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Abstract: While the Covid-19 emergency revealed some vulnerabilities in the Italian higher education system, it also enhanced its resiliency: in a short time, most Italian universities were able to ensure the continuity of teaching activities, replacing face-to-face experiences with online ones. The pandemic required stakeholders (including lecturers) to redesign teaching activities using distance learning methods, even if they were not prepared to do so. In addition to the difficulties of accepting and using information technologies, lecturers faced the challenge of planning and designing new forms of teaching that would ensure students' attendance and guarantee high levels of learning. Increasing attention has been paid to different forms of technological stress and their repercussions on students' well-being. Less attention has been paid to how technostress affects lecturers' quality of working life and work-family balance. This paper reflects on the experience of lecturers at the University of Milan Bicocca, discussing the outcomes of a survey administered to them. Data were analyzed through Structural Equation Modelling (SEM), focusing on the impact of two main dimensions of technostress (techno-overload and techno-insecurity) on lecturers' work-family balance in light of their perception of digital availability, gender, parenthood and relationship status.

Keywords: Techno-stress, digital availability, work-family balance, university lectures, Covid-19 emergency

Introduction

Since the early months of 2020, the emergency caused by the Covid-19 pandemic has triggered deep crises at various levels, dramatically highlighting the general economic, institutional, and cultural fragility of the world-system (Giovannini, 2020). Among the sectors most affected by the Covid-19 pandemic, "Education and Training" experienced severe disturbances in balances, routine practices, and cultural and regulatory models, with serious consequences for all stakeholders.

Teaching is one of the main aims of universities, but it is often taken for granted and undervalued, while research activities receive a lot more attention. On the one hand, the emergency pointed out some vulnerabilities in Italian universities but, on the other hand, it enhanced their resiliency: in a short time, most of them were able to ensure the continuity of their teaching activities, replacing face-to-face experiences with online alternatives. Furthermore, the pandemic has succeeded in bringing educational activities back to the center of attention, intensifying reflections on the quality of the delivery of the educational offer, the potential of distance learning to strengthen that offer, and the role of universities as active players in the territory (Hodges et al., 2020). The pandemic required stakeholders (including lecturers) to redesign teaching activities using distance learning methods, even if they were not prepared to do so. In addition to the difficulties of accepting and using information technologies, lecturers faced the challenge of planning and designing new forms of teaching that would ensure students' attendance and guarantee high levels of learning. Increasing attention has been paid to different forms of technological stress and their repercussions on students' and their families' well-being. Less attention has been paid to how technostress affects lecturers' quality of working life and work-family balance.

This paper reflects on the experience of the University of Milan Bicocca, which offers lecturers and students a combined use of the learning management system Moodle and the integrated web-conference tool Webex.

The following pages discuss the outcomes of a survey administered to university lecturers using the CAWI (Computer Assisted Web Interviewing) methodology. The survey was distributed to the lecturers' institutional email addresses through the Qualtrics web platform. The questionnaire was administered to 1,205 lecturers who taught during the first semester of AY 2020/21. A total of 955 questionnaires were collected, of which 481 were fully completed. The survey collected information on subjective perceptions of the experience of distance teaching and self-reported behavioral indicators. Data were analyzed through Structural Equation Modelling (SEM), focusing on the impact of two main dimensions of technostress (techno-overload and

techno-insecurity) on lecturers' work-family balance in light of their perception of digital availability, gender, parenthood and relationship status.

The survey is part of a broader research project (funded by the same University), which compares the information collected from the survey to administrative data about the same university lecturers and concerns the effective use of distance learning tools available on the university's online platform. Therefore, subjective perceptions of the distance teaching experience and self-reported behavioral indicators are integrated with objective behavioral data extrapolated from the Information Systems of the University of Milan Bicocca.

Furthermore, the research employs mixed methods strategies (including in-depth interviews and focus groups) and involves, in addition to lecturers at the University of Milan Bicocca, students and technical-administrative staff. In fact, we also carried out a qualitative study through in-depth interviews with first- and second-year students of bachelor's degree and single master's degree courses in order to analyze the learning experience provided by distance learning tools. The results of the survey and the in-depth interviews will be the stimulus for subsequent focus groups with lecturers and students to discuss and evaluate their experiences of both planning and implementing new strategies of teaching and learning.

In the third and final phase, the results of the research activities will inform university guidelines, complete with quality indicators, for the design of teaching proposals to be delivered in presential, semi-presential and distance learning modalities.

The paper is divided into four additional sections: the first provides a brief literature review on the issues of distance learning and its impact on lecturers' work experiences and work-family balance. The second section describes the research aims and hypothesis. The third describes data (3.1), variables (3.2) and methods (3.3). The fourth illustrates results from data analysis, focusing on the outcomes of the SEM. The paper ends with a discussion and conclusions section on main outcomes.

1. Brief literature review on lecturers and distance learning

Today, academic institutions have to continually update and advance their management and learning processes, fostering connectivity among lecturers, students, and technical-administrative staff. Digital approaches require skills, knowledge, and the confidence to use new technologies, but not all universities and stakeholders are ready to welcome such change.

As a result of the Covid-19 outbreak, education systems have been forced to move to online platforms in order to ensure continuity in education and training paths, and to start using new digital technologies and social media

applications as their primary modes of communication and collaboration. In many cases, educators have been forced to develop distance solutions and completely transfer their activities online, but have been given no time to plan or organize.

To frame the issue of digital availability and use among lecturers within the field of social science, we draw on the digital inequality framework, one of the most important fields of social research investigating people's use of Information and Communication Technologies (ICTs) (Van Dijk, 2005).

As stated by Guri-Rosenblit (2018), distance education radically changes the work of teachers. It requires a broad reformulation of their teaching practices and new forms of teaching support. Furthermore, it involves a lot more tools and resources. Over the last two years, the already in-motion shift towards distance learning has radically accelerated due to the restrictions imposed by governments in response to the Covid-19 pandemic. On the one hand, the digital acceleration prompted by this extraordinary situation can represent an opportunity to innovate education, its tools, and its languages (ibidem) seeing as, even before the pandemic, the gap between the education system (and its teachers) and the generation of digital natives (students), in terms of models and communication skills as well as content, was already the subject of debate (Landri, 2018). On the other hand, the acceleration of digitization imposed by the pandemic has impacted not only the teaching experience of teachers, but also the learning experience of students.

The crisis represented a massive natural experiment in using technologies that enable social distancing and remote work. Many university stakeholders were unprepared for the sudden change, and it is likely that workers' technology-related stress and exhaustion increased.

There are still few studies on this issue and most of them focus on students' and their families' experiences (Aguilera-Hermida, 2020; Hasan & Bao, 2020; Hawley et al., 2020; Pastori et al., 2020; Vicente et al. 2020). But some significant elements also emerge in relation to how distance teaching is both positively and negatively experienced by lecturers (Bouhnik & Marcus, 2006; Al-Fudail & Mellar, 2008; Jena, 2015; Ortagus, Kramer & Umbricht, 2018; Chen, Dobinson & Kent, 2020; Dwidienawati et al., 2020; Gandasari, 2020; Ramella & Rostan, 2020; Rapanta et al., 2020; Simamora et al., 2020; Susilaningsih et al., 2020; Aziz et al., 2021).

As far as we know, the only research on the experience of Italian university lecturers is "Universi-Dad" by Francesco Ramella and Michele Rostan - Centro Luigi Bobbio of the University of Turin, Department of Cultures, Politics and Society with Unires (Interuniversity Center for Research on Higher Education Systems) (Ramella & Rostan, 2020). The study focused on lecturers' experience of distance learning in some Italian universities (Milano Statale, Pavia, Bologna, Firenze, Torino, Scuola Normale Superiore of Pisa,

Liuc Università Cattaneo di Castellanza and Fondazione Crui – Conference of Rectors of Italian Universities) during the first period of the COVID-19 pandemic (March-June 2020). The research provides a descriptive analysis of lecturers' distance learning experience, focusing on lecturers' openness to continue to use distance tools in the future. The achieved sample of lecturers was 3,398. The main outcomes show that the availability of technology and, in particular, the platforms for online distance learning are considered useful by many lecturers in providing material for the lesson, although some obstacles (such as inadequate access to the Internet) can complicate the process. Although some campuses have provided learning management systems and web-conference tools to facilitate teaching activities, some lecturers have turned to applications from external online service providers (such as Zoom, Youtube, etc). Consistent with others, Ramella and Rostan's conclusions refer to the need to develop and improve infrastructures in order to make online learning more efficient in the future (Simamora et al., 2020; Chen, Dobinson & Kent, 2020).

Distance learning is not a new phenomenon, but its current magnitude due to the Covid-19 pandemic is novel. The digital inequality perspective has focused its attention on ICT skills and usage types (Van Dijk, 2005), leaving a gap in research on subjective and negative outcomes (Gui & Büchi, 2019). For example, using social media applications to interact with students and colleagues may challenge lecturers' abilities to set boundaries between their work and private lives. Work tasks and meetings may interrupt private life, whereas family life may disturb work meetings. These blurred boundaries between work and home can also lengthen lecturers' working hours (see, for example, Adisa, Gbadamosi & Osabutey, 2017).

Work–life and work–family balance refer to the harmonious division of time and attention between work and private life (Allen et al., 2000). This harmony can be threatened in numerous ways. Expectations from work or private life might cause negative intrusion or spillover from one domain into the other (Byron, 2005). In other words, work interferes with family and family interferes with work. Spillover occurring in either direction can cause conflict. Following the framework of the families' studies inequality perspective (Naldini, 2003), work-family conflict is unequally distributed among people on the basis of sociodemographic conditions, especially on the basis of gender, marital status and parental status. Therefore, we will refer to a negative work-life balance as work-life conflict throughout the rest of the paper.

Furthermore, the invasive nature of technology and social media can induce technostress in lecturers. Technostress refers to the stress people experience due to the use of technology and the demands related to that use (Suh & Lee, 2017). Technostress can occur in relation to any technology, but

it is more common with new technologies or situations (Shu, Tu & Wang, 2011). Only recently the focus of research on technologies and the Internet has moved from the issue of "use" to that of "overload" and the negative consequences of excessive use (Panek, 2014; Gui & Büchi, 2019). For this reason, there are still few sociological studies on the topic of technostress and its consequences, in particular in the field of education (Tarafdar et al. 2007; Tarafdar et al., 2020).

In line with the definitions of previous studies, we distinguish between "technostress creators" and "technostress inhibitors". We define technostress creators as that conditions in which technologies generate stress within a person and are related to the inadequate use of ICT. Some example of technostress conditions are those where some persons are glued to the phone, or constantly following new technology developments (Tarafdar et al., 2007). Therefore, technostress creators include techno-overload, techno-complexity, techno-insecurity, and techno-uncertainty. More precisely, the definition of techno-insecurity (which we use in our research) employed by Tarafdar et al. (2007) and Ragu-Nathan et al. (2008) encompasses techno-complexity and techno-uncertainty.

Differently, technostress inhibitors are described as available facilitating resources that could decrease negative consequences caused by technostress creators and improve people's productivity and performance. Some example of technostress inhibitors are technical support provision to overcome technical problems, efficient technical instrumentation and involvement facilitation (Ragu-Nathan et al., 2008; Jena, 2015; Li & Wang, 2021). A sociological approach to technostress and its impact on families is lacking (Bawens et al., 2020). Our study focuses on two specific technostress creators, techno-overload and techno-insecurity, and their role in university lecturer's work-family conflict.

Shifting to remote work and using digital communication methods may reduce the social support typically provided by the workplace. In addition, continuous online meetings can be exhausting and multitasking and concentration problems can arise, which can lead to fatigue, stress, and burnout (Leonardi, 2020). At home, work can easily spill over into free time and have negative consequences, such as decreased productivity, reduced well-being, and work–family conflicts (Eurofound, 2020).

A study by Susilaningsih and colleagues (2020), conducted during the pandemic, highlighted how distance learning caused a decline in the working life quality of lecturers and identified the main triggers as poor psychological well-being, stress related to the use of technologies (technostress) and reduced work-family balance. Flexibility, accessibility, perceived ease of use, interaction and internet connection are some of the factors crucial to the functioning and effectiveness of e-learning activities. On the other

hand, lack of or poor internet connection, lack of interaction and feelings of isolation are the main obstacles encountered by those initiating e-learning activities.

Furthermore, it would seem that where lecturers show greater familiarity with the integration of technology into mixed teaching models (such as blended e-learning), stress would be attributable above all to the amount of time necessary to prepare materials for distance learning and the difficulty of maintaining a balance between work and family and in managing other work-from-home commitments (Aziz et al., 2021).

2. The research aims and hypothesis

Our analysis of the literature shows that while much has been said about the impact of distance learning on students and their families, scant research has been devoted to the experience of lecturers, in particular to how technostress affects lecturers' quality of working life and its role in work-family conflict.

In this paper, we define the impact of technostress on work-family balance as a social problem. We focus on work-family conflict as a specific negative outcome of technostress, detrimental to the social well-being of both lecturers and their families (Colombo & Ghislieri, 2008; Bauwens et al., 2020). Furthermore, using the digital inequality framework (Van Dijk, 2005), we want to understand the role played by lecturers' perception of ICT availability in exacerbating technostress and, consequently, work-family conflict. Finally, because we frame the concept of work-family conflict within the families' studies inequality perspective (Naldini, 2003), we try to analyze its unequal distribution among lecturers based on characteristics such as gender, having children and having a partner.

Therefore, this paper aims to provide answers to the following research questions:

1. Is it possible to identify work-family conflict among university lecturers? If so, what is its prevalence?
2. In the same way, is it possible to identify technostress among lecturers, in particular in its two dimensions of techno-overload and techno-insecurity? If so, what is the respective prevalence of each?
3. What is the lecturers' perception of ICT availability?
4. How does the lecturers' perception of ICT availability affect their perception of techno-overload and techno-insecurity and, consequently, their work-family conflict?
5. How do some lecturers' socio-demographic characteristics (such as gender, having children and having a partner) influence the relationship between techno-overload, techno-insecurity and work-family conflict?

First of all, we hypothesize that (Hyp 1) techno-overload and techno-insecurity are negative elements of lecturers' well-being that could increase the effect on their perception of work-family conflict (Bauwens et al., 2020; Mercer & Gregersen, 2020).

Drawing on the literature, we suppose that (Hyp 2) the perception of having a wide (almost excessive) ICT availability could predict a positive effect on the perception of being techno-overloaded (Panek, 2014) and (Hyp 3) a negative effect on the perception of being techno-insecure (Tarafdar et al., 2007; Ragu-Nathan et al., 2008).

Previous research on the relationship between lecturers' gender and technostress has highlighted very different outcomes ranging from an overall absence of significant differences between women and men (Ragu-Nathan et al., 2008; Marchiori, Mainardes & Rodrigues, 2019; Li & Wang, 2020; Zhao et al., 2021) to higher levels of technostress among women, in particular techno-overload (Kimbrough et al., 2013; Gui & Büchi, 2019). In light of research on the traditional division of labor in families (Bauwens et al., 2020; Mishra, Gupta & Shree, 2020), in particular in Mediterranean European countries such as Italy (Naldini, 2003), where greater social and familial obligations and ties exist, we hypothesize (Hyp 4) that both types of techno-stressors will have a greater effect on work-family conflict for female than for male lecturers.

Similarly, given the reduction of childcare support from grandparents, schools, and other institutions during the pandemic, we suppose that (Hyp 5) having children could increase the impact of both techno-overload and techno-insecurity on the perception of work-family conflict (Ferragina et al., 2020).

Finally, we speculate that (Hyp 6) having a partner could mitigate the effect of both techno-overload and techno-insecurity on the perception of work-family conflict (for example, by relieving tasks related to childcare and management).

3. Data, variables, and methods

3.1 Data

The survey was administered to university lecturers of the University of Milan Bicocca using the CAWI methodology. The questionnaire was distributed to their institutional email addresses through the Qualtrics web platform. The survey was delivered to all 1,205 lecturers (full, associate, and assistant professors, as well as contract professors including PhD students, research fellows and external professionals) who held at least one course during the first semester of the 2020/21 academic year (from October 2020

to January 2021). The investigation began on March 8, 2021; reminders were sent to those who had not yet answered or had started but not completed the compilation on March 13, March 18, and March 24. A total of 955 questionnaires were collected, of which 481 were fully completed.

The respondents are 49.8% men and 50.2% women and mainly between the ages of 35 and 55 (61.5%), followed by over 56 (24.9%) and under 35 (13.6%). Of these, 33.3% are associate professors, followed by contract professors (32.2%), full professors (18.6%) and assistant professors (15.9%). The respondents were classified by drawing on the ISTAT definitions of macro-disciplinary areas and adapting them to the configuration of the areas of the University of Milan Bicocca (https://www.istat.it/it/files/2018/11/Report-Doctors-of-research- 26nov2018.pdf, accessed on September 5, 2021). The following classification was obtained: scientific area (52.9%), human and social sciences area (38.5%) and health area (8.6%).

Most respondents live with their partner and children (55.8%), followed by those who live with their partner (18.9%), those who live alone (13.8%), those who live with other people who are neither partners nor children (7.8%), and finally those who live with only their children (3.7%).

3.2 Variables

Work-family conflict, techno-overload and techno-insecurity. First, we want to underline that all the variables of this research are based on the subjective perception of the respondents. To create robust and concise measures of the conflict regarding work-family balance, techno-overload and techno-insecurity, we analysed the outputs of survey studies on the same or comparable issues that employed subjective-perceptive indicators (Al-Fudail & Mellar, 2008; Bauwens et al., 2020; Chou & Chou, 2021; Li & Wang, 2021; Penado Abilleira et al., 2021).

Within our questionnaire, we used validated scales to collect the perceptions of our respondents. In particular, we adopted the work-family conflict scale by Netemeyer, Boles and McMurrian (1996), using its Italian validation by Colombo and Ghislieri (2008), and the technostress scale by Tarafdar, Tu, Ragu-Nathan and Ragu-Nathan (2007) and Ragu-Nathan, Tarafdar, Ragu-Nathan and Tu (2008), using its Italian validation by Molino, Ingusci, Signore, Manuti, Giancaspro, Russo, Zito and Cortese (2020).

These are five point Likert-type scales (from 1 = completely disagree to 5 = completely agree). In keeping with the literature, we limited the number of items to three/four for each of the latent constructs (conflict within work-family balance, techno-overload and techno-insecurity), which also helped to improve practical usability. To identify these items, we used Principal Factor Analysis; we chose the first factor for the work-family conflict scale (see Appendix A1 and Appendix A3) and the first and second factors

for the technostress scale (see Appendix A2 and Appendix A3). As our variable of interest is conflict within families, we eliminated all respondents who reported living alone from the dataset. Therefore, we were left with 415 respondents for the following analysis.

Specifically, work-family conflict (henceforth *Conflict*) consists of the following three items:

a. the demands coming from online teaching have interfered with my family life (*Interfering*);
b. the amount of time online teaching, has made it difficult to fulfill my family responsibilities (*Difficulties*);
c. due to my work commitments for teaching I have had to change my family schedules (*Plan Changing*).

The eigenvalue of this factor is equal to 5.83; so it explains 58.3% of the variance in the entire set of items of the work-family conflict scale. This factor represents the exogenous variable in our Structural Equation Model SEM (which we will discuss shortly). Cronbach's α is 0.884.

Techno-overload (*Overload*) is composed of the following four items:

a. I felt that my personal life had been invaded by online education technologies (*Invasion*);
b. I have spent less time with my family due to online education technologies (*Less Time*);
c. I was forced by online teaching technologies to work with very tight deadlines (*Tight deadlines*);
d. I was forced by online education technologies to work much faster (*Work Faster*).

Techno-insecurity (*Insecurity*) consists of the following four items:

a. I didn't know enough about online education technology to handle my work satisfactorily (*Low knowledge*);
b. It took me a long time to understand and use the new technologies for online education (*Long to learn*);
c. I haven't found enough time to study and update my technology skills for online teaching (*Few time to learn*),
d. I have often found it too complex for me to understand and use new technologies for online education (*Too complex*).

These two factors of technostress creators represent the endogenous latent variables in our SEM. Cronbach's α is 0.822 for *Overload* and 0.828 for *Insecurity*. The values of Cronbach's α indicate the internal consistency of our factors.

The eigenvalue of the *Overload* factor is 5.39 and the eigenvalue of the *Insecurity* factor is 1.47, so they explain respectively 53.9% and 14.7% of the variance in the entire set of items of the technostress scale.

Index of perception of ICT availability. To gather information on our interviewees' perception of ICT availability, we used a five point Likert-type scale (from 1 = completely disagree to 5 = completely agree). The scale consists of the following four items:

a. the internet connection I used for online teaching is good;
b. the technical characteristics of my computer/laptop allowed me to use online teaching technologies in an adequate manner;
c. the computer I used for online teaching works smoothly;
d. the monitor through which I have delivered lessons in streaming is of adequate size.

To obtain an *Index of perception of ICT availability (Tech Availability)* we calculated the sum of the scores obtained by the respondents for each item. Subsequently we reduced this index to a range from 1 to 5 (Mean = 4.31, Standard Deviation = 0.81). This index represents a correlated variable in our SEM.

Socio-demographic variables. As stated above, we suppose that some lecturers' socio-demographic characteristics, such as gender (*Woman*), having children (*Children*) and having a partner (*Partner*), influence the relationship between techno-overload, techno-insecurity and work-family conflict. Women represent 49.9% of the 415 respondents. 86.5% of respondents reported having a partner and 68.9% reported having at least one child. These variables also represent correlated variables in our SEM.

3.3 Method

After a basic assessment of all the variables involved using univariate and bivariate analysis, we tested the effects of our endogenous latent variables (*Overload* and *Insecurity*) on the exogenous variable (*Work-family conflict*), also in light of correlated variables (*Index of perception of ICT availability*, *Woman*, *Children* and *Partner*). To this end, we achieved a multivariate analysis relying on SEM in Stata MP 17.0 (Acock, 2013; Mehmetoglu & Jakobsen, 2017). This multivariate analysis allowed for the use of latent variables in a structural path analysis and the estimation of direct effects (Mehmetoglu & Jakobsen, 2017).

4. Results

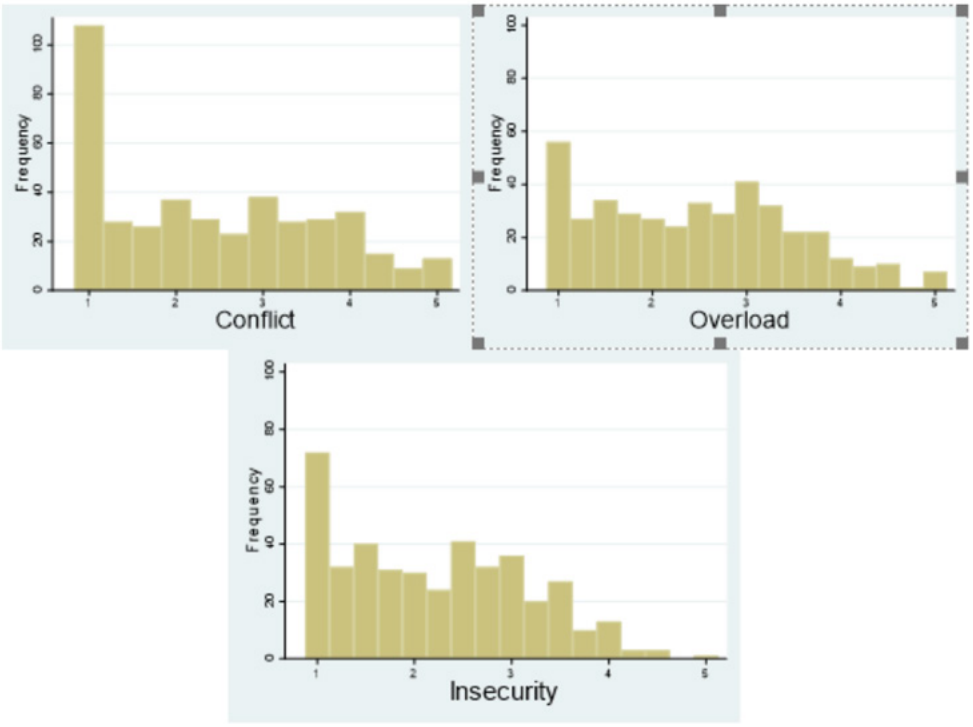
Figure 1 shows the histograms of the distributions of the *Conflict*, *Overload* and *Insecurity* variables, while Figure 2 shows their density plots by socio-demographic variables (see also Appendix A3) and Figure 3 the smoothed

lines of the *Conflict*, *Overload* and *Insecurity* variables by *Index of perception of ICT availability*.

In Figure 1, we can see that the three variables exhibit a distribution throughout the range with means of 2.42 (*Conflict*), 2.45 (*Overload*), and 2.21 (*Insecurity*). As we can see from Figure 1, they do not have normal distributions because, as can be observed, a huge number of respondents (the first histogram for each distribution) declare they do not experience *Conflict*, *Overload* and/or *Insecurity* at all.

With the exception of those who declare they have no *Conflict* at all, frequencies are mostly distributed among those who claim to have a medium level of *Conflict* (around Level 3). We then observe a decrease in the frequency of those who declare a high level of *Conflict* (Level 5). About 26% of lecturers agree or strongly agree with the statements about work-family conflict.

Figure 1. Histograms



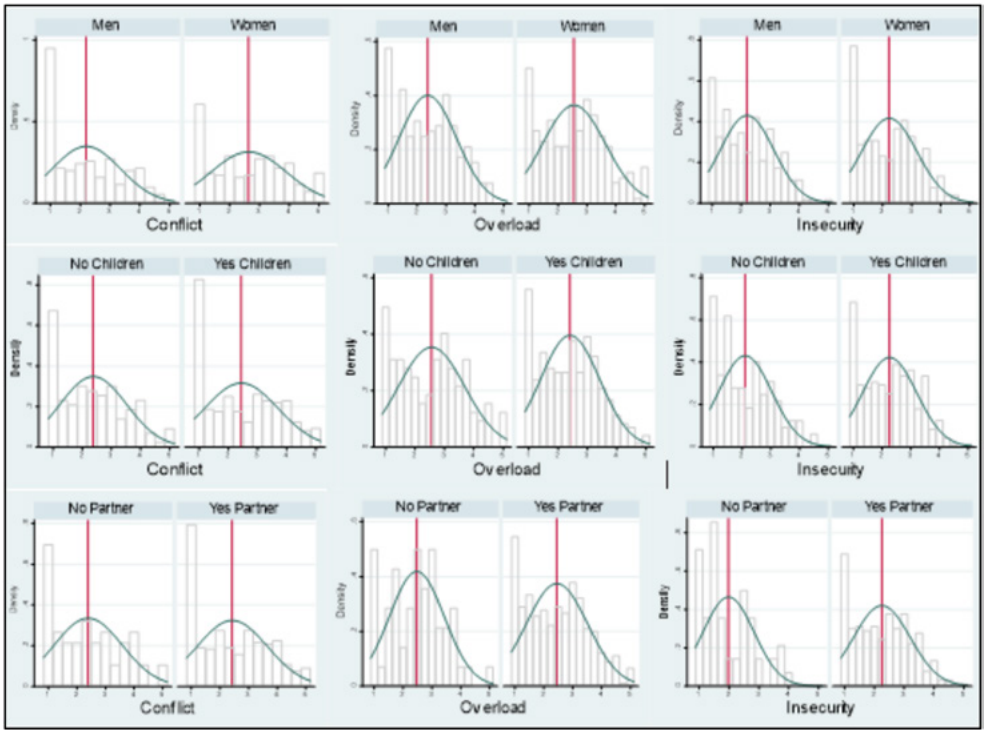
Histograms of Conflict, Overload and Insecurity variables

The *Insecurity* values are concentrated more at medium-low levels compared to the values for *Overload*: no one is positioned at the maximum level of *Insecurity* (Level 5), so we can say that all respondents believe to have a minimum level of ability in using technologies. About 20% of lecturers agree

or strongly agree with the statements about techno-overload and 15.2% with the statements about techno-insecurity.

The density plots (Figure 2) help us to understand the smoothed distribution of the points along the abscissa axis. The peaks of the density plots correspond to the highest concentration of points. Figure 2 shows that women differ little from men in the configuration of the density plots. Density plots are generally a little more levelled for women. The mean differences are statistically significant for *Conflict* – Two-sample t test with equal variances Pr (T < t) = 0.0001) –, while gender differences are not relevant for *Overload* and *Insecurity*. Very small and insignificant differences were found in the gap between *Children* and *Partner* from a statistical point of view.

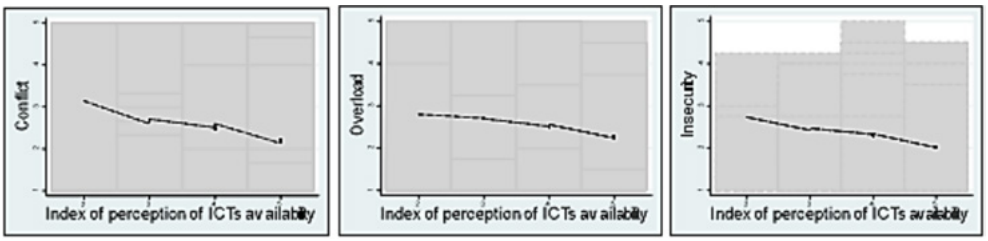
Figure 2. Histograms



Histograms of Conflict, Overload and Insecurity variables and their density plots by socio-demographic variables

Finally, the smoothed lines in Figure 3 show that as the perception of availability of technologies increases, the values of *Conflict*, *Overload* and *Insecurity* decrease.

Figure 3. Smoothed lines



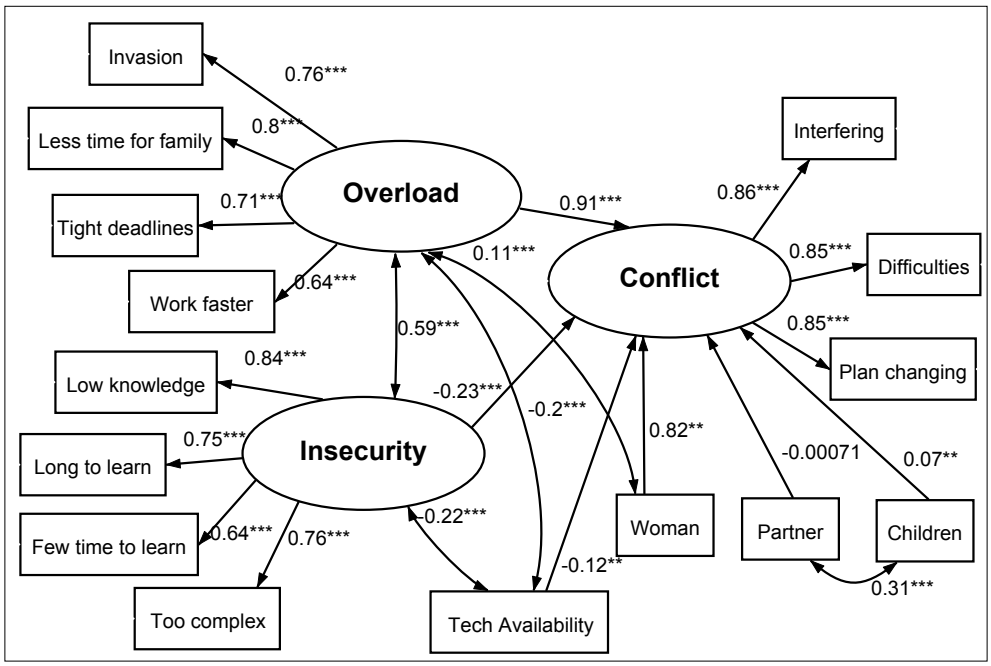
Smoothed lines of Conflict, Overload and Insecurity variables by Index of perception of ICTs availability (Tech Availability)

As stated in the previous paragraph, this basic assessment is instrumental to the implementation of a SEM. We used a SEM to test the effects of *Overload* and *Insecurity* on work-family *Conflict*, introducing the correlated variables of *Index of perception of ICT availability*, *Woman*, *Children* and *Partner*.

Figure 4 shows the SEM with standardized path estimates, while Table 1 presents unstandardized estimates and exact p values. While some of the structural paths are small in absolute effect size, the overall model fit is good (See Appendix A4). Therefore, general effects for a large and heterogeneous population can be detected (see Table 1). In fact, the model can rely on the following values: $\chi 2$ = 216.03 (N = 415, degrees of freedom = 74, p <.001), comparative fit index (CFI) =.942, Tucker-Lewis index (TLI) =.922, root mean square error of approximation (RMSEA) =.068 – 90% confidence interval (CI) = (.058, .079) –, and standardized root mean square residual (SRMR) =.050. Furthermore, the model accounts for 14% of the variance in *Conflict*.

As Figure 4 and Table 1 indicate, the overall strongest predictor of *Conflict* is *Overload*. The correlation between *Overload* and *Insecurity* predicts a positive direct effect (0.59): this means that the perception of techno-insecurity could have a positive effect on experiencing techno-overload and vice versa. However, our first hypothesis (Hyp 1) is only half confirmed. On the one hand, techno-overload represents a negative element of lecturers' well-being that affects (0.91) their perception of work-family conflict (Bauwens et al., 2020; Mercer & Gregersen, 2020). On the other hand, techno-insecurity (*Insecurity*) negatively predicts work-family conflict (-0.23). Both relationships are strongly significant from a statistical point of view.

Figure 4. Structural equation model with standardized path estimates



See Table 1 for unstandardized estimates and exact p values
All p <.05, except for the relationship between Partner and Conflict

Our second hypothesis (Hyp 2) is not confirmed: the *Index of perception of ICT availability* negatively affects *Overload* (-0.20). On the contrary, our third hypothesis (Hyp 3) is confirmed: the perception of having a wide ICT availability produces a negative effect (-0.22) on the perception of being techno-insecure (Tarafdar, et al., 2007; Ragu-Nathan et al., 2008). Substantially, the perception of having a good internet connection for online teaching and ICTs with top characteristics is associated with feelings of being less overloaded and insecure. Furthermore, the *Index of perception of ICT availability* is negatively associated with *Conflict* (-0.12).

Table 1. Parameter Estimates of the SEM

Type	Parameter	Estimate	*P*	Stand. estimate
Latent Variables				
	Conflict ⟶ Interfering	1[a]	0.000	0.86
	Conflict⟶ Difficulties	0.90	0.000	0.85
	Conflict⟶ Plan changing	0.99	0.000	0.85
	Overload ⟶ Invasion	1[a]	0.000	0.76
	Overload⟶ Less time for family	0.97	0.000	0.79
	Overload ⟶ Tight deadlines	0.87	0.000	0.72
	Overload ⟶ Work faster	0.72	0.000	0.64
	Insecurity ⟶ Low knowledge	1[a]	0.000	0.84
	Insecurity⟶ Long to learn	0.83	0.000	0.75
	Insecurity ⟶ Few time to learn	0.87	0.000	0.64
	Insecurity ⟶ Too complex	0.76	0.000	0.76
Regression				
	Conflict ⟵ Tech Availability	-0.170	0.001	-0.120
	Conflict ⟵ Woman	0.198	0.036	0.082
	Conflict ⟵ Children	0.239	0.028	0.070
	Conflict ⟵ Partner	-0.002	0.985	0.000
	Conflict ⟵ Overload	1.036	0.000	0.910
	Conflict ⟵ Insecurity	-0.279	0.000	-0.230
Covariances				
	Tech Availability ↔ Woman	-0.021	0.288	-0.053
	Tech Availability ↔ Children	0.012	0.513	0.032
	Tech Availability ↔ Partner	0.016	0.231	0.059
	Tech Availability↔ Insecurity	-0.167	0.000	-0.210
	Tech Availability ↔ Overload	-0.170	0.000	-0.200
	Woman ↔ Children	0.000	0.478	0.035
	Woman ↔ Partner	-0.012	0.179	-0.071
	Woman ↔ Overload	0.061	0.033	0.110
	Woman ↔ Insecurity	0.000	0.766	0.016
	Children ↔Partner	0.040	0.000	0.310
	Children ↔ Overload	-0.030	0.210	-0.064
	Children ↔ Insecurity	0.029	0.218	0.066
	Partner ↔ Insecurity	0.000	0.967	0.100
	Partner ↔ Overload	0.035	0.051	0.023
	Overload ↔ Insecurity	0.590	0.000	0.600

1[a] Reference item fixed to 1

Turning to sociodemographic variables, coherently with our hypotheses (Hyp 4 and Hyp 5), being a woman and having at least one child play an important role in the SEM. In fact, women experience greater work-family *Conflict* (0.198) and greater *Overload* (0.061) compared to men. In the same way, having at least one child predicts work-family conflict (0.239).

On the contrary, our sixth hypothesis (Hyp 6) is not confirmed: having a partner does not seem to predict any statistically significant effect on *Overload*, *Insecurity* and work-family *Conflict*.

5. Discussion and conclusions

In this paper, we defined the consequence of technostress on work-family balance as a social problem, trying to estimate its presence and its ability to act as a predictor of work-family conflict among university lecturers during the COVID-19 pandemic. In particular, we explored issues including how technostress creators can increase work-family conflict and which technostress creators are most effective in doing so.

Our study focuses on two specific creators of technostress, techno-overload and techno-insecurity (Tarafdar et al., 2007; Ragu-Nathan et al., 2008), using them to build the research model. This model was validated using survey data from 481 lecturers from the University of Milan-Bicocca who held at least one course during the first semester of the 2020/21 academic year (from October 2020 to January 2021).

There is a significant correlation between techno-overload and techno-insecurity: the perception of insecurity is positively correlated with the perception of being overloaded and vice versa. Nevertheless, the results only partially support our main argument (Hyp 1) that technostress positively affects the work-family conflict of lecturers. Indeed, if techno-overload increases work-family conflict, that is not the case for techno-insecurity, which shows a negative effect on work-family conflict. As mentioned above, techno-overload refers to the perceptions of being invaded, having less time for family, having tight deadlines, and being obliged to work faster. We can affirm that the decrease in time dedicated to family, due to the commitments and deadlines imposed by distance learning, has represented a shocking break with the work-family balance that existed before the pandemic.

Instead, techno-insecurity refers to the perceptions of not knowing enough about ICTs because they are too complex and of needing a long time to learn, but not having the necessary time. In essence, it corresponds to an admission of not being able to manage ICTs for distance learning. We speculate that the more the interviewees feel insecure about using technology, the more they avoid wasting their time and effort in solving technological problems associated with distance learning. The fact that techno-insecurity

does not have a direct effect on work-family balance appears to indicate the presence of a kind of exit strategy for lecturers. Here, time and effort saved translate into resources of time and energy to expend on private life and family. In fact, as techno-insecurity increases, work-family conflict decreases.

On the one hand, contrary to our hypothesis (Hyp 2), the perception of having a wide ICT availability has a negative effect on the perception of being techno-overloaded. On the other hand, confirming the existing literature (Tarafdar, et al. 2007; Al-Fudail & Mellar, 2008; Ragu-Nathan et al., 2008; Dwidienawati, 2020; Aziz et al., 2021) and our hypothesis (Hyp 3), an increase in the perception of ICT availability is negatively associated with techno-insecurity. These results, read jointly, lead us to assume that the perception of having efficient and fast ICTs translates into feelings of being able to respond more effectively to the demands imposed by distance learning and of being less techno-overloaded and techno-insecure.

With regard to the comparison between female and male lecturers, we did not observe any significant difference in techno-insecurity (Wu & Ling, 2021). Differently, techno-overload is an issue that involves women more than men in a statistically significant way (Kwon et al., 2013). It is possible to observe the same difference with reference to work-family conflict. In essence, the SEM confirms our hypothesis (Hyp 4) regarding the persistence of gender disparities in terms of perception of techno-overload (Kimbrough et al., 2013; Gui & Büchi, 2019) and its impact on work-family balance. Here, this disparity persists in a group (that of lecturers) that would typically be characterized by a specific attention to the reduction of the gender gap, given the high levels of education and professionalism.

Coherently with our hypothesis (Hyp 5), having children impacts the perception of work-family conflict, even if the presence of children does not seem to significantly increase or decrease – from a statistical point of view – techno-overload or techno-insecurity (Lewis & Giullari, 2005; Park, Kim & Cho, 2008).

Differently, having a partner predicts neither techno-overload, techno-insecurity nor a higher level of work-life balance (retracting our Hyp 6).

It is possible to draw a unique reading from the results relating to the last three hypotheses. Indeed, numerous studies show that various obstacles working against a gender-sensitive university: the emergence of movements that seek to dismantle the hard-won advances in gender equality, a resurgence of patriarchy in new forms, and neo-liberal managerialism that promotes a market-driven climate in which performativity, competitiveness and commodification prevail (Drew & Canavan, 2021). While the demands of the neoliberal university rely on a hegemonic work-centric model that can affect academics irrespective of gender, women are more likely to ex-

perience work–life conflict and its associated impacts (Rosa, 2022). We can say that this holds even more true in Italy, where, as stated above, greater social and familial obligations and ties exist (Naldini, 2003). As the Covid-19 pandemic raises new and specific challenges to work–life balance (Ferragina et al., 2020), more gender inclusive and theoretically informed studies will be needed to tackle the blind spots found here.

In summary, our main outcomes show that, differently from techno-insecurity, techno-overloading highlights an increase in work-family imbalance. Digital availability decreases the chance of feeling overloaded or insecure in implementing distance learning. The work-family balance seems to be more difficult for women and for those who have children, while the presence of a partner does not seem to have a significant effect. Therefore, our analysis underlines how the experience of distance learning during the Covid-19 pandemic brought out disparities among lecturers in managing technostress and, above all, work-family conflict. These disparities emerge as a new facet of digital inequality related to the effects of managing ICT overabundance and new technological tasks on working life and family life (Gui, Fasoli & Carradore, 2018). Contrarily, insecurity seems to be a more multifaceted phenomenon with a lower impact on work-family balance (Buchi & Harghittai, 2022).

A relevant limitation of our study is that all the latent constructs (*Conflict*, *Overload*, and *Insecurity*) used in the SEM refer to subjective perceptions. On the one hand, we measure the feeling of being overwhelmed and insecure with ICTs and distance learning, and the perception of the level of conflict within families, but we do not know if these feelings and perceptions translate into actual disadvantages. On the other hand, the social science literature – in particular the psychological and psycho-social fields – confirm that the perception of stress translates into detrimental outcomes (Hasan & Bao, 2020; Buchi, 2021). Therefore, research on inequality and its impacts usually starts by highlighting self-reported perceptions of the unequal distribution of material and symbolic resources, and subsequently measures their impact on socially relevant outcomes.

Second, since this study was conducted using a cross-sectional design, it is difficult to obtain causal relationships among techno-overload, techno-insecurity and work-family balance, especially if we consider the particular condition of the survey that was administered during the second phase of the pandemic (after the lock down). Future research may consider a longitudinal design to further investigate strongly possible causal relationships among these constructs.

Other limitations are related to sociodemographic variables that could be further enriched and diversified to be able to give a more comprehensive picture of technostress, work-family conflict, and its determinants. In par-

ticular, we do not know the exact cohabitant family structure of lecturers or how many children live with them and what their ages are. We suppose that having children aged 0-6 could lead to very different results regarding technostress and work-family conflict compared to having older children or, even more, adult children who might not live in the home of the respondent. Furthermore, in the questionnaire we asked if the lecturers have a partner, but we did not gather any information on the characteristics of that partner and their contribution, for example to managing and taking care of children.

Finally, additional limitations pertain to the fact that the data used in this study were collected from only one university; future studies will have to consider the information on lecturers belonging to different institutions in Italy, but also of other countries, even if (we hope) not during a pandemic.

As far as policy implications are concerned, the results presented in this paper are particularly useful in reflecting on the need to plan new teaching and learning strategies using ICTs and to protect lecturers from the negative consequences of ICTs, especially in relation to their work-family balance. As previously stated, among the limited number of studies in this field, few investigated the issue of technostress among lecturers in higher education, despite its constant emergence as a worsening social phenomenon in the aftermath of the pandemic. ICTs and distance learning transformed lecturers' experiences; they are under immense pressure to work faster and differently, updating their knowledge and skillsets continually. Manion (2019) and Dwidienawati and colleagues (2020) suggest that the combination of distance learning and face-to-face teaching (the so-called Blended elearning) represents the best teaching and learning option for both lecturers and students.

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Appendix

Appendix A.1 – Principal Component Analysis, Component loadings

Likert-type scale (1 = completely disagree, 5 = completely agree)	
1. The demands arising from online teaching have interfered with my family life	0.806
2. The amount of time online teaching takes has made it difficult to fulfil my family responsibilities	0.792
3. I was unable to complete the things I wanted to do at home because I had too many commitments deriving from online teaching	0.746
4. I was so tired and stressed when I finished teaching that it was difficult for me to fulfil my family duties	0.780
5. Due to my work commitments for teaching I have had to change my family schedules	0.792
6. The requests from my family (or from my partner) have interfered with my commitments / activities for online teaching	0.780
7. I happened to sacrifice teaching because I had to devote more time to the family	0.697
8. The things I wanted to do for teaching were not completed due to my family's requests	0.687
9. My family life has interfered with my teaching-related job responsibilities	0.769
10. Family anxieties and worries interfered with my ability to meet teaching-related job requests	0.778

Work-family conflict scale: Netemeyer, Boles and McMurrian scale (1996);

Italian validation by Colombo and Ghislieri (2008)

Appendix A.2 – Principal Component Analysis, Component loadings

Likert-type scale (1 = completely disagree, 5 = completely agree)	
1. I was forced by online education technologies to work much faster	0.7140
2. I was forced by online education technologies to do more work than I could handle	0.6010
3. I was forced by online teaching technologies to work with very tight deadlines	0.7643
4. I was forced to change my work habits to adapt to online teaching technologies	0.6656
5. I have spent less time with my family due to online education technologies	0.6974
6. I had to keep in touch with my work even during the holidays, evenings, and week-ends due to the technology for online education	0.6878
7. I felt that my personal life had been invaded by online education technologies	0.7463
8. I didn't know enough about online education technology to handle my work satisfactorily	0.6805
9. It took me a long time to understand and use the new technologies for online education	0.6575
10. I haven't found enough time to study and update my technology skills for online teaching	0.6302
11. I have often found it too complex for me to understand and use new technologies for online education	0.6375

Technostress conflict scale: Ragu-Nathen et al. (2008) and Tarafdar et al. (2007) scale;

Italian validation by Molino et al. (2020)

Appendix A.3 – Descriptive measures of latent constructs and related items

Latent Variable	Items	M	SD	Variance	Skewness	Kurtosis	Alpha Cronbach
Conflict		2.42	1.22	1.50	0.36	1.91	0.888
	Interferring	2.40	1.38	1.92	0.44	1.81	0.838
	Difficulties in Responsabilities	2.24	1.27	1.62	0.60	2.15	0.847
	Plan changing	2.45	1.40	1.96	0.40	1.73	0.837
Overload		2.45	1.10	1.42	0.28	2.13	0.822
	Invasion	2.45	1.39	1.93	0.41	1.85	0.766
	Less time for family	2.00	1.30	1.71	0.55	2.03	0.775
	Tight deadlines	2.59	1.29	1.67	0.22	1.94	0.768
	Work faster	2.46	1.19	1.42	0.29	2.21	0.793
Insecurity		2.21	0.94	0.88	0.34	2.13	0.828
	Low knowledge	2.14	1.17	1.38	0.66	1.00	0.742
	Long to learn	2.26	1.14	1.31	0.50	2.27	0.779
	Few time to learn	2.51	1.28	1.66	0.30	1.93	0.826
	Too complex	1.87	1.00	1.01	0.88	2.79	0.785

Appendix A.4 – Fit Model measures

Fit Statistic	Value	Description
Likelihood Ratio		
X^2_*Ms(74)*	216.319	Model Vs. Saturated
$P > X^2$	0.000	
X^2_*Bs(99)*	2.539.480	Baseline Vs. Saturated
$P > X^2$	0.000	
Population Error		
RMSEA	0.068	Root Mean Squared Error of Approximation
90% Ci, Lower Bound	0.058	
Upper Bound	0.079	
Pclose	0.003	Probability RMSEA <= 0.05
Information Criteria		
AIC	15.201.540	Akaike's Information Criterion
BIC	15.447.265	Bayesian Information Criterion
Baseline Comparison		
CFI	0.942	Comparative Fit Index
TLI	0.922	Tucker–Lewis Index
Size Of Residuals		
SRMR	0.050	Standardized Root Mean Squared Residual
CD	0.976	Coefficient of Determination
R^2	0.97	