

ECONOMICS

Sociology

Davidavičiene, V., Rymaniak, J., & Lis, K. (2023). Remote workplaces as a determinant of working conditions in education during COVID-19. *Economics and Sociology*, 16(1), 123-138. doi:10.14254/2071-789X.2023/16-2/8

REMOTE WORKPLACES AS A DETERMINANT OF WORKING CONDITIONS IN EDUCATION DURING COVID-19

Vida Davidavičiene

*Vilnius Gediminas Technical
University, Vilnius, Lithuania*

E-mail:

vida.davidaviciene@vilniustech.lt

ORCID 0000-0002-0931-0967

Janusz Rymaniak

*WSB University in Gdańsk,
Gdańsk, Poland*

E-mail: rymaniakjanusz3@wp.pl

ORCID 0000-0002-0269-7492

Katarzyna Lis

*Poznań University of Economics
and Business,*

Poznań, Poland

E-mail:

katarzyna.lis@ue.poznan.pl

ORCID 0000-0002-0433-2227

Received: August, 2022

1st Revision: January, 2023

Accepted: May, 2023

DOI: 10.14254/2071-
789X.2023/16-2/8

JEL Classification: I21, J81,
M54

ABSTRACT. The lockdown resulting from the COVID-19 epidemic forced employees of various vocational and social groups into working from home. The article presents the results of the research on the organisation of remote workstations in the education sector conducted in scope of an international remote work project. Unlike the dominant research topic in the literature (well-being, WLB), our research focuses on a newer endeavor: analysis from a workplace design perspective. Statistical methods such as structure indices and correlations were used in the research. The results presented concern the organizational level of the surveyed positions and the impact of external factors on employee preferences in scope of being sent away, including position financing, position time, and organizational efficiency. The study showed a specific profile of remote work of education employees. The results also indicate employees' expectations regarding the financing of physical space and household equipment by employers, as well as the legal regulations of the right to disconnect (R2D). These are the preconditions for the strategic, permanent use of remote work as a tool for organization and management because when working remotely, new forms of the educational function must be developed

Keywords: remote work, telework, pandemic education, designing work, workplace, pandemic crisis, sustainable development

Introduction

The COVID-19 pandemic disrupted the standards of stable and long-term development, which was formed by globalisation, the opening of the markets, labor flexibility, artificial intelligence, automation, etc. This situation forced institutions and employees to seek solutions in the scope of sustainable human and social resource development due to the ability to function in various personal and professional situations. Employees and groups must be able to create

new working opportunities, adapt to emerging situations, and find ways to change their situations (Kira & van Eijnatten, 2009, p. 233-246). It demands the appropriate level of digital skills which are still in deficit despite the steep digital development caused by the pandemic and remote work opportunity growth (Bilan et al., 2023; Lipták et al., 2023). In light of the above, the main problem was the animation of new working systems in sudden and unusual situations. Their analysis takes on various dimensions in comparable international surveys, including sector-based ones. This also applies to the education sector, which is an important factor of social complexity in the accumulated – in a quantitative, temporal, and functional aspect – conditions of working from home because of the lockdown. The significance of teachers working from home is dictated by numerous circumstances. This is a vocational group that can convey substantive matters in a remote format at the utmost degree by abandoning or restricting care and education due to the inability to have direct impact. Ensuring teaching continuity for students is necessary not only due to their personal development but also in order to avoid depression, stress, etc., effects of fatigue resulting from isolation and lack of relations with peers. Participation in classes also constitutes a form of "professional activation" for students, which facilitates a balance of life organisation in an often dense household environment.

Telework and remote work were usually acceptable on a voluntary basis, but they stopped being acceptance-based due to the lockdowns (Mihalca et al. 2021; Svabova et al. 2021; Kramarova et al. 2022). There is a previously detected deficiency in literature in remote work research from the perspective of the organisation and management (Kämpf-Dern & Konkol 2017, p. 208-238; Aslan et al., 2022), behavioural changes (Lipták & Musinszki, 2022) which is emphasised by the appearance of the new and unique conditions of the pandemic and lockdown, and a resulting deficiency of appropriate research in scope of theory and accumulated practical experience. Furthermore, no sector-based research was conducted on the creation of remote work conditions in such a forced situation. This study fills the deficiency and demonstrates the results of research in the education sector.

The research aims to investigate remote work of preschool, school, and academic education teachers in a household environment and targets the following research questions:

1. Level of factors perceived by the employee determining the organisation of remote work for education employees.
2. Level of pandemic conditions, remote work of teachers compared to those of people working in other sectors.
3. Impact of external factors (financing, duration, and organisational efficiency) in teachers' transition to remote work or only coexistence with the new workplace.

The research results empirically demonstrate the opinions of employees in the new and theoretically unpredictable situation. The results can serve in two ways, i.e. for strategic purposes (long-term and intentional application) and as a form of intervention (periodical) in the event of potential disturbances caused by turbulences in the environment such as pandemics, warfare, or random events (e.g. irritating consequences of abrupt climate changes etc.). The empirical research involves reviews, analysis, and synthesis of the literature on the subject. The data was collected from an online survey conducted among employees and analysed with descriptive and multidimensional statistics.

1. Literature review

1.1. *Workplaces in the era of "despatialization"*

The work was "spaced out" thanks to the broad availability of various technical devices allowing for work outside of the employer's location with the ability to contact the community for information (Taskin 2010, p. 61-76). The concept developed slowly. In the scope of employers, Yahoo – which has been endorsing remote work involving information and communication technologies since 1980 – repeatedly changed its approach (Messenger & Gschwind, 2016, p. 195-208). On the other hand, employees were not always encouraged by the ideas of theoreticians and politicians like the Work-at-Home concept promoted early in the 20th century for young mothers staying at home with their children.

The theoretical concepts were developed in numerous directions for various remote work forms and locations. The presented proposals covered the arrangement of various research concepts, names, types, and approaches. The theoretical analyses of conditions and attributes served as the grounds for the development of a concept framework for the discussed forms of work, i.e. work location, technology, and organisation. The result proposed the separation of three "despatialization" work generations, i.e. Home Office, Mobile Office, and Virtual Office (Messenger & Gschwind, 2016, 196-203). It should be noted that time is not recognized as a typological criterion, although it was used in the research to establish the category of mobile workers, i.e. those working over 10 hours a week in this format (Vartiainen & Hyrkkänen, 2010, 117- 135; Hyrkkänen, Nenonen & Kojo, 2012, 194- 203).

The aforementioned criteria of change were divided according to the review of existing research approaches. The study of properties in scope of comfort and adaptation between the workplace and the employee identified three hierarchic categories of comfort: physical, functional, and psychological. Physical comfort refers to basic human needs, i.e. security, hygiene, and availability (connection). Functional comfort is defined as support for the user's output capacity in work-related assignments and activities. Mental comfort reflects the sense of affiliation, ownership, and control of the workspace (Vischer, 2008, 97- 108). The model was used to assess adapt or not adapt the physical workspace of virtual workplaces (Hyrkkänen & Nenonen, 2011, 69 -75) and to improve the disposition of mobile employees (Nenonen et al., 2009; Hyrkkänen, Nenonen & Kojo, 2012, 194- 203).

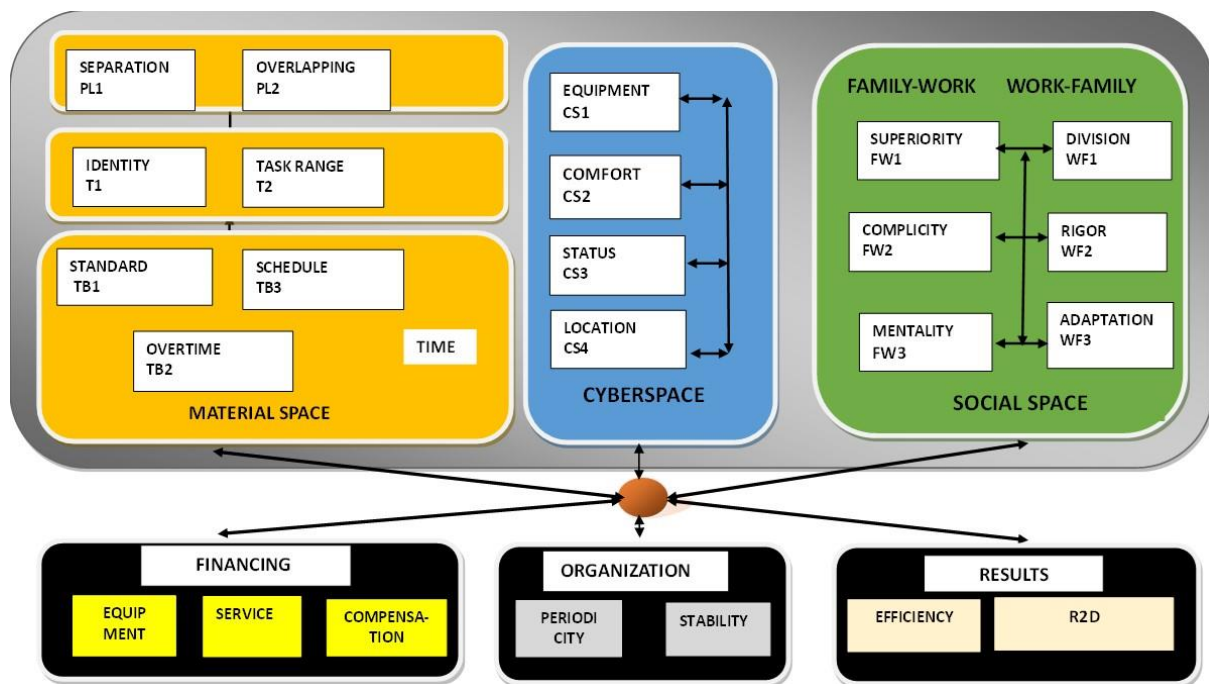
Another proposed methodology is a holistic approach where the workplace is composed of three dimensions: physical, social, and virtual. Their attributes cover the location or physical environment in the daily work environment, community or environment of interaction, information, communication, and other technologies. The social space is important for the purposes of creation, sharing, and internalization of knowledge and the development of social capital in organizations. On the other hand, the virtual space must be balanced and they must support each other (Nenonen, 2004a, 175- 189; Nenonen, 2004b, 233 – 239). In this approach, space is no longer assigned according to the management hierarchy. It now serves to support various working practices (Windlinger, Gersberg & Konkol, 2014 /2015, 83-95; Noor-Ilander, 2021).

These research approaches depart from the classic Work Design criteria (Rymaniak 2011, 23-44; 2015; 15-22; van den Broek & Parker 2017). They are concerned with evolutionary plans for the concept of development in stable conditions, not interventions and unplanned actions in tumultuous conditions. However, they constitute a theoretical starting point for the presented research.

1.2. Research approach

A model adapting the existing theoretical accomplishments in the scope of remote work was created for the purposes of empirical research. The matters important for remote education – the subject of the research – were also identified. The research model is presented on the Graph 1.

The model is composed of research areas, which include three attributes defining three types of physical space (Workspace), specifically material space, cyberspace, and social space (area on grey background on the Graph 1). This is a reconstruction and simultaneously adaptation of the spatial model suggested by Lefebvre (2007), who distinguished three types of space: representative space, spatial practice, and space representations. According to Lefebvre, space is a social concept where representative space covers a group of symbols, cultural codes. Spatial practice covers everyday activities, production, reproduction, localisation. Space representations involve the structure of social relations and spatial imaginations. These elements are within the mutual influence of each other (Pachura 2016, 52- 55), in the so-called "concept triad" (Milgrom 2008, 264- 280).



Graph 1. The framework of research of the impact of conditions on the properties of remote work during the pandemic.

Source: Rymaniak 2022, 437-448.

The Lefebvre model was adapted for research purposes in various scientific disciplines. For example, sociologists refer this concept to the space of the state as the territory of production, territorial state strategies, and the "territorial effect" understood as the naturalisation of own transformation effects in social and spatial relations through its territorial form (Brenner & Elden 2009, 353- 377). On the other hand, economists consider the casino gambling market (Humphrey 2010) or study spatial and market practices (Holmes, Fernandes & Palo 2021, 316-335). It is also important to have a critical communication theory based on the contemplations of Lefebvre and the projected stocking of common communication goods (Fuchs 2019, 129-150).

From the perspective of organisation and management, the classic Work Design approach – which is based on a comparison of different attribute sets with various requirements: labor, towards the employee, and result relation – was abandoned. In the construction of survey packages, it was assumed that the dedicated questionnaire would refer to information on physical space. The Lefebvre triad was adapted and specified by the separation of three areas of this space: material, social, and cyberspace. As the entire package concerns the creation and operation of remote workstations as forced, the study focused on capturing information clarifying work conditions in the scope of the location, relocated assignments, temporal conditions, technical conditions of cyberspace, and social attributes with attributes divided into those work-oriented and family-oriented. The triple structure is determined by the quality analyses of exploitation attributes. Material space is associated with the attributes of home and work. Cyberspace is understood by theoreticians as something broader than virtual space because – in addition to simulating the real world or generating virtual worlds – it also concerns network infrastructure (Pachura 2016), and the latter element determines the purposefulness and sense of the studied distancing. And ultimately, social attributes are multidirectional relations between the employee and members of the household in the context of labour and its conditions at home.

The latter dimension – defined as social space – is covered in two blocks to adapt solutions resulting from the psychological research of Greenhaus and Allen (2011, 165- 183), who developed a model where the sense of balance is created from interaction of productiveness and satisfaction in the field of work and family with life values. The studied category is a two-way structure involving the work-to-family conflict (W-to-FC) and the family-to-work conflict (F-to-WC) and is used to study relations with work and family satisfaction. Scientists claim that the energy or engagement generated or generated in the vocational or family domain helps the individual effectively manage the second domain – work or family, as appropriate (Haar, Russo, Suñe & Ollier-Malaterre 2014, 361- 373; Kossek, Valcour & Lirio 2014, 295- 318; Pattusamy & Jacob 2017, 193- 202). With consideration of the suggestions of this research, the studied WF and FW elements are assigned to two different social space blocks.

In this model, we are studying the co-dependency of remote workplaces with three determinant groups (black background on Graph 1). The first is financing. The random nature of the incident forced a sudden launch of remote workstations at home without advance preparations of the locations or employees. This was practically a free loan with no compensation (in addition to maintenance of the employee status), with the equipment and communication of the employee and household members being used in numerous instances. The second is surveying the preferences of the remote work duration in the context of home workstation profiles. The third block includes the following attributes: effectiveness in a comparative aspect (with stationary position) and availability in the context of R2D (Right to Disconnect) adopted in the European Union as the binding labor law. The latter lies in the interests of European Union authorities. The vocational situation of European remote workers was attempted to be consolidated by the directive on work-life balance (2019/1158/EU). Despite awareness of the fact that the nature of the workplace may have little in common with a macro-level solution, it was decided to retain this element following a test analysis of questionnaires on a small sample (Rymaniak, Lis, Davidavičienė, Pérez-Pérez & Martínez-Sánchez, 2021).

2. Methodological approach

The research was conducted in the scope of the international pilot project named "Remote work in organizational and social dimensions, which was conducted in Poland, Spain,

and Lithuania (Rymaniak, Lis, Davidavičienė, Pérez-Pérez & Martínez-Sánchez, 2021)). The countries demonstrated a low level of remote work indicators within the bottom quartile of European Union results. The tradition was not developed, and employees had no experience. The pilot research project covered both qualitative and quantitative research questionnaires. The research was conducted in two stages. The first stage was conducted in the initial pandemic period on 14.04-10.06.2020. On the other hand, the canceled lockdown in the summer led to negative situations such as a considerable growth of infections and more than usual deaths in Poland and Lithuania. In light of this, the surveys were expanded over more qualitative data and the second stage of research was conducted on 10.09-31.11.2020. The analysis of the presented data covers all research.

Individual elements of all surveys constituting the research package were graded on the five point Likert scale with point values as follows: 1 = "strongly disagree", 2 = "disagree", 3 = "neutral" ("neither agree nor disagree"), 4 = "agree", 5 = "strongly agree". The results were converted into structural coefficients (5 points = 1).

The study was conducted on a sample of 434 positively verified surveys among education employees of all levels, from preschool to academic. The cohesion result was high because Cronbach's alpha reached 0.712 for teacher workstations. The research involved structural analyses and correlation methods (Pearson, partial, and repeated correlation).

Selection of these attributes and model conditions – much like all questionnaires of the remote work study – was tested in 2020 on a small respondent group. The research items were discussed in the next section with the interpretation of statistical results.

The respondent profile from the surveyed group demonstrates a considerable majority of women (369, i.e. 86%), age group 21-30 years old (178, i.e. 41%) and 31-40 years old (134, i.e. 31%), with tenure of 6-10 years (182, i.e. 42%) and above 10 years (117, i.e. 27%), and with an academic education (321, i.e. 74%). The data indicates a considerable level of vocational feminisation and a rising share of age and vocational experience among education employees, which does not necessarily affected by the aging society.

3. Conducting research and results

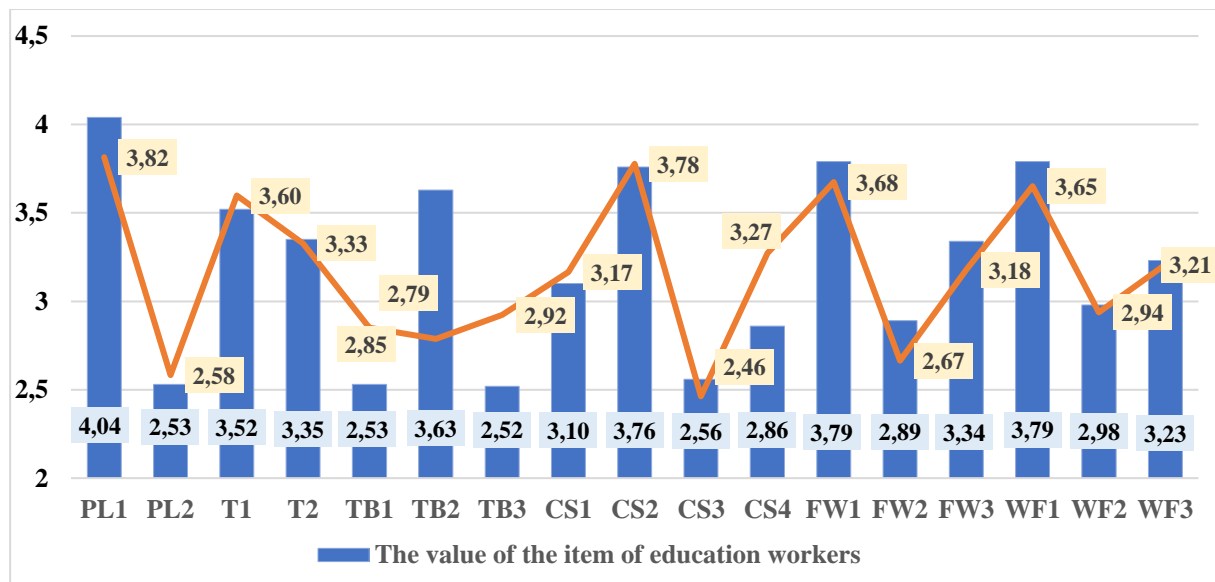
3.1. Structural analysis of remote workplaces in education

The results of the comparative structural analysis demonstrating the level of value of individual attributes of the education employee model in light of the average value of sector (administration, business, education, managers) research are presented on Graph 2. The first block contains attributes of material aspects, demonstrating the parameters of the location, assignments, and time of remote workstations. The value of the exclusiveness (designation of the workstation - PL1) parameter is demonstrated among education workers at the level of 4.04, i.e. 81% of the Likert scale. This is the highest of all tested model parameters, which clearly exceeds the general average of the tested parameter. Peace, quiet, focus, etc. are indispensable and fundamental elements required for teaching purposes, which is why the state of adaptation of the space at home to the requirements of an independent "professional" space should be graded positively. This is confirmed in the evaluation of overlapping work and home space (PL2). This sees representatives of all respondent groups give a negative grade given to the impact on the quality of both areas, although the opinions of education employees are not all that radical, and the result is somewhat higher than the average of the general package.

The second group of physical space attributes covers work tasks. Employees reported that 70% of assignments were required to be performed on location (T1). This means that assignments, which could not have been conducted in cyberspace, such as extracurricular

activities, field trips, parties, outdoor classes, sports, etc. were pretty much excluded. Simultaneously, the sudden and unprepared nature of the introduction of remote education also had an impact on the restriction of the scope of activity in assignments (T2). In this case, the respondents estimated the coverage level at 67%. This is related to attendance (absence) provisions and the measurement of listener activity, methodological skills, and abilities, equipment, communication, etc. In effect, the remote workplace was more passive and permeable than active and stimulating listeners to efficient performance.

In the group of temporal attributes of physical space, the characteristic parameters are those of duration (TB1) and distribution of working time (TB3). The employees have a negative opinion towards both elements, which signals a clear disruption of the balance in the relation between work and other areas of life (overburdening with work). This is confirmed in the values comparing working time on location and remotely (TB2). The reported parameter value is 17% higher than in other vocational groups, which is completely specific and characteristic for this research.



Graph 2. Positioning the roles of education employees in light of the REMOTE WORKS research average.

Source: research results

The next group designated in the research covers cyberspace attributes. The employees declare that one in three does not have dedicated hardware for exclusive use (CS1). According to the comparison with the average, the situation in this vocational group is no different from others. Evaluation of communication quality shows a high level of comfort at 75% (CS2). This does not convert to improving the condition of the employee (CS3) and cyber benefit (CS4) as only 43% assume the significance of the physical distance from the location of the school. The opinions of employees concerning cyberspace are rather similar to the average survey results in the scope of the remote work project.

Two blocks were methodically separated in social space. The first is the Family-Work relationship. Having a remote workstation at home creates a situation where work establishes the organisation and rhythm in family life (FW1). The nature of work causes household members to get involved in 58% of scale value (FW2), and the entrance of business (the school) to home presents a mental challenge for 67% of household members (FW3). The two last attributes emphasize the specifics and social status of teachers. The work-family relation is

shaped similarly. The aforementioned predominance of work leads to the performance of tasks unrelated to work 76% of the time at work (WF1). This is being countered by 60% of respondents (WF2). In effect, 65% believe that lockdowns make it easier to implement new working methods (WF3), which is an interesting paradox in the analysed situation.

Some interesting results are provided by the comparative analysis of education employees and employees of other groups (administration, business, managers). 10 out of the 17 surveyed parameters demonstrate higher results among education employees. Considerably higher results concerning intensiveness of teaching work and partially the social status of working from home. In this situation, the opposite is logical, where other employees work much less intensively (and definitely just in time), demonstrating greater spatial independence away from the location. These results indicate significant specific attributes in this social group.

3.2. Significance of financing, organisation, and effectiveness in designing remote workstations in the education sector

3.2.1. Financing

The study assumes financing as the evaluation of co-dependency of three factors: (1) responsibilities of the employer in the scope of equipment and maintenance of home offices, (2) maintenance of efficient home office workstations and (3) compensation for using space and working from home. The data in table 1 show a significant correlation between the nature of financing and physical space. Similarly to the surveys of the Polish employee population (Rymaniak 2022, p.437- 448), it is directly proportional to the work location and inversely proportional to the interference of work with household functions. Furthermore, there is a considerable influence of routine, which is expressed in the level of assignment identity (T1) and expected recognition of work.

It is important to determine the relationship between the use of home space and working from home. The data in table 1 show a significant correlation between the nature of financing and physical space. It is directly proportional to the work location and inversely proportional to the interference of work with household functions. Furthermore, there is a considerable influence of routine, which is expressed in the level of assignment identity (T1) and expected appreciation by the employer of work intensity (TB2). The broadest range of general significance is demonstrated by the compensation factor as education employees believe six of the seven parameters to be statistically significant.

Table 1. Correlations of financing attributes, organisation and results, and organisational space parameters for remote workstations in the perception of education employees during the COVID-19 period

FACTORS		FINANCING			ORGANIZATION		RESULTS	
Codes and items		Team - mind	Service	Company station	Periodicity	Stability	Efficiency	Discrimination
MATERIAL SPACE								
PL1	Separation	0,208**	0,091	0,169**	-0,174**	-0,113*	-0,216***	-0,078
PL2	Overlap	-0,275***	-0,356***	0,098	0,387***	0,544***	0,448***	0,045
T1	Identity	0,122*	0,189**	0,124*	0,102	0,245***	0,011	-0,133**
T2	Scope of tasks	-0,013	0,099	0,150**	0,073	0,156**	0,013	-0,096
TB1	Norm	-0,003	0,126*	-0,148**	0,335***	0,318***	0,454***	-0,110
TB2	Overtime	0,112*	0,081	0,201**	-0,193**	-0,281***	-0,343***	0,030
TB3	Schedule	0,094	-0,056	-0,222***	0,113*	0,504***	0,350***	-0,046
CYBERSPACE								
CS1	Equipment	0,087	-0,167**	-0,034	0,295***	0,064	0,220***	-0,029

RECENT ISSUES IN SOCIOLOGICAL RESEARCH

CS2	Comfort	0,189**	-0,048	-0,151**	0,377***	0,152**	0,406***	-0,171**
CS3	Stan	-0,267***	-0,432***	-0,028	-0,022	0,285***	0,192**	0,128*
CS4	Location	-0,167**	-0,096	-0,040	0,149**	0,469***	0,201**	-0,277***
SOCIAL SPACE								
FW1	Superiority	0,036	-0,101	0,234***	-0,142**	0,129	0,019	-0,059
FW2	Complicity	0,105	0,050	0,043	-0,057	0,356***	0,002	-0,231***
FW3	Mentality	0,063	0,010	0,274***	-0,060	0,164**	-0,229***	-0,006
WF1	Division	-0,072	-0,238***	0,184***	-0,163**	0,004	0,034	-0,105
WF2	Rigor	-0,079	-0,101	0,081	0,247***	0,136**	0,248***	-0,024
WF3	Adaptation	0,047	-0,260***	-0,095	0,219***	0,552***	0,246***	0,054

Notes: codes for groups of components of spatial dimensions: *PL* – place; *T* – tasks; *TB* – time-based; *CS* – cyberspace; *FW* – family work; *PE* – work-family. Significance levels * $p < 0,1$; ** $p < 0,05$; *** $p < 0,001$.

Statistically significant characteristics are bolded

Responsibilities of the workplace are also strongly emphasized in relation to employee activity in cyberspace. The employees assume that the workplace is responsible for equipping remote workstations, but they expect the stations to be maintained at a level raising their personal status (punctuality, contact security, hardware quality, etc.) as key educators (core business). The typology of Messenger and Gschwind (2016) will not be sufficient to transition from remote work at home to virtual work (Davidavičiėnė, Al Majzoub, & Meidutė-Kavaliauskienė, 2020).

The co-dependency of financing with the nature of social space demonstrates a low statistical significance. This concerns Work-Family attributes in the scope of breaching the time for assignments (turbulences in the scope of family concentration, functions, and assignments performed simultaneously in the given time within the limited household space).

In the evaluation of the statistical results of the discussed relations, it should be noted that only certain attributes, such as status or interference of assignments, demonstrate a strong level of statistical dependency.

3.2.2. Organisation

The surveys also evaluated the correlation between the form of organisation of the work of education employees and remote workstations. The preferences were studied with the selection of a periodical variation resulting from random circumstances with an expected duration (e.g. COVID-19) or a stable variation assumed as a long-term strategic education format.

The greater co-dependency range with attributes of material space has a stable variation, which covers the full range of material space. The strong relation involves relations with the work time schedule (TB3) and overlapping of functional spaces at home (PL2) despite the rather low level of value of the indicators in question (fig. 2). In relations with cyberspace indicators, the only insignificant parameter is exclusiveness (having equipment dedicated to working only). The highest level of relation resilience is demonstrated by parameter TB3, which is known as the "despacialization" coefficient (Taskin 2010, 61-76), i.e. independence of the performed work from the physical space and location of the workstation. Meanwhile, social space does not involve any significant co-dependencies with top-graded parameters, i.e. superiority of work over household life (FW1) and breach of working time due to the need to do other things (WF1). These elements fall under the responsibility of the household organiser – the employee.

The relations are somewhat different in the periodical variation performed during the time of covid-19. The range of co-dependency with physical space attributes – the assignment attributes of which are insignificant – is smaller. This is probably due to the fact that they must

be somehow organised and conducted with available means in an emergency and without preparations. However, the interference of assignments and functions in the space (PL2) is a statistically significant element in this group. Therefore, the external force beyond the control of the employee requires overcoming the time and equipment collisions and synchronisation with internal household assignments, i.e. constitutes a significant element of the best possible way to work from home.

The range of co-dependency with attributes of cyberspace and social space is similar to that in the stable variation. The role of the insignificant factor demonstrates the status (CS3), because all education employees perform remotely in this emergency situation, and this is not a distinguishing element. The greatest impact on operating effectiveness is provided by communication comfort (CS2), which demonstrates the greatest level of statistical relation. Insignificant elements change in social space with the same number of statistically significant relations. In this variation, these are the Family-Work elements, i.e. participation of household members (FW2) and mental challenges associated with having a teacher at home all day long (FW3).

3.2.3. Results

The last of the studied interactivities are the relations between the effects and components of organisational space. They concern the level of evaluation of effective work from home and the employee's rights to disconnection (R2D). In the scope of the effectiveness study, the assignment factors are statistically insignificant in the group of material space. This role is taken over by other factors with particular consideration of the impact of interference (PL2 – overlapping assignments in the household space), quantitative intensity (TB1), and temporal consolidation of the workload (TB3). Relations with cyberspace, including the comfort of communication from remote workstations (CS2), are comprehensive in the scope of their range and significant in the scope of statistical dependency. The strength of relations with social space attributes is moderately significant. It concerns the discipline of separating working hours (WF2) and adapting the implementation of teaching work at home (WF3) as conditions for achieving the efficiency level required by education employees.

The matter of the employee's right to disconnection (R2D) has a major relation with four position attributes. Statistical data suggest recognition of the range of activity relocation (T1), all attributes of cyberspace (with the exception of CS1), and participation of household members (FW2) in evaluations. A load of assignments, technical efficiency, and disruptions resulting from situations caused by household members seem to compose the logical range of monitoring in the scope of this problem.

4. Discussion and final notes

The presented results can be evaluated on two planes: analytics and nationwide determinants, expanding deliberations over the results of analyses of other professional literature sources and published results of the inspections of various directional institutions and state control authorities.

In relation to material space, the least debatable is location space. It is pretty much determined only by the location of the employee (home) and is an unchanging element in the sudden conditions of COVID-19, which means that it is beyond the control of the employee, who has specific location conditions for the period starting with the announcement of lockdown.

Adaptation specifics also depend on the disposable time for preparation and realisation. In Poland, educational establishments suspended their operations on 11 March 2020 and remote

learning started on 25 March 2020 following two weeks of preparations. In this time, there were 23.6 thousand schools operating in the country, providing for almost 5 million students (NIK 2021). Lithuania was quarantined twice, in March and in December of 2020 (Lietuva 2021). In the event of extremely poor conditions, teachers often breached the lockdown and tried to teach classes from school rooms that were previously equipped with computers. The very nature of remote work dictated the demonstrated reduction of assignments to around two-thirds as it concerned mainly activities requiring face-to-face relations, i.e. the social and behavioral function. It had no relation with the curriculum reduction as – since there was no way to prepare – the complete onsite curriculum was being realised as inspired by the ministry (unchanged core curriculum).

Furthermore, teachers had to deal with their initially poor digital competencies and lack of materials prepared for cyberspace purposes. They were forced to quickly raise their skills and were able to enrich classes with multimedia materials prepared ad hoc (Pyżalski & Walter 2021; Plebańska, Sieńczewska & Szyller 2021; Dima et al. 2022). This caused a tremendous additional burden with preparations. The results of studies conducted by the Lithuanian barometer confirm that these are the reasons for the very high values of parameters TB2 and TB3 – i.e. burden of work and exceeding beyond the time of regular working hours – in our research (Bylaitė-Šalavėjienė 2020, 51-61).

The second major problem was technical security from the perspective of cyberspace. Initially, the main problems involved equipment and internet connections. Asynchronous didactics – based on handing out assignments through an electronic register - dominated, and the students mainly used their smartphones (Ptaszek, Stunża, Pyżalski, Dębski & Bigaj. 2020; Bylaitė-Šalavėjienė 2020, 51- 61). The hardware problems were reduced with the involvement of all forms of assistance, from government programs and funding for computers to those repaired by volunteers, discontinued by corporations and institutions, and repaired units offered to schools and teachers. It was a bottom-up initiative of citizens, which was an attempt at the possibilities of the civic community, which, thanks to the self-organization of citizens, later also led to the rapid organization of accepting several million Ukrainian women and children. The problems with equipment were solved by expanding the application to various platforms. The assistance materials prepared by the World Bank and OECD promoted the 21 platforms available for educational purposes (Pellegrino & Hilton 2012; Schleicher 2020). Initially, several different ones were used in a single school due to the lack of institutional coordination (Pyżalski, Walter 2021; Bylaitė-Šalavėjienė 2020, 51- 61). We also need to recognize the elevated competencies, including through workshops (Davidavičiienė, Žvirblė & Daveiko, 2021, 4477- 4488), and the target development of virtual formats for purposes not limited to those of academic education (Davidavičiienė & Al Majzoub, 2022).

The third research problem concerns the designation of external factor conditions. The obtained experiences indicate the need to establish financing standards by companies requiring remote workstations at home, and Lithuanian employees expect compensation even for previous expenses (Bylaitė-Šalavėjienė 2020, 51- 61). The obtained experience, the improved hardware base, and the developed competencies make the statistical significance coefficients indicate approval of introducing a constant variation of remote workstations at home in education. Furthermore, we need to consider the factor of the duration of the virus. The reversal of the pandemic wave in the fall of 2021 was particularly troublesome for Poland and Lithuania. According to the data of OECD, Poland was second in the world in above-standard deaths (including those resulting from COVID-19). There is also a drop in the average lifespan in Poland and Lithuania by 1.3 years (Health-at a Glance, 2021). This may have also impacted the preference of stable remote work variations, especially in light of the high level of infections among teachers in the fall of 2020 (Lietuva 2021).

The research also shows the political and social context. The nature of the desire to raise the social status demonstrated by teachers in the analyzed indicators resulted from this vocational group being systematically ignored and pauperized in Poland for political reasons due to the political strategy of the party in power, which does not see education employees as its voters. In effect, the numbers of teachers are quickly and systematically dropping. According to the data of the Polish Ministry of Education and Science, the school-academic year of 2022/2023 started with 602 000 teachers in comparison to 798 318 teaching jobs counted, including overtime and increased classes (Nowosielska, Otto 2022). The result of 75% means the absence of one in four teachers, meaning that there are teachers working more than one job. However, even the application of remote work to make it easier to work multiple jobs can only partially cover the rising human resources deficiencies. It seems that the political authorities have assumed the strategy of waiting things out for demographic reasons as the projections show a declining number of school-aged youth in the upcoming years. The discussed processes are not conducive to the improvement of their material status expected by the teachers.

Conclusions

The presented results of statistical research and literature evaluations clarify the posed research problems. Education employees often have a critical view of their positions in the context of remote work, especially the dissonance between the needs and the possibilities of exclusive access to the remote workstation at home. Their statements suggest a high level of work expenditure, hardware problems, and communication reliability, which is a must in remote education. They emphasize the identity of the assignments transitioned from the school system, i.e. no digital content or teaching methods ("anti-remote"). There is also the problem of density, which is understood as the densification of other assignments during work. These elements determine the specifics of this workplace in the COVID-19 era, which confirms the profile of remote workstations of educators and demonstrates extreme values in 14 of 17 – 82% – of the attributes of said stations in sector sections. The tremendous economic and financial effort of states and citizens failed to reduce all limitations and imperfections, for example, teachers sharing hardware or working. This also means more inconvenient working conditions than those of administrative or business employees or even managers. Nevertheless, 65% of respondents have noted a tremendous quality leap in the development of the methodical base, which is an opportunity to implement new working models.

The presented results demonstrate the effects of the practical transformation of workstations from one location in educational institutions to remote at home. In the situation resulting from the pandemic, mass virtual education space was developed in countries demonstrating a low level of remote work, i.e. Poland, Spain, and Lithuania. This way, in the age of common information availability, technological development was used to expand the previous distance education (which started historically by conveying the written and printed word via mail and rail services) into learning in real-time.

The Lefebvre triad model was proposed to conduct the research, which assigns appropriate elements of material space, equipment, and social relations in the family resulting from the sudden transition from work to home. This recognised relations significant to the development of remote education in the researched countries but also demonstrated the weak points of the solutions implemented without preparation and the diversity of social effects dependent on the political environment. The restrictions are determined mainly by the assumed method. The applied perception measures are not entirely free of error in response. The measurements come from a section study, which cannot test causal relations. It is required to prepare studies with longitudinal and more consolidated data with more diverse samples in

order to – for example – evaluate the dynamic effects of the pandemic on the conditions of work of tele-teachers.

The research demonstrated a not just interesting and specific profile of the education sector and its conditions in the researched countries but also noted the need for technologically advanced management processes and designing work in form of new working models. The scale of problems requires integrated psychological, pedagogical, sociological, political, and organisational studies, which will determine the directions, scope, and conditions for the required system changes in education and actions based on development of multiple variation adaptation scenarios in the event of tumultuous changes in the environment.

Acknowledgements

The authors would like to thank Witold Gedymin of the Poznań University of Economics for professional assistance and preparation of complex statistical analyses. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

- Aslan, M., Yaman, F., Aksu, A., & Güngör, H. (2022). Task performance and job satisfaction under the effect of remote working: Call center evidence. *Economics and Sociology*, 15(1), 284-296. doi:10.14254/2071-789X.2022/15-1/18
- Bilan, Y., Mishchuk, H., & Samoliuk, N. (2023). Digital Skills of Civil Servants: Assessing Readiness for Successful Interaction in e-society. *Acta Polytechnica Hungarica*, 20(3), 155-174. DOI: 10.12700/APH.20.3.2023.3.10
- Bozkurt, A. (2019). From Distance Education to Open and Distance Learning: A Holistic Evaluation of History, Definitions, and Theories. In: S. Sisman-Ugur, G. Kurubacak (Eds.), *Handbook of Research on Learning in the Age of Transhumanism* (252-273). Hershey, PA: IGI Global
- Brenner, N., Elden, S. (2009). Henry Lefebvre on State, Space, Territory. *International Political Sociology*, 3, 353-377.
- Bylaitė-Šalavėjienė, D. (2020). Distance Learning During the COVID-19 Pandemic: School Barometer Lithuania. *Socialinis ugdymas*. 54(2). 51-61
- Chute, A. G. (2003). From teletraining to e-learning and knowledge management. In: M. G. Moore, M.G. Anderson (Eds), *Handbook of distance education*, (pp. 297-314), Mahwah, New Jersey – London: LEA
- Davidavičienė V., Al Majzoub, K., Meidutė-Kavaliauskienė, I. (2020). Factors affecting decision-making processes in virtual teams in the UAE. *Information*. 11(10). 1-13.
- Davidavičienė V., Žvirblė V., Daveiko J.(2021). *Conducting creative workshops in the process of distance learning at higher education institutions*. Edulearn21: 13th international [online] conference on education and new learning technologies, 5-6 July 2021: Conference proceedings. Palma: IATED Academy, 4477-4488.
- Davidavičienė V., Al Majzoub K. (2022) The effect of cultural intelligence, conflict, and transformational leadership on decision-making processes in virtual teams. *Social sciences*. 11(2). 1-16.
- Dima, A. M., Busu, M., & Vargas, V. M. (2022). The mediating role of students' ability to adapt to online activities on the relationship between perceived university culture and academic performance. *Oeconomia Copernicana*, 13(4), 1253–1281. <https://doi.org/10.24136/oc.2022.036>.

- Fuchs, Ch. (2019). Production of Space and the Critical Theory of Communication. *Communication Theory*, 29 (2), 129–150. <https://doi.org/10.1093/ct/qty025>
- Greenhaus, J. H., & Allen, T. D. (2011). Work–family balance: A review and extension of the literature. In J. C. Quick & L. E. Tetrick (Eds.), *Handbook of occupational health psychology* (pp. 165–183). American Psychological Association
- Haar, J. M., Russo, M., Suñe, A., & Ollier-Malaterre, A. (2014). Outcomes of work–life balance on job satisfaction, life satisfaction and mental health: A study across seven cultures, *Journal of Vocational Behavior*, 85(3), 361–373
- Health at a Glance (2021). <https://www.oecd.org/health/health-at-a-glance/>
- Holmes, T., Fernandes, J. & Palo, T. (2021). 'Spatio-market practices': Conceptualising the always spatial dimensions of market making practices. *AMS Rev 11*, 316–335 (2021). <https://doi.org/10.1007/s13162-021-00203-1>
- Humphreys, A. (2010). Megamarketing: the creation of markets as a social process. *Journal of Marketing*, 74(2), 1–19.
- Hyrkkänen, U., Nenonen, S., Kojo, I. (2012). The Virtual Reality of Work – How to Create a Workplace that Enhances Well-Being for a Mobile Employee. In: Sík Lányi, C. (ed.) *Virtual Reality and Environments*, (pp. 194- 203). Rijeka: InTech.
- Hyrkkänen, U. & Nenonen, S. (2011). The virtual workplace of a mobile employee – how does Vischer's model function in identifying physical, functional and psychosocial fit? In J. A. Jacko (Ed.) *Human-Computer Interaction: Towards Mobile and Intelligent Interaction Environments*. Human-Computer Interaction, Part III, LNCS, Vol. 6763, (pp. 69- 75). Heidelberg: Springer. Available from URL: <
<http://www.springer.com/computer/hci/book/978-3-642-21615-2>
- Kämpf-Dern, A. & Konkol, J. (2017). Performance-oriented office environments – framework for effective workplace design and the accompanying change process. *Journal of Corporate Real Estate*, 19 (4), 208-238
- Kira, M. & Eijnatten, F.M. van (2009). Sustained by work: Individual and social sustainability in work organizations. In: Docherty, P., Kira, M. & Shani, A.B. (eds), *Creating Sustainable Work Systems. Developing Social Sustainability*. 2nd edition. (pp. 233- 246). London: Routledge.
- Kossek, E. E., Valcour, M., & Lirio, P. (2014). Organizational strategies for promoting work–life balance and wellbeing. In C. Cooper, & P.Chen (Eds.), *Work and wellbeing* (pp. 295–318). Oxford: UK: Wiley-Blackwell
- Kramarova, K., Švábová, L. ., & Gabrikova, B. (2022). Impacts of the Covid-19 crisis on unemployment in Slovakia: a statistically created counterfactual approach using the time series analysis. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 17(2), 343–389. <https://doi.org/10.24136/eq.2022.012>
- Lefebvre, H. (2007). *The Production of Space*. Translated by D. Nicholson-Smith. Maiden USA-Oxford UK- Carlton Australia: BLACKWELL Publishing.
- Lietuva/ Lithuania. Education in the country and regions (2021). Distance education. Ministry of Education, Science and Sport. Vilnius.
- Lipták, K., Horváthné Csolák, E., & Musinszki, Z. (2023). The digital world and atypical work: Perceptions and difficulties of teleworking in Hungary and Romania. *Human Technology*, 19(1), 5–22. <https://doi.org/10.14254/1795-6889.2023.19-1.2>
- Lipták, K., & Musinszki, Z. (2022). Impact of teleworking on shopping habits during the COVID-19 pandemic in Hungary. *Journal of International Studies*, 15(3), 186-200. doi:10.14254/2071-8330.2022/15-3/13

- Messenger, J.C., & Gschwind, L. (2016). Three generations of Telework: New ICTs and the (R)evolution from Home Office to Virtual Office. *New Technology, Work and Employment*, 31(3), 195- 208.
- Mihalca, L., Lucia Ratiu, L., Bredeea, G., Metz, D., Dragan, M., & Dobre, F. (2021). Exhaustion while teleworking during COVID-19: a moderated-mediation model of role clarity, self-efficacy, and task interdependence. *Oeconomia Copernicana*, 12(2), 269–306. <https://doi.org/10.24136/oc.2021.010>.
- Milgrom, R. (2008). Lucien Kroll: design, difference, everyday life. In: Goonewardena, K., Kipfer, S., Milgrom, R., Schmid, Ch. (eds.). *Space, Difference, Everyday Life. Reading Henri Lefebvre* (pp. 264- 280). New York-Abingdon: Routledge,
- Neenonen, S., Airo, K., Bosch, P., Fruchter, R., Koivisto, S., Gersberg, N., Rothe, P., Ruohomäki V., & Vartiainen, M. (2009). Managing Workplace Resources for Knowledge Work. Project: ProWork – Productive Knowledge Work. Accessed 10 November 2022 https://www.researchgate.net/profile/Matti-Vartiainen-2/publication/242581425_Managing_Workplace_Resources_for_Knowledge_Work/links/0deec51d1b1e0b353b000000/Managing-Workplace-Resources-for-Knowledge-Work.pdf
- Neenonen, S. (2004a). Tangible workspace for intangible work. *Nordic Journal of Surveying and Real Estate Research*, 1, 175-189.
- Neenonen, S. (2004b). Analysing the intangible benefits of workspace. *Facilities*, 22 (9-10), 233- 239
- NIK (2022). Schools during the pandemic. Warszawa: NIK <https://www.nik.gov.pl/aktualnosci/szkoly-w-czasach-pandemii.html> 12.11
- Noor-Ilander, K. (2021). *Leading and Designing the Change Experience in Workplace Transformation*. Laurea: Laurea University of Applied Sciences.
- Nowosielska, P., Otto, P. (2022). *Suche fakty o nauczycielach: Ilu ich jest, ile jest wakatów i godzin nadliczbowych* [OPINIA]. Accessed 18 November 2022 <https://serwisy.gazetaprawna.pl/edukacja/artykuly/8521759,fakty-o-nauczycielach-liczba-wakaty-godziny-nadliczbowe-czarnek.html>
- Pachura, P. (2016), *O przestrzeni w zarządzaniu. Studium metodologiczne*. Warszawa: PWN
- Pattusamy, M., Jacob, J. (2017). A Test of Greenhaus and Allen (2011) Model on Work-Family Balance. *Curr Psychol.*, 36, 193–202.
- Pellegrino, J.W. i M.L. Hilton (red.) (2012). *Education for Life and Work: Developing Transferable Knowledge and Skills in the Twenty-First Century*. Waszyngton, DC: National Academies Press.
- Peters, O. (2003). Learning with new media in distance education. In M. G. Moore, W.G. Anderson (Eds), *Handbook of distance education*, (87- 112). Mahwah New Jersey – London: LEA.
- Plebańska, M., Sińczewska, M., Szyller, A. (2020). *Edukacja zdalna w czasach COVID-19. Raport z badania*. Warszawa: Wydział Pedagogiczny Uniwersytetu Warszawskiego.
- Ptaszek, G., Stunża, G. D., Pyżalski, J., Dębski, M., Bigaj, M. (2020). *Edukacja zdalna: co stało się z uczniami, ich rodzicami i nauczycielami?* Gdańsk: Gdańskie Wydawnictwo Psychologiczne .
- Pyżalski, J., Walter, N. (2021) *Edukacja zdalna w czasie pandemii COVID-19 w Polsce – mapa głównych szans i zagrożeń*. Raport. UAM. Poznań
- Rymaniak, J. (2022). Remote workplaces over the time of COVID-19 in Poland as a form of organisational space. *Scientific Papers of Silesian University of Technology. Organization and Management Series*, 164, 437- 448.

- Rymaniak J., & Lis K. (2021), Praca zdalna w początkowym okresie pandemii – świadomość zmian a relacje organizacyjne, w: Paluchowski, Wł. J., Bakiera, L. (red.), *Psychospołeczny obraz pierwszej fali pandemii COVID-19 w Polsce* (pp. 243-250). Poznań: UAM
- Rymaniak, J., Lis, K., Davidavičienė, V., Pérez-Pérez, M., & Martínez-Sánchez Á. (2021), From stationary to remote: Employee risks at pandemic migration of workplaces. *Sustainability*, 13(13), 7180. doi: 10.3390/su13137180
- Rymaniak, J. (2015). Współczesne cechy pracy: koncepcja teoretyczna i weryfikacja empiryczna, [w:] M. Makowiec (Red.), *Wybrane problemy w kształtowaniu zachowań organizacyjnych*, (pp. 15- 22). Kraków: Uniwersytet Ekonomiczny w Krakowie.
- Rymaniak, J. (2011). O nowy paradygmat pracy – ponad i poza człowiekiem, *Humanizacja Pracy*, 1(259), 23- 44.
- Schleicher, A. (2020). The impact of COVID-19 on education insights from *EDUCATION AT A GLANCE 2020*. OECD
- Svabova, L., Tesarova, E. N., Durica, M., & Strakova, L. (2021). Evaluation of the impacts of the COVID-19 pandemic on the development of the unemployment rate in Slovakia: counterfactual before-after comparison. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 16(2), 261–284. <https://doi.org/10.24136/eq.2021.010>;
- Taskin L. (2010), « La déspatialisation » Enjeux de gestion. *Revue Française de Gestion*, 3 (202), 61-76. doi: 10.3166/rfg.202.61-76
- The Work-life Balance Directive16 (2019/1158/EU). *Official Journal of the European Union* L 188/79, 12.7.2019
- Thulin, E., Vilhelmson, B. (2021), Pacesetters in contemporary telework: How smartphones and mediated presence reshape the time–space rhythms of daily work, *New Technology, Work and Employment, Special Issue*, pp.1-20. Doi: [org/10.1111/ntwe.12224](https://doi.org/10.1111/ntwe.12224)
- Van der Broeck, A., & Parker, S.K. (2017). Job and work design. Oxford Research Encyclopedia of Psychology. Oxford
- Vartiainen, M., & Hyrkkänen, U. (2010). Changing requirements and mental workload factors in mobile multi-location work. *New Technology, Work and Employment* 25(2), 117-135
- Visher, J. C. (2008). Towards and environmental psychology of workspace: How people are affected by environments for work. *Architectural Science Review*, 51(2), 97-108.
- Windlinger, L., Gersberg, N., & Konkol, J. (2014/2015). Unterstützung mobil-flexibler Arbeit durch aktivitätsorientierte Gestaltung von Büroräumen. *Wirtschaftspsychologie*, 4, 83-95.