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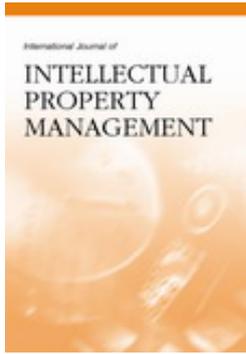
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Impact of the technological implications of teleworking on higher education teaching staff

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Abstract: Although the concept of teleworking has existed for more than 30 years, it was in 2020 when it experienced its greatest boom, when an unprecedented and virtually unplanned social experiment forced millions of people to work from home due to a global pandemic. In the case of higher education, face-to-face teaching became online in a matter of weeks, without having been so designed neither in terms of the training activities nor the teaching methodologies nor evaluation systems, with virtually no training for teachers and with unsuitable infrastructures. In this context, our study, based on the C.I.S. survey *Trends in the Digital Society During the COVID-19 Pandemic*, conducted in March 2021, tries to analyse the perception of telework for 474 university teachers in relation not only to the technological resources available, but also to the digital skills of teachers; concluding that they see it as positive for business, employees, family life and society.

Keywords: telework; university; higher education; hybrid training; digital competencies for teachers; innovation; technology management; organisational strategies; teaching; professors.

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Biographical notes: María de las Mercedes de Obesso is a Fellow of the Higher Education Academy. She is Professor of ESIC University in Madrid, Spain and the Director of Quality Undergraduate Area. She has published research articles in some of the main business journals in the world and in prestigious Spanish publishers. Her research areas include higher education, management, quality control and brand.

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1 Introduction

Although many meanings define telework and many authors have tried to define it (Gajendran and Harrison, 2007; Eurofound, or the International Labour Organisation 2017), there does seem to be consensus when considering it as: a form of work organisation, the main characteristic of which lies in its performance outside the physical space of the company, thanks to the implementation, as new means of work, of information and communications technologies (I.C.T.s) (Peiró, 2020). The concept of telework dates back to 1979 (Sârbu et al., 2021), and it was in that same year when I.B.M. allowed five employees to work from home (Pratt, 1984), a figure that increased to 2000 workers in 1983 (Toptal Research, n.d.).

Technological improvements in information and communication systems have led to the stimulation of telework (Welz and Wolf, 2010), a growth that increased exponentially with COVID-19 (Gostin et al., 2020) and whose post-pandemic evolution, according to the International Labour Office, seems to continue an upward trend (I.L.O., 2021). The intensive use of this work modality has allowed workers and employers to know the benefits and drawbacks of its adoption and to assume telework as a commonly accepted practice (Baert et al., 2020).

To this must be added the degree of satisfaction reported by employees who telework, who value autonomy (Shockley and Allen, 2012), and improved conditions for reconciling family life with work (Coenen and Kok, 2014; Peters et al., 2004). In this line, the Third European Survey of Enterprises on New and Emerging Risks (2019) (E.S.E.N.E.R. 3) reveals that digitalisation brings the flexibility mentioned above as the main contribution to the employee. The effective inclusion of I.C.T. has broken down traditional space-time barriers, types of supervision, and the way of understanding the very concept of work (Cuello, and Montenegro, 2021; Messenger and Gschwind, 2016; Xie et al., 2018), a circumstance that, for other authors, far from favoring work-life balance, can lead to a lack of differentiation between the limits of work and non-work dedication (Santana and Cobo, 2020; Felstead and Henseke, 2017; Mellner et al., 2015). This issue that has spread throughout the EU., which seeks to regulate the right of employees to disconnect from all electronic communication systems outside working hours (Llave and Weber, 2020).

As for the modalities of telework, Allen et al. (2015) differentiate between telework to achieve several objectives related to such work, telework that seeks the conciliation mentioned above and involuntary telework. The latter has to do with implementing telework at the employer's expense for logistical (Lapierre et al., 2016) or health reasons, as a consequence of COVID-19 (Afonso et al., 2021).

In addition to seeking a better work-life balance, teleworking should ensure that productivity is not affected. Gajendran and Harrison (2007) state that the flexibility given to the worker has a positive impact on their performance, as the familiar environment

isolates them from the interruptions inherent in a shared workspace with other co-workers.

However, not all employees welcome telework, not least because they prefer to have direct daily contact with their customers or lack the necessary technological facilities at home (Peters et al., 2004).

The COVID-19 pandemic has entailed the need to implement teleworking. The aim of this research is to investigate how university teachers assess the impact of telework in higher education in Spain. They included different groups (companies/workers/society/family), considering the context of haste caused by the pandemic and the technological, training and social gap derived from an accelerated implementation of the same. In addition, the gap mentioned earlier opens new avenues of discussion around this issue, related to how telework also affects university management.

From the methodological point of view, this work is based on a descriptive analysis of the study's variables on a sample of 474 teachers, extracted from the survey conducted in March 2021 of the C.I.S. "*Trends in the Digital Society during the COVID-19 pandemic*", in which 52.4% of the sample were women and 47.6% men with an average age of 42.86 years. We also applied the student's t-test for independent samples for quantitative variables and the chi-square test to validate whether the participants' perceptions were related to factors in their context. These analyses were carried out using S.P.S.S. statistical software, version 23.0.

The results of the analysis results show that teachers consider teleworking a positive practice for companies, employees, society, and family life. They have the resources and technological habits, training, and technical support from the company.

2 Theoretical framework

Telework has had a different impact depending on the sector, the activity, and the type of worker. A significant proportion of European teleworkers are classified as knowledge workers, whose distinguishing feature is a highly professional and technological qualification that allows them to work from home. According to Eurofund and I.L.O. (2017), university teachers, the subject of our study, would fall into this category (Dingel and Neiman, 2020).

Bologna brought the emergence of distinctly innovative distance-learning formats, different from those we knew until then thanks to technological development. Academic results were assimilated to face-to-face training and multiplied the possibilities of access to e-learning (Aguado, 2018; Ramirez Anormaliza et al., 2015; Udo et al., 2011).

But the great revolution as far as distance-learning is concerned came with the global health crisis caused by the COVID-19. RD 463/2020 of March 14, 2020, declares a state of emergency in Spain to manage the health crisis caused by the COVID-19. Article 9 of this document declared the suspension of face-to-face educational activity of university education and indicating that during this period, educational activities would be maintained through distance and online modalities, whenever possible. In March 2020, millions of children and young people were locked in their homes. With this unprecedented event (Zimmerman, 2020), we began to talk about emergency remote learning or hybrid learning (Bozkurt and Sharma, 2020), since the teachings conceived and designed as face-to-face became online, in many cases synchronous (Kim, 2020). This new model of education that emerged in the aftermath of the pandemic involved an

unprecedented digital transformation of faculty and university organisations themselves (Bonfield et al., 2020; Escobar et al., 2020). When the situation improved and the confinement ended, the existing capacity constraints meant that professors in the classroom were simultaneously teaching face-to-face classes for some students and synchronous online courses for others. University professors demonstrated a great capacity for adaptation, and in a matter of weeks, they migrated to this new model, which ensured that education did not stop (Benitez-Amado, 2020). To carry this out, teachers took advantage of many techniques of online training, yet without the content having been designed this way; as stated in the book *Learning online: What Research Tell us about Weather, When and How*, several dimensions must be taken into account, such as course modality, possibilities of monitoring, student/teacher ratio, pedagogy, evaluation and feedback systems, the role of the teacher and the student, simultaneity or asynchronous. Specifically, the following hypothesis is to be analysed:

H1 Teachers' perceptions of telework are related to their pre-pandemic technology habits.

To this end, we refer to the BBVA Foundation study (2021) on attitudes towards technology and uses of ICTs in Spanish society within the framework of COVID-19. On the one hand, this study indicates that in 2008 only 18% of Spaniards considered the Internet to be 'essential' for their lives and that this percentage will rise to 60% in 2020, after the pandemic; and on the other hand, it points out that the future validity of practices such as teleworking will be conditioned by the previous experience of employees.

The World Bank (2020) takes the same position in its report on the impact of COVID-19 on education and public policy responses, which analyses how prior technological experience favours service delivery by teachers and learning by students.

Another way of justifying H1 would be through Davis' (1987) TAM, which analyses how users accept and use a new technology, through a series of factors that influence how and when they will use it; these are:

- Perceived usefulness: Degree to which a system improves performance.
- Ease of use: Degree to which a person believes that using a particular technology will involve little effort (Davis, 1989).
- Perceived enjoyment: Degree to which a person finds an activity pleasurable (Davis et al., 1992).

Many authors have used the TAM model applied to higher education, such as Fathema et al. (2015), Chintalapati and Daruri (2017) or Martín-García et al. (2019) and others who link it not only to higher education but also to telework, such as Maluki (2020).

Although the goal of integrating information and communication technologies (ICTs) in the teaching-learning process had already been present for some time in the academic literature (Al-Samarraie et al., 2018; Ramirez Anormaliza et al., 2015), the global pandemic caused by COVID-19 highlighted the importance of developing the digital competencies of all members of the university community, but especially of teachers.

We align with Ally (2019) in considering that the training of teaching and research staff for telework is closely related to the development of their ICT skills.

Many authors have tried to define the concept of competence (Salganik et al., 1999; Riesco González, 2008). In this context, digital competence is considered one of the key competencies for lifelong learning (European Commission, 2006; Morselli, 2019). In this

way, different tools have emerged to assess and enhance the digital competence of individuals, such as D.I.G.C.O.M.P. or DIGCOMEDU (Redecker, 2017) at the international level. In Spain, the Ministry of Education developed the INTEF model (Durán Cuartero et al., 2019; Touron et al., 2018). However, the most relevant is the European DigCompEdu model (Cabero-Almenara et al., 2020) which describes the digital competence of an educator in six parts, which show 22 specific competencies (Redecker and Punie, 2017). Specifically, the following hypothesis is to be analysed:

H2 Teachers' perception of telework is related to their self-assessment of their telework during the pandemic.

Another issue that has been addressed in relation to perceptions is the need for technological resources, as Arora and Srinivasan (2020) point out, adding to the success of online training the variable of technical resources. These authors conducted a questionnaire aimed at higher education teachers in India to discover a technological gap due to connectivity problems, which prevented understanding between teachers and students in their interactions through the virtual classroom. In addition, they found that this gap was also caused by a lack of qualified personnel who knew how to take advantage of the possibilities offered by technology in an online teaching system. The key lies in the professionalisation of human resources in the university context to adapt telework (Wasserman and Migdal, 2021).

But the success of teleworking must also be subject to the quality and reliability of digital services, including the reliability of the Internet connection at the employee's home, as this will enable them to perform their work smoothly (Budnitz and Tranos, 2021). This is a need that became even more pressing during the COVID-19 pandemic, where isolation led to an increase in the consumption of content over the Internet. Although this was an exceptional situation, it served to accelerate the trend that authors such as Del Fresno Garcia (2011) and Scolari (2019) had already detected previously, where the socio-cultural changes caused by cyberspace were already conditioning the emergence of new collective pedagogies, based on reciprocity and role exchange, under the nomenclature of student centred learning.

In this sense, university teachers must have the necessary infrastructures to overcome the different levels of the digital divide. Riddlesden and Singleton (2014) and Philip et al. (2017) talk about the first level of the digital divide regarding the availability and quality of Internet connection. On a second level, they focus on the employee's lack of skills to efficiently use the various digital and Internet technologies available to them (Van Deursen and Van Dijk, 2011; Blank and Groselj, 2014). Finally, the third level of the digital divide is the different performance of individuals depending on their socioeconomic status and how this contributes to a greater distance between classes (Van Deursen and Van Dijk, 2014; Van Deursen and Helsper, 2015), a variable to which Neirotti et al. (2012) add that this productivity improvement is subject to the professional having information systems and I.C.T. infrastructures that allow them to carry out more effectively efficient and satisfactory processes.

This is a double-edged sword, which for Kanellopoulos (2011) can lead to social exclusion for employees with more limited purchasing power. They must face an additional cost derived from a technification that passes, at least, by having access to the Internet, a computer, as well as the acquisition of the necessary skills for the use of these technologies.

Specifically, we want to analyse the following hypothesis:

H3 The perception that teachers have of teleworking is related to the personal technological resources available to them.

One factor to be taken into account in relation to job satisfaction is the technological equipment that the company has provided to the worker during the pandemic. Although there are studies that state that it has no influence (Georgescu et al., 2021), they also indicate that the probability of wishing to continue teleworking even after the end of the pandemic increases if the field of activity is IT, the field in which workers possess the most adapted technological resources. Other authors point out that those who require specific resources such as laboratories or workshops do not have the same perception of telework, as they do not have them in the domestic space (Ramos et al., 2020).

In the world of higher education, as of September 2020, Spanish public and private universities opted for the combination of small groups and online classes (synchronous or asynchronous) (De Obesso and Nuñez-Canal, 2021) with the aim of guaranteeing that training does not stop and that students obtain the learning outcomes established in the reports of each degree programme a temporary educational solution was used to manage a supervening problem (Golden, 2020) that logically contemplates the benefits of online training existing up to now, but adapted to a new and absolutely disruptive context.

Universities invested in equipment in the classroom, installing digital whiteboards, microphones, speakers, and cameras that improve the learning experience, and software adapted to the new reality; Zoom, CANVAS, Moodle, Blackboard, or Google Classroom, etc were the most common licenses. But aware that technology is only a means and not an end in itself, it was necessary to train teachers in digital skills, methodology, evaluation systems, etc, (Kreiling, and Scanlan, 2020).

However, even being aware of the need to invest in technology (understood as hardware, software, and training), the financial situation of universities in many cases is complicated, and the drop in income due to loss of enrolment is compounded by costly economic investments (Krishnamurthy, 2020).

In this situation, it is key that the student has internalised the student-centred learning methodology, being responsible for their learning (Oakley and Sejnowski, 2019), and sees the teacher as a mediator or facilitator in the process (O'Neill and McMahon, 2005).

Specifically, we want to analyse the following hypothesis:

H4 Teachers' perception of teleworking is related to the technological equipment that their company has provided them with during the pandemic.

3 Methods and sampling

This research has used data from the study "*Trends in the digital society during the COVID-19 pandemic*", elaborated by the C.I.S. between 8 and 17 March 2021, on the consequences and effects of the COVID-19 pandemic. The C.I.S. developed a structured instrument containing 45 items administered by computer-assisted telephone interview (CATI) to adults selected by simple random sampling. The confidence level was 95.5%, $P = Q$, and the sampling error was $\pm 1.8\%$. Of the 3014 interviews carried out by the C.I.S., those selected correspond to persons who have teleworked from home giving classes or training activities and who have been considered teachers or professors, these being 15.7% of the total (474 participants).

The sample consisted of 474 teachers who had been teleworked during the last pandemic year; 52.4% were female, and 47.6% were male. The mean age was 42.86 years ($SD = 10.60$).

In terms of the size of the population in which the participants lived, 2% of them lived in towns with up to 2,000 inhabitants, 8.3% in cities with between 2,001 and 10,000 inhabitants, 23.4% in cities with between 10,001 and 50,000 inhabitants, 14.5% in towns with between 50,001 and 100,000 inhabitants, 25.5% in cities with between 100,001 and 400,000 inhabitants, 9.3% in cities with between 400,001 and 1,000,000 inhabitants and 17% in towns with more than 1,000,000 inhabitants.

Regarding their social class, 12.5% of the participants are upper and upper-middle class, 67.5% middle class, 10.9% lower-middle-class, 7.3% working class, 1.8% lower class.

82.9% of the participants have higher education.

3.1 *Measurements*

Based on the items of the C.I.S. questionnaire, the variables defined for this research are:

- Evaluation of telework for companies. A qualitative variable that collects how participants evaluate telework for companies; has two categories: 1 = positive, and 2 = negative or conditioned (for some things it is positive and detrimental for others).
- Evaluation of telework for employees/workers. The qualitative variable that captures the participants' evaluation of telework for employees or workers; has two categories: 1 = positive, and 2 = negative or conditional (for some things it is positive and for others it is detrimental).
- Evaluation of telework for society. The qualitative variable that captures the participants' evaluation of telework for the organisation; has two categories: 1 = positive, and 2 = negative or conditional (for some things it is positive and for others it is detrimental).
- Evaluation of teleworking for the family life of employees/workers. The qualitative variable that collects how the participants evaluate teleworking for employees or workers; has two categories: 1 = positive; and 2 = negative or conditional (for some things it is positive and for others it is detrimental).
- Personal technological resources. It includes two quantitative variables: the amount of technical equipment (computer, laptop, or tablet) available in the participant's home and the number of users who have this equipment; and a categorical variable: the gap between equipment and users (dichotomised into 1 = if the amount of equipment \leq number of users; and 2 = if the amount of equipment $>$ number of users).
- Previous technological habits. The quantitative variable that collects 15 types of purchases of articles, activities, or procedures evaluated (buying fresh food; buying cooked food, catering; buying drinks and liquor; buying clothes and footwear; buying furniture; buying books; buying train or plane tickets; buying paid digital media; buying electronic equipment; buying household appliances; contracting services such as electricity, water, telephones, courses, yoga, etc.; getting tickets for

shows; paying taxes; dealing with administration; and dealing with banks), regarding how many of them the participants carry out online.

- Evaluation of their experience of teleworking during the pandemic. An ordinal variable that shows how participants rate the outcome of their teleworking during the pandemic compared to their previous teleworking experience. It has three levels: 1 = better; 2 = same; and 3 = worse.
- Technological equipment provided by the company. It includes four dichotomous qualitative variables (1 = yes; and 2 = no) that include: whether the worker had technological equipment provided by the company before the pandemic; whether the worker used their equipment temporarily until equipment was provided, or continuously throughout the confinement; and whether the workers had technical support provided by the company to telework effectively.

First, a descriptive analysis of the study variables was carried out. Then, to analyse whether the participants' perceptions were related to factors in their context, we applied a student's *t-test* for independent samples for quantitative variables and the chi-squared test for qualitative variables.

The significance value set is < 0.05 .

Data analysis was carried out with the S.P.S.S. statistical package, version 23.0.

4 Results

The analyses show that most teachers believe that teleworking is positive for all the groups analysed. Specifically, 79.9% of teachers believe that teleworking is positive, especially for the group of *companies*.

4.1 Relationship between perceptions of telework and pre-pandemic technology habits

Taking as a starting point hypothesis 1: "Teachers' perception of telework is related to their pre-pandemic technology habits", we identified the 15 types of procedures or purchases of products and services that Internet users most commonly manage online; teachers had a pre-pandemic habit of carrying out an average of 7.79 of the types ($SD = 2.95$).

Considering their perceptions of telework for the different groups Table 1, teachers who thought that telecommuting is positive for *employees* had more habits of managing themselves pre-pandemic online than those who considered this way of working to be negative or dependent on what it is evaluated for (8.12 vs. 7.37). Similarly, participants who believed that telecommuting is positive for society also had more online working habits than those with a more negative or conditional view (8.12 vs. 7.16).

Table 1 Teachers' evaluations of teleworking according to their technological habits before COVID-19

	<i>Evaluation of teleworking for</i>							
	<i>The companies</i>				<i>The employees</i>			
	<i>Positive</i>		<i>Negative/cond.</i>		<i>Positive</i>		<i>Negative/cond.</i>	
	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>
Habits	7.95	2.90	7.48	3.12	8.12	3.02	7.37	2.79

	<i>The company</i>				<i>Family life</i>			
	<i>Positive</i>		<i>Negative/cond.</i>		<i>Positive</i>		<i>Negative/cond.</i>	
	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>
	Habits	8.12	3.03	7.16	2.60	7.94	2.94	7.65

Table 2 Teachers' evaluations of teleworking according to their technological habits before COVID-19

	<i>Evaluation of teleworking for...</i>							
	<i>The companies</i>				<i>The employees</i>			
	<i>Positive</i>		<i>Negative/cond.</i>		<i>Positive</i>		<i>Negative/cond.</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Best	112	88.9	14	11.1	96	76.8	29	23.2
Same	143	88.3	19	11.7	115	69.3	51	30.7
Worst	74	61.2	47	37.8	41	31.1	91	68.9

	<i>The company</i>				<i>Family life</i>			
	<i>Positive</i>		<i>Negative/cond.</i>		<i>Positive</i>		<i>Negative/cond.</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
	Best	101	82.1	22	17.9	99	79.2	26
Same	126	75.9	40	24.1	116	69.0	52	31.0
Worst	62	48.8	65	51.2	67	51.5	63	48.5

4.2 Influence of one's own experience on perceptions of teleworking

As regards Hypothesis 2: 'The perception that teachers have of telework is related to the self-assessment they make of their telework during the pandemic', 29.4% of teachers believed that the results obtained in their experience of teleworking during the pandemic were better than those obtained previously; 39.2% think they have been the same and 31.4% described them as worse.

If we analyse the perceptions of telework in terms of their personal experience Table 2, we obtain that the evaluation of their own results obtained with this way of working is associated with the evaluation they made of teleworking for: companies ($\chi^2(2, N = 409) = 40,627; p < 0.001$), employees ($\chi^2(2, N = 423) = 66,452; p < 0.001$), society ($\chi^2(2, N = 416) = 38,048; p < 0.001$) and family life ($\chi^2(2, N = 423) = 22,653; p < 0.001$); with all groups having a more favourable perception of teleworking the better their own experience with this form of work ($p < 0.001$).

Table 3 Teachers' evaluations of telework according to the technological resources they had at their disposal

		<i>Evaluation of teleworking for...</i>							
		<i>The companies</i>				<i>The employees</i>			
		<i>Positive</i>		<i>Negative/cond.</i>		<i>Positive</i>		<i>Negative/cond.</i>	
		<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>
Teams		3.50	1.53	3.45	1.42	3.47	1.49	3.42	1.53
Users		2.56	1.11	2.59	1.03	2.52	1.08	2.63	1.10
		<i>Positive</i>		<i>Negative/cond.</i>		<i>Positive</i>		<i>Negative/cond.</i>	
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Gap	E ≤ U	139	78.1	39	21.9	109	57.1	82	42.9
	E > U	212	80.6	51	19.4	164	61.4	103	38.6
		<i>The company</i>				<i>Family life</i>			
		<i>Positive</i>		<i>Negative/cond.</i>		<i>Positive</i>		<i>Negative/cond.</i>	
		<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>	<i>M</i>	<i>DT</i>
Teams		3.59	1.53	3.18	1.52	3.46	1.46	3.49	1.56
Users		2.55	1.09	2.59	1.12	2.53	1.07	2.66	1.12
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Gap	E ≤ U	113	62.1	69	37.9	123	65.4	65	34.6
	E > U	195	73.0	72	27.0	181	67.3	88	32.7

Note: E = equipment, U = users.

4.3 Evaluation of teleworking according to technological resources

As regards Hypothesis 3: "The perception that teachers have of telework is related to the personal technological resources available to them", the research has recorded that, on average, in their homes, teachers had 3.46 ($SD = 1.50$) computers for 2.57 ($SD = 1.09$) users; so that, in 58.7% of their homes they had more computers than users and, in 41.3% the equipment was less than or equal to the number of users.

On the one hand, analysing the perceptions that teachers have of telework for society in terms of their resources Table 3, it has been obtained that their assessments were related to the number of computers they had ($t(447) = 2,661$; $+ = 0.008$; $d = -0.273$); registering that those who think that teleworking was positive for society had an average of 3.59 computers, while those who believed it was negative or believed that it depended on what it was evaluated for had 3.18 computers. Likewise, their evaluations are also associated with the technological gap ($\chi^2(1, N = 449) = 6,019$; $p = 0.014$; $Phi = 0.116$); while among those with a surplus of equipment, 73% rate teleworked positively for society; among those with more restricted access to equipment, a smaller proportion of participants rated it favorably, namely 62.1%.

On the other hand, the results have indicated that teachers' perceptions of whether or not telework is beneficial for business, employees, and family life are not related to the technological resources available to them Table 3.

4.4 Perception of telework and technological endowment provided by companies

As regards Hypothesis 4: “The perception that teachers have of telework is related to the technological equipment their company has provided them with during the pandemic”, Table 4 shows the data on items relating to the technological equipment that companies have provided to the teachers who participated in the study. In the case of 41.4% of the teachers, their company had given them a computer before the pandemic; in the case of 24.6%, the company asked them to temporarily use their personal computer until they could provide them with a computer; in the case of 38.9%, the company asked them to use their personal computer during the confinement; and in the case of 63.7%, the company provided them with technical support to be able to telework effectively.

Table 4 Frequencies of business technology equipment provided to teachers

	<i>n</i>	%
Your employer had already equipped you with a laptop before the pandemic.		
Yes	172	41.4
No	243	58.6
Your employer asked you to use a computer he owned until he was provided with a laptop.		
Yes	101	24.6
No	311	75.4
Your employer asked you to use a computer owned by you for the duration of your confinement.		
Yes	160	38.9
No	251	61.6
Your employer organised technical support to help employees to implement telework effectively.		
Yes	258	63.7
No	147	36.3

If we analyse their perceptions of teleworking, taking into account the business endowments available to the teachers Table 5, we find that:

- 1 The availability, prior to the pandemic, of a laptop computer provided by the company is related to the teachers' perception of telework with respect to all groups. Thus, among those who had previously been equipped with a computer, the proportion of teachers who perceived telework positively is higher for *companies* ($\chi^2(1, N = 391) = 7,001; p = 0.008; Phi = 0.134$), for *employees* ($\chi^2(1, N = 409) = 5,226; p = 0.022; Phi = 0.113$), for *society* ($\chi^2(1, N = 402) = 11,542; p = 0.0001; Phi = 0.169$) and for *family life* ($\chi^2(1, N = 409) = 6,831; p = 0.009; Phi = 0.129$).
- 2 Teachers having had to temporarily use their computer until they were provided with a company computer is related to their perception of teleworking activities about *employees*. It turns out that, among teachers who have had to use their computers temporarily, the proportion of those who perceived telework positively for *employees* is lower ($\chi^2(1, N = 407) = 4,603; p = 0.032; Phi = -0.106$).

Table 5 Teachers' evaluations of teleworking according to the technological endowment of their company

	Evaluation of teleworking for...															
	The companies				The employees				The company				Family life			
	Positive n	%	Negative/cond. n	%	Positive n	%	Negative/cond. n	%	Positive n	%	Negative/cond. n	%	Positive n	%	Negative/cond. n	%
Had equipment before the pandemic																
Yes	145	87.9	20	12.1	113	66.5	57	33.5	129	76.8	39	23.2	124	73.8	44	26.2
No	175	77.4	51	22.6	132	55.2	107	44.8	142	60.7	92	39.9	148	61.4	93	38.6
Temporarily use your equipment																
Yes	76	80.9	18	19.1	50	50.5	49	49.5	61	61.6	38	38.4	61	61.0	39	39.0
No	242	81.8	54	18.2	193	62.7	115	37.3	208	69.1	93	30.9	210	68.2	98	31.8
Uses own equipment in confinement																
Yes	116	78.9	31	21.1	79	50.3	78	49.7	89	57.8	65	42.2	92	58.2	66	41.8
No	202	83.1	41	16.9	165	66.0	85	34.0	181	73.3	66	26.7	177	71.4	71	28.6
Had technical support																
Yes	213	85.2	37	14.8	176	69.3	78	30.7	188	74.6	64	25.4	178	69.8	77	30.2
No	100	75.2	33	24.8	62	43.1	82	56.9	80	55.9	63	44.1	87	60.0	58	40.0

- 3 Whether teachers had to use their own computer for the duration of the confinement is related to their perception of telework for *employees*, *society* and *family life*. Among those who have had to use their computer for the duration of the confinement, the proportion of teachers who perceived telework positively for *employees* is lower ($\chi^2(1, N = 407) = 9,877; p = 0.002; Phi = -0.156$), for *society* ($\chi^2(1, N = 401) = 10,344; p = 0.001; Phi = -0.161$) and for *family life* ($\chi^2(1, N = 406) = 7,457; p = 0.006; Phi = -0.136$).
- 4 Whether the company organised technical support for employees to implement telework effectively is related to teachers' perceptions of telework for all groups. Thus, among those who have had technical support, a higher proportion of teachers perceived telework positively for *companies* ($\chi^2(1, N = 383) = 5,826; p = 0.016; Phi = 0.123$), for *employees* ($\chi^2(1, N = 398) = 26,313; p < 0.001; Phi = 0.257$), for *society* ($\chi^2(1, N = 395) = 14,561; p < 0.001; Phi = 0.192$) and for *family life* ($\chi^2(1, N = 400) = 3,974; p = 0.046; Phi = 0.100$).

5 Discussion

Although the concept of teleworking dates back to the last quarter of the 20th century (Sârbu et al., 2021), the health crisis caused by COVID-19 and the confinement it brought with it, forced employers and workers to accept a new form of home-based work (Baert et al., 2020), which, as the International Labour Office indicates, seems to continue today (International Labour Office, 2021).

RD 463/2020 of 14 March 2020 declared a state of emergency in Spain for the management of the health crisis caused by COVID-19, establishing in its Article 9 the suspension of face-to-face educational activity of university education and indicating that during this period, educational activities would be maintained through distance and online modalities, whenever possible, so that in March 2020 we began to speak of emergency remote training or hybrid training (Bozkurt and Sharma, 2020). University professors demonstrated a great capacity for adaptation and migrated to this new model in a matter of weeks, which ensured that education did not stop (Benitez-Amado, 2020). This required both technological resources and digital skills, which not everyone possessed to the same extent.

In line with the approach of Ramos et al. (2020), who state that teleworking has been verified as positive for productivity, as long as the necessary resources are available to work and the conditions related to mental health are equally favourable, the results of our research have shown that teachers consider that teleworking is a positive practice for companies, for employees, for society, and family life, but with nuances that depend on the number of technological resources, technological habits, own experience, or the provision of equipment or technical support by the company.

Specifically, the amount of resources/equipment (technological resources) at home is not related to telework perception for business, employees, or family life. However, the more resources they have, the more favorable they consider telework to be for society; results are in line with the studies of Neufeld and Fang (2005).

On the other hand, teachers who think that teleworking is positive for employees and society had more online management habits before the pandemic. Thus, among teachers who had previously been equipped with a computer or had received technical support, the

proportion of teachers who perceive telework positively for companies and also for employees in the case of adequate support is higher; however, among teachers who had to use their personal computer temporarily or during the whole confinement, the proportion of those who perceive telework positively for employees, for society, and family life is lower.

Finally, the better one's teleworking experience, the more favorable the perception of teleworking is. These results contrast with Haddon and Lewis (1994) and Bojovic et al. (2020).

This new reality has shown that universities, beyond the teaching-learning process and the promotion of research, are also complex organisations (Forliano et al., 2021) with a clear mission of economic dynamics (Etzkowitz and Leydesdorff, 2000). They have a responsibility towards stakeholders (students, teachers, families, support and service staff, society...), and one of the most relevant is the business fabric, which receives the results of this process in the form of graduates and new workers who have to put the acquired competences into practice. Planning how higher education training will develop in the future, taking advantage of the best of each model is a great challenge for the entire educational community.

6 Conclusions

Our study confirms that the majority of teachers believe that teleworking is a positive practice for all the groups analysed (companies, employees, society), but especially for companies. This perception is conditioned by a series of factors: those who had more technological habits prior to the pandemic consider teleworking to be more positive for employees and for society; those who have had better experience working at home during the pandemic also value it better; those who have more technological resources generally think it is good for society; and finally, those who have had more technological resources provided by the company see it as more positive for employees, for the company and for society as a whole.

In future lines of research, we will try to analyse whether the perception of telework is similar in teachers at all levels of education and regardless of whether they are in public or private universities. The comparison by sector of activity will also be considered.

One limitation of the study is that the period of the study was very close to the health crisis so that the results may be conditioned, so it would be desirable to repeat the survey after some time and with the "return to the new normality" to reassess and analyse whether the results are conclusive.

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