age groups reported an increase of work time more often than its decrease, most evident among those between 45 and 59 years of age, among whom only 11% reported a decrease and 45% an increase of work time. This age group apparently compromised on their leisure time (13% reporting its decrease, 6%—increase), whereas the younger one (31 to 44 years of age) on their sleep time (28% reporting its decrease, 17%—increase). For the older group (60 to 75 years of age) an increase of time spent on all categories could be observed, which, considering the already mentioned limitations of

the measurement instrument, can be explained that in their case often a larger increase in one category must have been compensated by smaller decreases in the two others, which were not captured.

Figure 7. Net Change in Faculty Time Distribution by Age, Gender, and Position (in Percentage Points)

The visualizations of change for men and women look similar (increase of work time, decrease of sleep and leisure time), with the increase of work time more evident among female respondents (44% reporting its increase vs. 13%—decrease; for males, it was 39% vs. 21%).

The work time increase seems to grow along with the academic rank, peaking at Associate Professor (41% reporting its increase vs. 11%—decrease), and then falling down for Full Professors (40% vs. 20%), who are also the only group for which the share of those reporting an increase in sleep time was larger (20%) than those reporting its decrease (no one). This may indicate an increasing work pressure due to attaining subsequent academic career milestones: doctorate, postdoctoral contract, and tenure (which Full Professors are free of). As for Teaching and Research Assistants, these are the youngest academics who seem to have coped better with the switch to remote teaching than their older counterparts (with 36% reporting an increase of work time vs. 23%—decrease).

There were too few answers received from 12 of 13 countries from which the respondents hailed to allow comparing the responses on per country basis. However, an increase of work time was reported more often than its decrease in both Poland (+26 p.p.; 42% reporting an increase vs. 16%—decrease) and the remaining countries (+9 p.p. ; 35% reporting an increase vs. 26%—decrease).

In Figure 8, we present the net change in work time spending between before and during the pandemic, depending on age, gender, and position, measured as the difference in percentage points between the share of respondents who reported increase of time devoted to respective activity type and the number of respondents who reported decrease of time devoted to the same activity type. The data were obtained with the same methodology as those presented in Figure 7, so they share their limitations.

Looking at Figure 8, all age groups reported an increase of time spent on teaching and on services to their organizations more often than its decrease. The former was most evident among those between 45 and 59 years of age (44% reporting an increase of teaching time vs. 3%—its decrease), and the latter among those between 31 and 44 years old (41% reporting an increase of organizational services time vs. 16%—its decrease). In all age groups, a decrease of time spent on research was reported more often than its increase, most evident among those between 45 and 59 years of age (6% reporting its increase vs. 25%—decrease). The answers regarding community services were more varied across age groups: the largest change was reported by those between 60 and 75 years of age, and it was negative (with no one reporting its increase and 20% reporting its decrease); in the group of those 31–44 years old, the change was also negative, but slight (5% vs. 8%), whereas those between 45 and 59 years of age more often reported an increase of time spent on community services (15%) rather than its decrease (3%).

The visualizations of change for men and women look similar, with the changes (in both directions) more evident among female respondents, especially in the case of time spent on research (with only 5% women reporting its increase vs. 27%—its decrease).

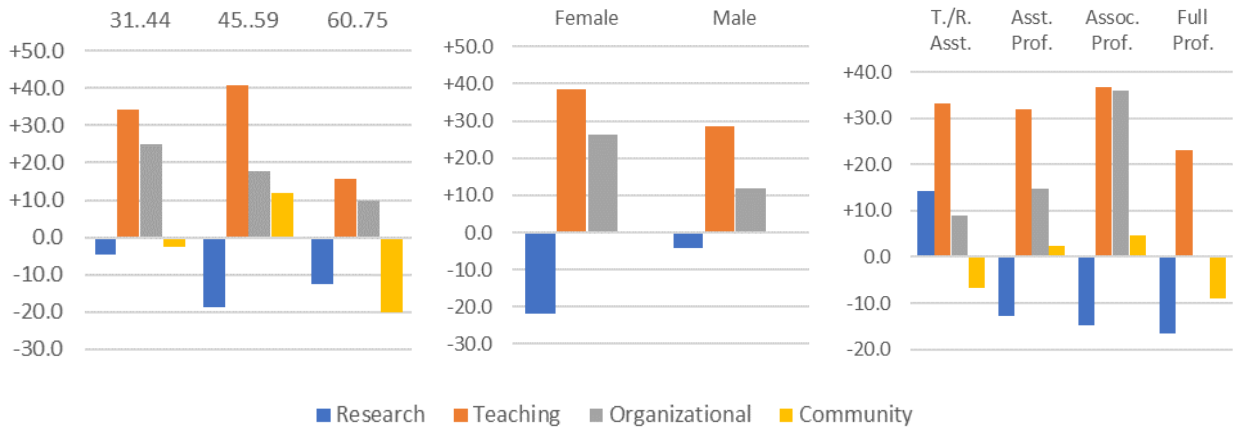

Figure 8. Net Change in Faculty Work Time Distribution by Age, Gender, and Position (in Percentage Points)

Whereas the increase in teaching time is common for all academic ranks, there are differences in other aspects. Teaching and Research Assistants did not report a decrease of time spent on research more often than its increase (0% vs. 14%) like the others, whereas Full Professors did not report an increase of time spent on organizational services more often than its decrease (17% vs. 17%) like the others. A drop of time spent on community services was observed by Full Professors (9% vs. 18%) and Teaching and Research Assistants (7% vs. 13%), whereas the two other groups reported its net increase, though smaller in extent.

As for country-specific data, which we do not present here in full extent for the reasons mentioned earlier, we can observe that the respondents from both Poland and other countries reported an increase of time spent on teaching (+36 p.p. in Poland, +18 p.p. elsewhere) and organizational services (+18 p.p. in Poland, +17 p.p. elsewhere) more often than its decrease, as well as an equal number of those reporting a decrease and increase of time spent on community services (0 p.p.). Polish respondents more often reported a decrease of time spent on research than its increase (-13 p.p.; 10% reporting an increase vs. 23%—decrease), the respondents from other countries gave balanced answers in this regard (0 p.p.; 16% reporting an increase and 16%—decrease).

Discussion

Bhagat and Kim identified four types of challenges faced by the higher education community amidst COVID-19: organizational and technical preparedness for crisis, ensuring remote learning quality, financial, and transformation toward online delivery, including difficulties in maintaining the pre-pandemic level of student engagement and attention (Bhagat and Kim 2020). The results presented here indicate one more challenge: maintaining the balance both between faculty's work and life, and between their research and teaching activities.

The emergency remote teaching introduced due to the COVID-19 pandemic resulted in a change of distribution of academics' time on three levels: general (work, sleep, and leisure), work time (research, teaching, organizational services, and community services), and individual types of activity (e.g., the switch from on-site to online forms of teaching). While prior research indicated an increase of faculty workload during the pandemic (De Gruyter 2020, p. 9; The Chronicle of Higher Education 2020, p. 13; Watermeyer et al. 2021, p. 630), it provided only a fragmentary information regarding the change of academics' time distribution. This gap has been addressed in this paper.

The results presented here have to be interpreted acknowledging the limitations of the applied research methodology. The effective sample size (172) was small – and the respondents were recruited in the author's personal and professional networks. In consequence, although faculty members from 13 countries were represented in the sample, nearly 4/5 of the respondents hailed from one country. The

respondents answered most questions by picking value intervals, which resulted in measurements which can only be considered approximate (as any change, no matter how frequent, within interval boundaries could not be recorded). It has to be noted though, that gathering precise data of this kind (e.g., to determine how many minutes given activity took every day) would require a long term observation supported with time tracking tools, that the participants would have to use constantly and consistently, and which would have to be started ahead of the pandemic, which was not the case.

Despite the presented limitations, the validity of the obtained results is supported by their confirmation of various phenomena observed earlier on much larger and more diverse samples, such as: the increase of time spent on online teaching (Watermeyer et al. 2021, p. 633) and, in particular, development of materials for online teaching (Watermeyer et al. 2021, p. 634); the decrease of time spent on research (De Gruyter 2020, p. 9); the fact that the time distribution of women was much more affected than that of men (The Chronicle of Higher Education 2020, p. 6); or the fact that the late-career academics were impacted by the pandemic to much lesser degree (De Gruyter 2020, p. 11).

The results presented here bring some novel interesting observations:

- in order to meet new situation, the younger academics sacrificed primarily their sleep time, the older – their leisure time;
- the group at the bottom of the academic career ladder (Teaching and Research Assistants) was even less affected by the pandemic than the one at the top (Full Professors);
- nearly twice as many faculty members worked on research less during the pandemic than worked more;
- a notable group of academics spent less time on teaching during the pandemic than before;
- the time spent by faculty members on organizational services increased, whereas the time spent on community services stayed near its pre-pandemic level (while the share of time spent on direct educational activities aimed at non-students as well as activities within professional associations was reduced, the share of time devoted to the development of open content has increased).

Conclusion

The primary effect of the COVID-19 pandemic was the disruption of the operations of higher education institutions. With on-site education no longer possible in many countries, a workaround was provided with the help of e-learning systems. Despite this kind of systems are expected to lessen the burden of teaching, and to allow the instructors to effectively handle much larger numbers of students, the results presented both here and in the prior studies show that an opposite effect has been observed: although the number of students has not increased, the faculty's time spent on teaching increased at the cost of reduced research, sleep, and/or leisure time. While one cause of this can be seen in the abrupt and enforced nature of the switch to remote teaching (providing an interesting case for the studies of e-learning implementation), another is the change in the teacher-student communication: while in the on-site education before the pandemic most of it happened during classes, the less formal synchronous communication channels of the e-learning systems encouraged students to ask questions any time any weekday, and to expect instant answers. This puts in focus the problem of educating on and promoting the culture of information systems usage rather than teaching merely its technical aspects, which should be given more attention in IS research.

In the practical aspect, the results presented here are worth considering for the management of higher education institutions. As overworking has a number of negative consequences, policies should be devised and adopted to help keep academics' weekly work time within boundaries allowing achievement of work-life balance.

Our future work will be to perform additional types of analysis on the collected data. What we consider as particularly interesting is identifying clusters of faculty members according to their time distribution before and during the pandemic.

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