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The good and the bad of remote work: A JDR-Model overview about the impact of remote work on university professors.

Ian Pedro de Sousa Pugsley Gomes

Master's in human resources and Organizational Consulting

Supervisor:

PhD Aristides Isidoro Ferreira, Associate Professor, Iscte-IUL

November, 2021

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Department of Human Resources and Organizational Behaviour

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Abstract

Covid-19 has abruptly changed the way organizations work and universities have not been left out as faculty members have been forced to adopt remote working as their newborn baby. This research examines, according to the JDR-model, what are the demands and resources that colleges of higher education have at their disposal during remote working. With this aim, a study was carried out with a sample of Portuguese universities, at two different moments. At the first moment the sample consisted of 126 individuals. The second moment consisted of data collection in three different weeks, where in the first week we obtained 125 answers, 62 answers regarding the second week and 53 answers regarding the third week. In the first moment, the perceived family support and the impact of remote work were assessed, in particular on technostress, work-family conflict, and the absence of social interaction. The results showed that work-family conflict and the absence of social interaction mediate the relationship between family support and technostress. Moreover, engagement, performance and positive affect were also tested during the second moment, during three different weeks. The results revealed that engagement is positively associated with performance. Additionally, positive affect moderates the relationship between engagement and performance. The practical and theoretical implications of the results were also analyzed, followed by potential questions for future research, with suggestions for improvement.

Resumo

A Covid-19 mudou abruptamente a forma de trabalho das organizações e as universidades não foram deixadas de fora, uma vez que os membros das faculdades foram forçados a adotar o trabalho remoto como o seu bebé recém-nascido. Esta investigação analisa, segundo o *JDR-model*, quais são as exigências e os recursos que as faculdades de ensino superior têm ao seu dispor durante o trabalho remoto. Com este objetivo, foi realizado um estudo com uma amostra de universidades portuguesas, em dois momentos diferentes. No primeiro momento a amostra consistiu em 126 indivíduos. O segundo momento consistiu na recolha de dados em três semanas diferentes, em que na primeira semana obtivemos 125 respostas, 62 respostas relativas à segunda semana e 53 respostas relativas à terceira semana. No primeiro momento foram avaliados o apoio familiar percebido e o impacto do trabalho remoto, em particular sobre o *technostress*, o conflito trabalho-família, e a ausência de interação social. Os resultados mostraram que o conflito trabalho-família e a ausência de interação social medeiam a relação entre o apoio familiar e o *technostress*. Além disso, o *engagement*, a performance e os afetos positivos foram também testados durante o segundo momento, durante três semanas diferentes. Os resultados revelaram que o *engagement* está positivamente associado à performance. Adicionalmente, os afetos positivos moderam a relação entre o *engagement* e a performance. As implicações práticas e teóricas dos resultados foram também analisadas, seguidas de potenciais questões para investigações futuras, com sugestões de melhoria.

Palavras-chave: Trabalho Remoto; *engagement*; technostress; JDR-Model; mediação; moderação

JEL Classification System:

I12 - Health Behavior

I23 - Higher Education

O15 - Human Resources

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Introduction

The global pandemic created by the Covid-19, come to affect a wide array of sectors, such as the sector of education. It was estimated that 63 million professors were affected on a global level, causing a crisis in the education sector (Education International, 2020).

Worldwide teachers weren't prepared to face the consequences of Covid-19 and the impact that would have in their life's, such as adapting quickly to a variety of new technologies. The United Nation (2020) refer that this phenomenon occur across the globe as professors were obligated to implement distance learning modalities.

As in 18 of March, Portugal decreed state of emergency across the country in order to slow down the spread of the coronavirus. Instituto Nacional de Estatística (INE) calculated that on the second trimester of 2020, 1 094 400 individuals were working from home, which represent approximately 23% of the employed population. Of those 1 094 400 individuals, 91.2% specify that the reason why they were working remotely was due to the Covid-19 pandemic. It was still revealed that, 23.6% of this population has as main activity the sector of education. This mean that about a quarter of the employed population that is working from home is a professor (Instituto Nacional de Estatística, 2020). In comparison on the second trimester of 2019, only 120 700 individuals were working from home which represent 2.5% of the employed population (Instituto Nacional de Estatística, 2019).

Although the government created new laws to keep up with the new change that the virus demanded, it should be noted that there was an exponential growth of workers who saw their way of working changed without notice. This sudden change gave rise to the largest spike in workers who found themselves remote working, as well as teachers and students who were forced to take classes online. In order to keep up with this sudden change, higher education institutions were forced to implement new processes and tools that would allow them to maintain their normal day-to-day operations.

In its majority this mean that all the work that professors would normally do in the comfort of their office or their classroom, was changed to a virtual office and a virtual classroom. Sudden changes forced upon higher education faculties have then an impact on their health.

As documented, the current Covid-19 pandemic has cause workers to have a higher level of contact with information communication technologies which in consequence can lead to higher levels of technostress (Ghislieri, Molino, Dolce, Sanseverino, & Presutti, 2021). Other

major concern relies on the impact that forced remote work can have on an individual loneliness (Pai & Vella, 2021) as well the impact that can have on the family spectrum.

Given that professors represent a large part of the employed population in Portugal but also around the globe and considering all the variables that are involved in remote working as a teacher, it is imperative to assess the impact of forced remote work on those.

Therefore, we pretend to observe which are the perceptions that teachers have about remote work and their advantages or disadvantages. With this purpose in mind, we must understand all the factors that comes with being a higher education professor, such as online teaching, writing papers or meetings with other colleagues. To complement this analyzes will be examined which are the perceptions that professors have about family support.

On a second instant we pretend to analyze variables such as: a) performance; b) engagement; and c) emotions.

Overall, the study focuses on the advantages and disadvantages of remote work while at a pandemic context. As acknowledged by the job demands and resources model (JDR-Model) (Demerouti, Nachreiner, Bakker, & Schaufeli, 2001), a person work has a set of demands and resources that have a direct impact on an individual health and performance. Therefore, variables such as emotions or perceived family support can act as resources or demands of one work, which in the scope of the JDR-model allow us to analyze whether such variables have a direct impact on a person health and performance.

For this purpose, we set our goal to collect data in 4 separate moments, where the first moment we assess the perception of higher education faculties regarding remote work as well the perception they have about the family support that they receive. The remaining weeks had a separation of collection data of one week and it was collected information's about variables such as positive affects, engagement, and performance. This separation exists as we argue that across the moments of data collection variables as such as engagement can have an impact on an individual engagement.

Briefly, the main purpose of the present study is to understand to which extent remote work influences the health of a higher education professor. Furthermore, we aim to understand the mediating influence of work-family conflict as well the mediating effect of absence of social interaction on the relationship between negative family support and technostress. Additionally, we expect that a higher report of positive emotions moderates the relationship between engagement and performance (Figure 1).
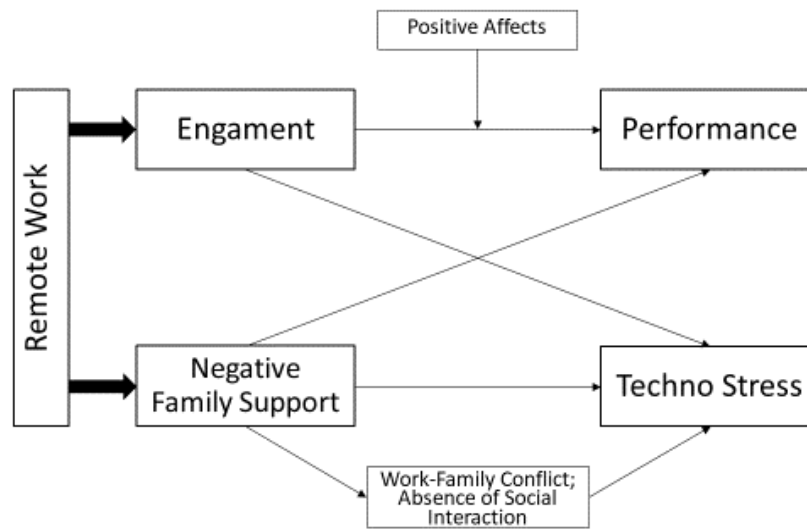
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Figure 1. Conceptual model of the study

1. Review of literature

Remote work, a subject that leads academic to observe and analyze all the consequences from it, whether they are bad or good. Some will advocate that the downsides of remote work surpass the advantages, as some say the reverse.

The truth is that remote work is a subject in debate for over 4 decades, to be more precise, Jack Niles in 1975 observe that the growth of information technologies could foment a new form of work, where organizations may be able to transport their workplace (Nilles, 1975).

But what is the definition of remote work? Remote work can be defined as an alternative form of work, which employers carry out their tasks at an alternative location to the workplace. To this end, workers make use of technology to complete their tasks (Fitzer, 1975 cited by Pinsonneault & Boisvert, 2001).

With this idea, also come the concerns that are still a major point of debate in today days, such as "Can we maintain a normal level of performance if we adopt remote work?".

Over time various academics have been studying the impact of remote work and what are the advantages and disadvantages of this form of work. Multiple articles highlight several variables, as: a) performance; b) work satisfaction; c) isolation; and d) among others (to a details list see Pinsonneault & Boisvert, 2001).

Gajendran and Harrison (2007) observe that remote work in its majority represent positive aspects, increasing the individual's perception of autonomy, reducing work-family conflicts and

doesn´t reveal negative aspects on a social level. Nevertheless, it is mentioned that in the absence of choice, that is, when remote work is mandatory, it may increase stress and decrease job satisfaction (Gajendran & Harrison, 2007).

Ammons and Markham (2004), also emphasize the idea that remote work has consequences in various areas of an individual. Among other examples, they mention the boundaries between workspace and family space or isolation.

Although the literature point to the same conclusion, the pandemic brought a new set of ideas that are yet to be deepen explored. One of the greatest concerns that United Nation (United Nation, 2020) observe is stress and the lack of most basic information communication technologies (ICT).

As previously mentioned, a person job consists of resources and demands, where family support, for example, is an important resource, especially in the pandemic context. Thereby and with the help of the JDR-Model we intend to analyze whether higher education faculties have a higher level of demands or resources. With this purpose in mind, JDR-model gives a framework to work with, as it will be explained in further detail, a person demands, and resources have a direct impact on his performance and health.

Demerouti and colleagues (2001), propose that work mechanism can be divided in 2 clusters: 1) job demands; and 2) job resources. The first one focus on the demands that a worker can have, whether is on a physical, social, or organizational level. For example, one can say that the number of working hours or the number of objectives that one has is a job demand. This variable then, require a psychological or physical effort which can have a direct effect on a worker health, as also have an impact on the person motivation.

The second group, job resources, highlight the tools that are used by workers that in some way, mitigate the job demands. Those are the tools that workers use in some way to attenuate the require effort, psychological or physical, that comes with the tasks inherent of the job. For example, workers may engage in formations that increase their set of skills. Those tools then have an impact on their motivation and an effect on the individual health.

Nonetheless, it should be noted that, an excessive job demand is link to worker exhaustion (Lesener, Gusy, & Wolter, 2019), an issue that is currently gaining increasing attention due to the production costs it generates in organizations as well the impact it has on workers' health. On the other hand, an increased level of job resources are associated with workers' commitment

to work. The result therefore be a junction of negative results, that have an impact on the health of professionals, and positive outcomes which have an impact on an professional performance.

Thus, we will analyze variables such as, stress, engagement, emotions, performance, burnout, and the perceptions of professors about remote work and family support. All the later are integrated in a worker job, whether they are resources or demands, which then can help us understand, in a pandemic context, what are the impacts of those variables and create solutions and adopt policies that improve an individual "workplace".

Engagement and performance relationship

Literature tells us that engagement is the opposite side of burnout, where worker find high levels of energy, mental resilience and dedication during their work period. However, an excess of commitment with one work can lead to workaholism (Bakker, 2009).

Furthermore, engagement is segmented in three components: a) vigor, characterized by high levels of energy and mental resilience; b) dedication, characterized as a feeling of enthusiasm, pride or inspiration, mainly refer as a person identification with his work or job; and c) absorption, characterized as a state where an individual experience a state of optimal experience (Schaufeli, Salanova, González-Romá, & Bakker, 2002).

With this concept in mind, one can conclude that engagement does in fact lead to higher levels of performance (Bakker, 2009). Additionally, performance is described as the worker's actions that contribute to the organization goal. However, this definition doesn't comprehend all the concept, since isn´t as easy to ask a person if he/she have done all the objectives (Campbell & Wiernik, 2015).

To evaluate performance, we need to observe an employee quantity and quality of his or her work (Welbourne, Johnson, & Erez, 1998), in order to obtain an "average" that corresponds as closely as possible to reality. With this mindset, we will approach performance has the amount of work that one does and the quality of that work.

Taken together, we purpose that the practical implication of the Covid-19 pandemic and consequently the restrictions as well the new norm of work routine is affected. For example, it is known, and as formerly explained, higher education faculties had to shift theirs form of work to remote work instead of presential, forcing a higher use of information communication technologies. Consequently, if engagement is characterized by high levels of energy and being strongly involved in one's work, a higher level of engagement could lead to higher levels of

performance (Bakker, 2009). Nevertheless, it's known that engagement is positively correlated with performance, the pertinence of our study focus on whether a higher education faculties still present the same correlation as previously study while experience forced remote working due to a pandemic. Since it is known, Covid-19 has caused a huge impact on the life of several individuals, specifically, and as previously explained, individuals seen their workplace being transfer to their homes. Given that we argue that:

H1. Engagement is positively and significantly correlated with job performance.

The moderator effect of positive emotion in the relationship between engagement and performance

So far, we argued that a high level of engagement has a positive impact on a professor performance. Additionally, it is known that emotion have a part on a person response to an event. The American Psychological Association, states that emotions are:

> "a complex reaction pattern, involving experiential, behavioral, and physiological elements, by which an individual attempts to deal with a personally significant matter or event. The specific quality of the emotion (e.g., fear, shame) is determined by the specific significance of the event. For example, if the significance involves threat, fear is likely to be generated; if the significance involves disapproval from another, shame is likely to be generated. Emotion typically involves feeling but differs from feeling in having an overt or implicit engagement with the world." (American Psychological Association, n.d.).

Furthermore, Watson, Clark, and Tellegen (1988), note that affective traits as the disposition people have in experiencing certain emotions or moods, in certain situations. So, a person could have a trait that has a higher probability to experience negative emotions or the reverse. This means affective traits can be divided in two segments, the positives, and the negatives. A person with an affective trait mostly positive is more likely to experience positive states such as determination or enthusiasm. On the other hand, an individual that have an affective trait generally negative, has a higher chance to experience states such as embarrassment or nervousness (Costa Galinha, Pereira, & Esteves, 2014).

In short, it is expected that an individual that is more predisposed to experience positive emotions or state of mind, such as active, inspired or excited, would have a solid base to strive

for a better performance (Dubreuil, Ben Mansour, Forest, Courcy, & Fernet, 2021). However, an individual with a higher position to experience negative emotions or state of mind, such as nervous or ashamed, should present a lower performance.

If work engagement has a positive impact on job performance and have the general tendency to lower an individual probability to experience distressing emotions and a higher probability to experience a more happier disposition (Bakker, 2009), as well positive emotions does indeed promote higher levels of performance, will this relationship be true if a person is experiencing a pandemic context. The analyses can then answer the question of whether, a higher education faculty that is experiencing remote work will present a higher or lower performance when the relationship between engagement and performance is moderated by positive affects. Being expected that a higher level of positive affects has a direct impact on the performance of an individual. Meaning that for high levels of positive affect, performance can be expected to increase accordingly.

H2. The relationship between engagement and performance is moderated by positive affects
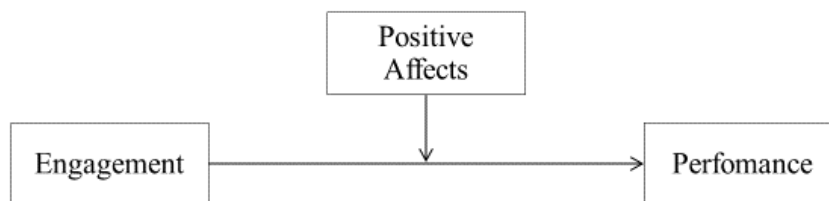
Figure 2. Moderate effect of positive affects

The mediating influence of work-family conflict

Social support is known to moderate the effect of some stressors in an individual (Beehr, King, & King, 1990). The literature then argues that a high amount of social support that has high quality can indeed low the stress that an individual may be experiencing. On the other hand, a low amount and quality of social support can increase that said stress.

In patients with terminal illnesses has been proven that a high social support led to better coping mechanisms. However, a low social support can decreased that person resilience (Haggard, Robert, & Rose, 2011)(Ozbay et al., 2007).

Furthermore, an individual perception of family support can have a direct impact on work-family balance, since balance is defined as a resource that consist of a subjective emotional

state or "feelings of balance". This resource can then be used to challenge the demands of an individual work (Wayne, Matthews, Crawford, & Casper, 2020).

Since March 2020, most of the workers were forced to adopt a new work regime and required to adopt technologies as their newborn baby in order to perform their tasks they needed to learn or incorporate technologies mentioned before. Particularly higher education faculties, were asked to have a moderate knowledge with some technologies so they can continue to teach online classes.

In a recent study, it was measured the mental health and resilience of faculty professors, and it was revealed that 37% of 355 individuals had suffer from some form of burnout due to their professional activity (for more information see CINTESIS, 2020).

Given that, a new form of stress comes in the picture as the digital era as such an impact in today world. Technostress arises in the picture as the nature of technology and social media can induce technostress in workers. Technostress is the stress that individuals' experiences, consequence of the use of technology, although is more common with new technologies, can also occur with old technologies (Oksanen et al., 2021).

Technostress has been observed to have a direct impact on a person productivity, job performance, job satisfaction and organizational commitment (La Torre, Esposito, Sciarra, & Chiappetta, 2019). As well it is characterized as "phenomenon of stress experienced by end users in organizations as a result of their use of ICTs" (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008).

If negative family support can have a direct impact on an individual level of technostress since remote work involves the worker in a new dynamic. Additionally, if an individual partner is as well working from home and children have online schooling, potential stressors can immerge (Oksanen et al., 2021).

Furthermore, work-family conflict is described as "the extent to which work and family demands and resources conflict with each other" (Voydanoff, 2005) as well as an relationship that can be played out in two forms,: 1) work-to-family conflict where the demands of one work make it harder to perform family obligations and 2) family-to-work where family demands constrain the individual performance on his work (Voydanoff, 2005).This represents that, if a lower family support is seen as a work demand, is only possible that a lower perception of family support can have a direct impact on work-family conflict. Additionally, a lower family support can also maintain a direct relationship with a worker levels of technostress.

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Although, it has been studied the mediating effect of work-family conflict between support and burnout (Blanch & Aluja, 2012), there still a gap with respect of the mediating effect between family support and technostress.

Altogether, and keeping in sight the new context of remote work, a higher education faculty must be capable of balance their work life and family life, maintaining a balance between both and yet suffer the consequences that comes with the use of technologies, which can represent a higher level of technostress. In sum, we purpose that:

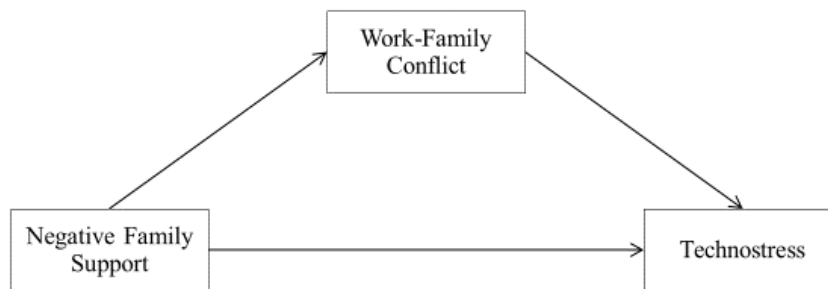**H3.** The relationships between a negative family support and technostress are mediated by the work-family Conflict.

Figure 3. Mediator effect of work-family conflict

The mediating influence of absence of social interaction

As work-family balance and other variables can been a resource there is also demands that comes with one's work. The most common observed is stress, where in the presence of high levels can lead, for example, to burnout (Demerouti, Schaufeli, et al., 2001). As said previously, remote work involved workers with a new atmosphere where they had to adapt to a new set of mechanism work wise. Particularly, professors had to adapt to online teaching as well to online meeting.

Although there aren't a great number of literature about the advantages and disadvantages of online teaching, it is known that one of the biggest advantages is flexibility. Nevertheless, some limitations include: a) lack of student feedback; b) limited attention span; and c) lack of attentiveness (Mukhtar, Javed, Arooj, & Sethi, 2020).

All the later mentioned, can be understood as a form of interaction, since a great part of a professor duties is to give lessons to his students as well to communicate with their peers. If a professor is in an unusual situation where he/she does not share an office with their fellow co-workers and their students are represented by a black screen, or the student camara is turn off,

the amount of feedback receive is low. Consequently, all those factors can have a direct impact on a professor loneliness.

Furthermore, literature have shown a relationship between loneliness and stress (Banerjee & Rai, 2020; Toscano & Zappalà, 2020), keeping in mind the JDR-model, absence of social interaction can be perceived as a job demand, which consequently have a direct impact on a worker health.

At last, the spectrum of relationships between a family is largely abundant and complicated, however it is known that negative social interactions can be a consequence of innumerous reasons, such as social network stressors or interpersonal stress (Lincoln, 2000), as one can say that a pandemic context can cause both. It´s then probable that a lower family support in combination with a pandemic context can lead to a lower level of interaction.

For this reason, we argue that absence of social interaction mediates the effect between an individual perception, family support and technostress. Given that we purpose that:

H4. The relationship between a negative family support and technostress is mediated by the absence of social interaction.
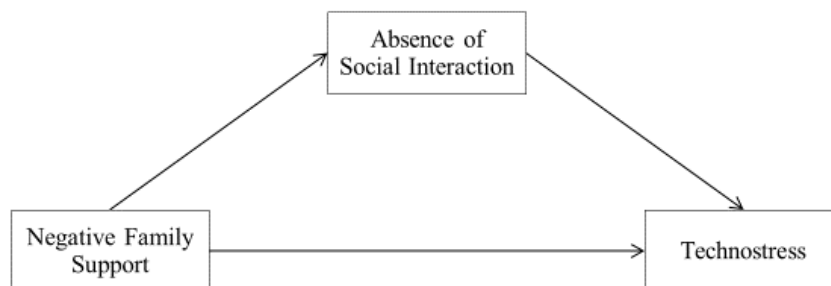
Figure 4. Mediator effect of absence of social interaction

2. Methodology

2.1 Objective

The present study aims to observe and analyze the impact of remote work in the health of a higher education professor and on his performance, as well, to evaluate in which way variables as engagement, performance, and family support affect theirs overall performance and health.

Thereby, the study is divided in two parts, where in the first one the advantages and disadvantages that university professors perceive regarding remote work is assessed. Still in a

first moment, we will be using Juhani scale (Julkunen & Greenglass, 1989), which aims to understand at what level the individual feels supported by his or her family.

The second phase will comprehend scales that evaluate variables such as the mention already during this study (i.e., performance, engagement and emotions). For this, participants are asked to fill a diary during a period of 3 weeks. This mean, that a participant will have to fill the same questionnaires in week 1, week 2 and week 3, always with one week apart from the other.

2.2 Sample and Procedures

Since the study revolves around the impact of remote work on university professors, our sample consists of higher education faculty that currently enrolled in online teaching and mostly of our sample comes from the district of Lisbon.

All teachers were contacted via e-mail, and we obtained their e-mails through the websites of the various faculties, such as ISCTE-IUL, ISEG or ISEL. The participants were informed in this e-mail about the general objective of the study, and it was explained that the study consisted in two distinct moments. In the first moment, their perception regarding remote work and family support is evaluated and in the second moment we evaluated other variables, such as engagement; performance; and positive affects, in a period of 3 distinct weeks. Therefore, in the second moment participants had to fill out 3 distinct questionnaires that have a minimum of 6 days of separation between answers.

Regarding the first moment, we obtained the answer of 126 individuals, 70 of which are males (57%).

Regarding the second moment, in the first week we obtained a total of 125 answers, in the second week a total of 62 answers, and in the third week a total of 53 answers.

In all the response moments, the participants were informed of the confidentiality of the data obtained there, as well as that they could withdraw from the study at any time. All data were obtained through the Qualtrics platform.

2.3 Measures

Technostress. The Technostress subscale was measured with a five-point Likert scale (1 "strongly disagree" to 5 "strongly agree"). The subscale was developed from the scratch, and

asses the level of stress that professors experience due to the use of Information Communication Technologies.

Two examples of items of this variable include: i) "Remote work leads to higher conflicts" and ii) "Remote work makes space to have negative thoughts".

Through an exploratory factorial analysis, we observe that the original scale which consisted of 21 items, presented 6 components. Out of those 6 components, we observe that the subscale, named *Technostress*, consisted of 6 items, and present an explained variance of 16.96% out of a total of 66.82% and reasonable internal consistency (0.840).

Work-Family conflict. The Work-Family conflict subscale was measure as measured with a five-point Likert scale (1 "strongly disagree" to 5 "strongly agree"). The subscale was developed from the scratch and evaluate the impact of remote work towards work-family conflict perceive by higher education's faculties.

Two examples of items of this variable include: i) "It's hard to maintain a separation between work and family during remote work" and ii) "In remote work is easier to manage conflicts between personal and professional life".

Through an exploratory factorial analysis, we observe that the original scale which consisted of 21 items, presented 6 components. Out of those 6 components, we observe that the component, related to *Work-Family conflict*, consisted of 2 items and presented an explained variance of 10.95% out of a total of 66.82% and reasonable internal consistency (0.849).

Absence of social interaction. The absence of social interaction subscale was measured with a five-point Likert scale (1 "strongly disagree" to 5 "strongly agree"). The subscale has the main goal of analyze the impact of remote work in professors' interactions.

Two examples of items of this variable include: i) "Remote work promote a higher interaction between co-workers" and ii) "Is hard to motivate the students in remote work".

Through an exploratory factorial analysis, we observe that the original scale which consisted of 21 items, presented 6 components. Out of those 6 components, we observe that the subscale, named *Absence of social interaction*, consisted of 3 items, and presented an explained variance of 16.96% out of a total of 66.82% and poor internal consistency (0.566).

Family support scale. The family support scale was measured with a five-point Likert scale (1 "strongly disagree" to 5 "strongly agree"), and the purpose is to evaluate the level of family support that an individual perceive. Two examples of items of this variable include: i) "It is impossible to really relax at home" and ii) "Conflicts at home sometimes take all of my energy".

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The Family Support Scale originally developed by Juhani (1989) was adapted to the purpose of this study, since the scale objective was to evaluate the family support in the beginning of a disease. The scale consists in 12 items and in an overall scope is divided in a negative pole and a positive one.

An exploratory factorial analysis was conducted and the items 1, 2, 4, 7, 10 and 12 were removed from the analysis since they weren't stable throughout the analysis of the 3 weeks. The factorial structure of the scale with these items remains invariant across the three weeks leaving the present focus on the negative pole were the positive one was excluded from the results.

A new exploratory factorial analysis was conducted within the present study revealed a single factor structure with 44.65% of the explained variance and high internal consistency (0.751).

Emotions. The positive and negative affect were measured with a five-point Likert scale (1 "not at all or very slightly" to 5 "extremely"), and the purpose is to evaluate if a subject is experiencing more positive or negative emotions at a given time. Two examples of emotions assessed in this scale include: i) "Determined" and ii) "Nervous".

In the present study we used a translated version of Galinha and colleagues (2014), that consist of a reduced version of the originally scale. In previous studies the scale revealed a high internal consistency both to the positive affects component (0.860) and to the negative affects component (0.890) (Costa Galinha et al., 2014). In the present study, an exploratory factorial analysis was conducted and taking the Kaiser criteria, the item "Guilty" presented low communality in the third week (0.172) and therefore was removed from the analysis.

A new exploratory factorial analysis was conducted which revealed a two-factor structure for all the weeks in study. Since for the results it was only used the positive affects component of the first week the explained variance and internal is presented for that said dataset. The explained variance and the internal consistency, of the second week, are the following: explained variance of 71.19% and an internal consistency of 0.896.

Engagement. The engagement was measured with a seven-point Likert scale (1 "never" to 5 "always"). Two examples of items assessed in this scale include: i) "At my work, I feel bursting with energy" and ii) "When I get up in the morning, I feel like going to work".

In the present study we used a translated version of Sinval and colleagues (2018). Previous studies revealed a high internal consistency (0.960) (Sinval et al., 2018). In the present study,

an exploratory factorial analysis was performed for all the weeks and only the items related to the vigor component were stable throughout the analysis. Given that, a new exploratory factorial analysis was conducted using those items which showed a single factor, *vigor*, for the three weeks. The explained variance and the internal consistency, of the first week, are the following: explained variance of 85.89% and an internal consistency of 0.912

Performance. The performance was measured with a five-point Likert scale (1 "needs a lot of improvement" to 5 "Excellent"). Two examples of items of this variable include: i) "Quantity of work output" and ii) "Quality of work output".

This scale was originally developed by Welbourne and colleagues (1998) and consisted of five factors were as in this study we use only the factor related to the job component and the item "Customer service provided" was changed to "Accomplish the objectives within the established deadlines", since our sample consist of strictly higher education professor. The scale was translated to Portuguese and retranslated to English.

In previous studies the scale revealed an internal consistency of 0.760 (Welbourne et al., 1998). In the present study, an exploratory factorial analysis was conducted which presented a single factor for the three weeks. Since for the results it was only used the first week dataset the explained variance and internal is presented for that said week. The explained variance and the internal consistency, of the third week, are the following: explained variance of 77.52% and an internal consistency of 0.897.

3. Results

3.1 Descriptive analysis

In Table 1, means, standard deviation and zero-order correlations of the studied variables are presented. Observing the mean scores, participants show a high level of engagement regarding the first week (M = 4.59; SD = 1.11). In respect to the negative family support variable, it presents a mean score in between (M = 2.50; SD = 0.97), which points that participant can be apprehensive to reply to the questionnaire, since include items as "It's impossible to relax at home".

Furthermore, the variable negative family support was positively and significantly correlated with technostress (r = 0.626, p < 0.05), work-family (r = 0.390, p < 0.05) and absence of social interaction (r = 0.209, p < 0.05).

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Engagement is positively and significantly correlated with performance ($r = 0.283$, $p <$ 0.05) and with positive affects ($r = 0.506$, $p < 0.05$), which goes in line with previous studies.

Table 1. Means, standard deviations and correlations between the variables

Variables	M	SD	N	1	2	3	4	5	6
1. Negative Family Support	2.50	0.67	119						
2. Technostress	2.86	0.88	124	.626**					
3. Work-Family	3.49	1.06	124	.390**	.558**				
4. Absence of Social Interaction	3.69	0.72	124	.209*	.410**	.252**			
5. Engagement T1	4.59	1.11	123	-0.098	-0.014	-0.039	0.047		
6. Performance T3	3.74	0.73	53	-0.075	-.368*	-.363*	-0.101	.283*	
7. Pannas Positive T2	3.59	0.70	62	-0.095	-0.061	-0.127	0.115	.506**	.407**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

M = Mean; SD = Standard Deviation

3.2 Moderation Analysis

Positive affects were examined as a moderator of the relationship between engagement and performance. The overall model was significant (F (3,45) = 5.5505, $p<.05$, R^2 = .27). As we argue before in the second hypothesis there was a significant interaction between performance and positive affects ($b = .3497$, t (45) = 2.4752, $p< .05$), which indicates that positive affects are a significant moderator between performance and engagement. Additionally, the result indicated that the association between engagement and performance is significant ($b = -1.1053$, t (45) = -2.2684, $p<0.05$). However, the same is not confirmed to the association between positive affects and performance ($b = -1.3028$, t (45) = -1.8942, $p=0.646$).

Table 2. Results for the moderation effects of Positive Emotions

Moderation	B	SE	T	P	CI (lower)	CI (upper)
X1 → Y	-1.1053	0.4872	-2.2684	<.05	-2.0866	-0.1239
W → Y	-1.3028	0.6878	-1.8942	=.06	-2.6881	0.0825
X1 * W → Y	0.3497	0.1413	2.4752	<.05	0.0651	0.6343
Conditional effect for low	-0.0561	0.1166	-0.4810	0.6329	-0.2909	0.7187

positive affects						
Conditional effect for medium positive affects	0.2237	0.1208	1.8514	0.0707	-0.0197	0.4671
Conditional effect for high positive affects	0.3636	0.1571	2.3141	0.0253	0.0471	0.6801

Therefore, we accepted the first hypothesis representing that engagement is positively and significantly correlated with job performance, as well that the relationship between engagement and performance is moderated by positive affects confirming in the second hypothesis as represented in Table 2.
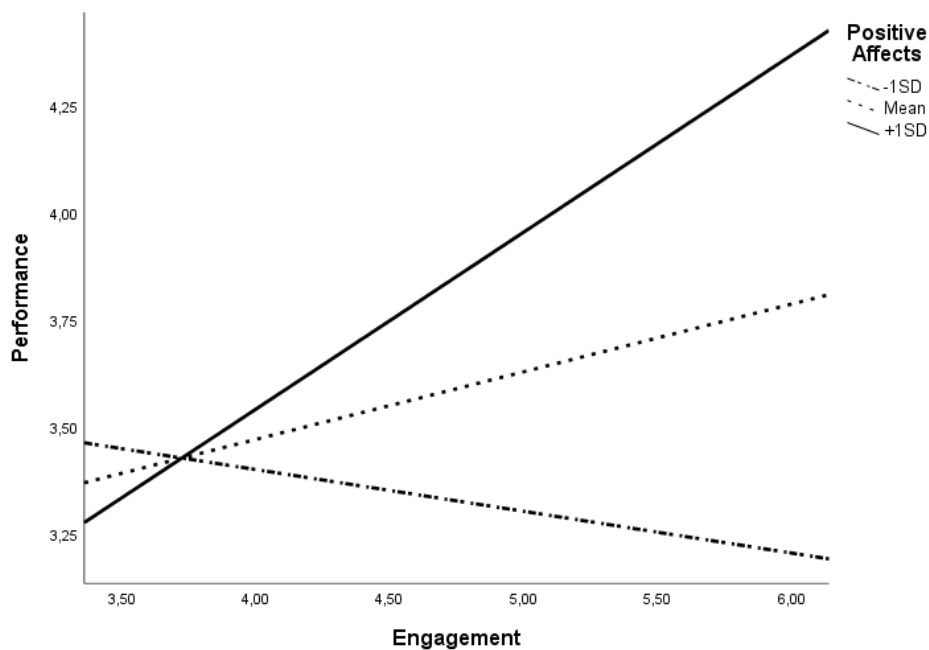

Figure 5. Interactions of Engagement and positive affects in predicting performance.

3.3 Mediation Analysis

Work-Family conflict was examined as a mediator between negative family support and technostress. The full model with work-family conflict as a mediator was significant ($F_{(2,116)}$ = 59.36, $p<.05$, $R^2 = .51$).
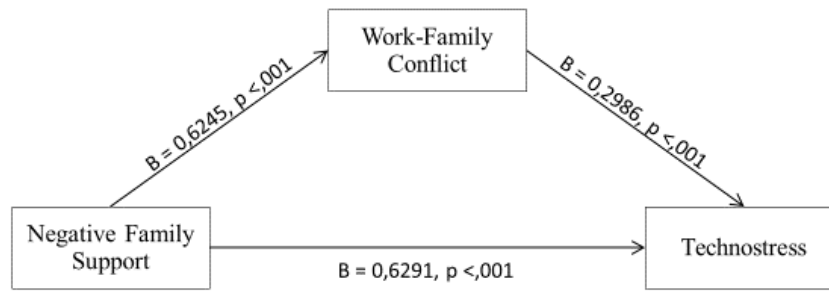
16

Figure 6. Mediation effect of work-family conflict

Results revealed the significant effects of negative family support on work-family conflict (path a) (b = .6245, t (117) = 4.5842, $p<.05$, 95% CI [.3547, .8942]) and on the work-family conflict on technostress (path b) (b = .2986, t (116) = 5.1736, $p<.05$, 95% CI [.1843, .4130]). The direct effect (path c) of the negative family support on technostress was also significant (b = .6291, t (116) = 6.8100, $p<.05$, 95% CI [.4461, .8120]). Additionally, there was a significant indirect effect of negative family support on technostress through work-family conflict, demonstrated by the bootstrapped 95% CI of the indirect effect (b = .1865, SE = .0543, 95% CI [.0929, .3117]). These results, presented in Table 3, suggest that work-family conflict mediate the relationship between negative family support and technostress as argued in hypothesis 3.

Table 3. Results for the mediating effects of Work-Family Conflict

Mediation	B	SE	T	P	CI (lower)	CI (upper)
X1 → M (a)	0.6245	0.1362	4.5842	<.001	0.3547	0.8942
M → Y (b)	0.2986	0.0577	5.1736	<.001	0.1843	0.4130
X1 → Y (c)	0.6291	0.0924	6.8100	<.001	0.4461	0.8120
X1 → M → Y (a1*b1)	0.1865	0.0534			0.0945	0.3034

Furthermore, absence of social interaction was examined as a mediator between negative family support and technostress. The full model with absence of social interaction as a mediator was significant (F (2,116) = 53.39, $p<.05$, R^2 = .48).
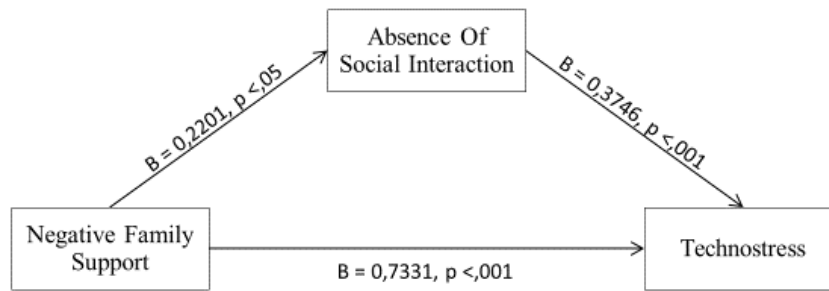
Figure 7. Mediating effects of absence of social interaction

Results revealed the significant of negative family support on absence of social interaction (path a) (b = .2201, t (117) = 2.3134, p< .05, 95% CI [.0317, .4086]) and on the absence of social interaction on technostress (path b) (b = .3746, t (116) = 4.4172, p<.05, 95% CI [.2066, .5426]). The direct effect (path c) of the negative family support on technostress was also significant (b = .7331, t (116) = 8.2117, p<.05, 95% CI [.5563, .9099]). Moreover, there was a significant indirect effect of negative family support on technostress through absence of social interaction, demonstrated by the bootstrapped 95% CI of the indirect effect (b = .0825, SE = .0392, 95% CI [.0204, .1726]). These results support that absence of social interaction mediate the relationship between negative family support and technostress as previously discussed in hypothesis 4.

Table 4. Results for the mediating effects of Absence of Social Interaction

Mediation	B	SE	T	P	CI (lower)	CI (upper)
X1 → M (a)	0.2201	0.0952	2.3134	<.05	0.0317	0.4086
M → Y (b)	0.3746	0.0848	4.4172	<.001	0.2066	0.5426
X1 → Y (c)	0.7331	0.0893	8.2117	<.001	0.5563	0.9099
X1 → M → Y (a1*b1)	0.0825	0.0390			0.0203	0.1734

4. Discussion

4.1 Summary of Findings

JDR- model explains that an individual while at work is presented with resources that can been used to tackle demands of one work (Demerouti, Schaufeli, et al., 2001). As in this case professors were in the situation of new forms of resources and demands. For this reason, the study has the main goal of understanding to which extent remote work could have an impact on higher education professors, ranging from their performance and health. For this goal, we

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proposed that a professor job demands, and resources would have a direct impact on his performance and on his health.

As expected, results showed us that engagement is positively connected to performance. Additionally, our finding presents that the link between engagement and performance is moderated by the presence of positive emotions, proving in the presence of positive emotions this relationship is stronger, therefore it can be seen as an important resource to organization with the goal of promoting performance and engagement. This fact points that professors with higher levels of engagement and positive emotions can achieve higher levels of performance which goes in line with the literature (Bakker, 2009).

Furthermore, results suggest that a negative family support has a positive impact in an individual technostress. Moreover, results indicated that a professor work-family conflict does indeed mediate the relationship between a negative family support and technostress.

As seen around the world remote work would bring a new level of demands to an individual work, since individual were forced to conciliate work life and personal life. Additionally, it is known that work-family balance can be affected due to remote working, since individuals must create a set of rules that maintain a sense of separation, between work and family (Wayne et al., 2020). However, and since the beginning of the pandemic, this dynamic has been taking hits because the forced lockdown.

On the other hand, absence of social interaction mediates the relationship between negative family support and technostress. Although remote work offers a higher flexibility, where an individual can manage their own work rhythm, it is hard to manage the balance between personal life and work, especially if the partner is also working from home and there is children attending online schooling (Oksanen et al., 2021). Moreover, remote work implies that the level of contact face to face, which was once at a high time level since professors spend a large amount of time with their students, now as seen a drastic cut due to the pandemic.

The interaction that a professor was used to have has been shifted, and as known the interaction between professor and student is vital for the learning environment. In an online situation it was expected that professors felt isolated.

As represented by the United Nation it's possible to observe that even in countries that present satisfactory infrastructure and connectivity, as is the case of Portugal, there still exist a lack of knowledge in most basic information communication technologies (ICT) skills, which represent that a professional can't express their full protentional.

At last, and although Portugal presents adequate infrastructure there is a need to revise the guidelines and the support that we give to our professors, since they have been overcharged with a world of demands in order to adapt to online teaching, where the level of supports seems to have a deficit.

4.2 Theoretical contributions

Our findings gave us an image of the resources and demands that higher educations faculties have at their disposal as well as the tools that they don't have a hold. In the upper side, remote work provides increased productivity, satisfaction and give a worker more flexibility. However, on the negative side, it can lead a worker to feel isolated, have a higher difficulty to balance work and family and an increase of stress (Ferreira, Pereira, Bianchi, & da Silva, 2021).

As previously mentioned, our results show that absence of social interaction mediates the relationship between a negative family support and technostress, this opens a possibility for research, especially in organizations contexts.

Stress is already a theme highly debated through the year, being proved that a higher level of stress has a direct impact on a worker performance as well in his health, leading, for example, to burnout (Prentice & Thaichon, 2019). However, technostress still has a gap in the literature. The study observes that family support does indeed has a link with technostress, specifically if a person perceives a lower level of family support has an increased level of technostress. Additionally, if technostress can be described as a form of stress, then is only logic that absence of social interaction and work-family conflict can be seen as demands inherent to remote work.

All the above represents that a professor have number of resources at his disposal, but it also has several demands that he needs to handle. Regarding the JDR-model our results support the proposition that an individual line of work is made of resources and demands, for instance, positive emotions could be used as powerful resources in organizational contexts to hinder the deleterious effects of high job demands (Dubreuil et al., 2021).

4.3 Practical implications

Covid-19 as proven that remote work is possible and the previous idea that the disadvantages outweigh the advantages is outdated. As seen, globally organizations adopt remote work and adjust their company policies in order to fit remote work as the new form of

work. However, there is still a need to improve the process that comes with this system, as although most individual are used to work with technologies there is room to improve.

This study emphasizes that higher education faculties still struggle to maintain a balance between a professional life and family, which consequently as direct effect on the workers' health. As the modern world changes, the family spectrum is extensively consistent with dual career and single parent families, as well more individuals that care for the elder generation (Chang, Zhou, Wang, & Heredero, 2017).

Considering that a healthy work-life balance is a major concern, organizations have to review their policies and consider implementing a form of hybrid model, since the biggest drawback, that our study reflect, is the impact of absence of social interaction and work-family conflict on an individual. Given this, a hybrid form of work could offer the best of both options, keeping in check that remote work should be accompanied with specific training, where workers can, for example receive formation in the more technical aspect of the work as for the use of technologies, but as well in management of time or the right to disconnect (Ghislieri et al., 2021). All of the previous, can and should be implemented in institutions with the thought that change take time and practice.

4.4 Limitations and Future Research

This work had a considerable difference between number of participants throughout the sample collections times. For this reason, future research should present a higher number of participants and preserve stability of numbers during the moments of data collection.

Additionally, all the queries are self-reported measures which, and given the nature of questions of the scales, subjects may answer on a more socially acceptable manner.

Furthermore, although all response had 6-day minimum intervals between queries, it could be interesting to have a larger time gap between participants answers.

Additionally, future research should assess if there are differences between participants responses according sex, since a recent study found that gendered patterns of childcare responsibilities persist (Shockley, Clark, Dodd, & King, 2021).

Moreover, it would be interesting to reproduce the study in a larger scale, analyze whether integrated psychological support, manuals and other tools would lead to lower level of technostress, since, extensively mentioned, professors have been overcharged with demands and are on the position of lack of resources (Erin E. Makarius, Barbara Z. Larson, 2021).

Regarding the scale used to measure engagement it was only use the component, vigor, which in future research should be analyzed all the components involved in the scale in order to maintain a higher level of reliability.

At last, the absence of social interaction has a poor internal consistency (0.566), which may interfere with the results. Conclusions must be cautiously interpreted.

5. Conclusions

This research deepens the scientific community knowledge of the resources and demands that are at disposal or higher education's faculties, as well as the knowledge that those can be improved. Interestingly, it is observed that emotions can act as a link between a worker performance and engagement. This conclusion has more impact as we perceived that a higher level of positive emotions can cultivate an individual performance and engagement and smoother the demands that comes with one's work. As for institutions, they could implement forms that allows workers to experience more positive emotions and consequently lower negative emotions and as a result achieve a higher performance (Dubreuil et al., 2021)

Finally, the absence of social interaction and work-family conflict as proven to be an ally to stress as well to a lower perception of family support. These results show us that policies must be implemented in order to reduce a person perception of loneliness as well as to concede resources to employees as a way of reducing the demands intrinsic to remote work. Given that, companies should invest in a wider control, reinforce measures tools that follow up how workers can balance their work and personal life and practices that promote team cohesion such as regular meetings (Ferreira et al., 2021).

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Annexes

Annexes A

Technostress Subscale

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1. O trabalho remoto provoca-me stress

9. O trabalho remoto conduz a maiores conflitos familiares

12. O trabalho remoto faz-me ter tempo para pensar em coisas negativas

13. No trabalho remoto sinto-me isolado

14. No trabalho remoto existem distrações que me impedem de realizar o meu trabalho

17. No trabalho remoto é difícil manter padrões de trabalho

Annexes B

Work-Family Conflict Subscale

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15. No trabalho remoto é difícil manter o trabalho e a família separada

16. No trabalho remoto é difícil manter a vida pessoal e profissional separadas

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Annexes C

Absence of Social Interaction Subscale

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8. O trabalho remoto promove uma maior interação entre colegas

20. No ensino a distância é difícil motivar os alunos

21. No ensino a distância sinto que estou a expor a matéria para um ecrã em preto

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Annexes D

Positive Affects Subscale

1.Interessado/a

3.Entusiasmado/a

5.Inspirado/a

6.Ativo/a

9.Determinado/a

Annexes E

Performance Subscale

1.Quantidade de trabalho feito

2.Qualidade do trabalho feito

3.Precisão/Eficácia no trabalho

4.Cumprir os objetivos dentro dos prazos estabelecidos

Annexes F

Engagement Subscale (Vigor)

1.Sinto-me cheio de energia no meu trabalho

2.Sinto-me com força e vigor no meu trabalho

3.Quando me levanto pela manhã, tenho vontade de trabalhar