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## Session 2B: Educational Workspace

### Shared Use of Academic Workspaces

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#### ABSTRACT

##### *Purpose*

This paper discusses the shared use of academic facilities and related notions. Its aim is to examine modes for effective and efficient use of facilities in the post-pandemic era. The paper first defines the aspects related to the shared use of spaces on campuses and academic workplaces. Based on the factors, it illustrates nine modes associated with the shared use of workspaces. The various ways to use shared facilities are clarified in the model description.

##### *Theory*

Theoretically, the paper reviews the access-based consumption of academic facilities.

##### *Design/methodology/approach*

This paper examines data collected from two universities in Finland during 2022. The main findings are formulated in an inductive process using qualitative content analysis and the theory of shared use of facilities. The material comprises 18 semi-structured interviews and 10 group interviews conducted through workshops. The interviewees represent all levels of the academic environment: administration, professors, teachers, and students.

##### *Findings*

The findings discuss the shared use of facilities through three thematic clusters of aspects. The first cluster illustrates the sharing on campuses based on the user groups, the time/length of use, and the access option. The second cluster defines four levels for shared facilities: individual, team, interface, and organisation based. The third cluster concentrates on workspaces from the individuals' viewpoint and formulates nine work modes based on time and space variables.

##### *Originality/value*

The shared use of facilities in university and academic work contexts still needs thorough investigation after the pandemic. The data collected in this study represents well the cynical approach to the problems yet to be solved. The results benefit the briefing and designing of campus environments from various viewpoints for shared use of facilities. The role of facilities management should be to follow the change processes within users' sharing practices.

## **Keywords**

Sharing, shared use, campus, workspace, academic workplace

## **1 INTRODUCTION**

The higher education institutions and their functions are evolving (Alexander et al., 2019). The context of academic environments has drastically changed during the last decades due to many societal, technological, and pedagogical developments (Fisher, 2019; Whitton, 2018; Marmot, 2014; den Heijer, 2011; Harrison & Hutton, 2014; Temple, 2014; Benneworth, 2014). The digital environment has immersed itself in all situations, and the contemporary campus is both post-digital and hybrid (Lamb et al., 2021; Jandrić et al., 2018; Goodyear, 2022; Fisher, 2019). In the hybrid campus, the campus users can engage in activities at a suitable time and place (e.g. Fisher, 2019).

Universities have responded to these changes by adapting their premises (Marmot, 2014; Benneworth, 2014; Harrison & Hutton, 2014) and retrofitting the existing facilities to meet the users' evolving needs (e.g. Nenonen et al., 2016). While some universities have invested in new buildings (Whitton, 2018), many institutions have reduced their footprint and focused on more efficient use of facilities due to, e.g., financial pressures (den Heijer, 2011; Marmot, 2014; Harrison & Hutton, 2014; Whitton, 2018). Instead, the focus is on the quality of spaces over their quantity (den Heijer, 2011).

The more intensive use of facilities is enabled by strategies of sharing (Dugdale, 2009; Harrison & Hutton, 2014; Nordquist & Laing, 2015; den Heijer, 2011; Marmot, 2014), such as centrally controlled booking systems (JISC, 2006) and ad-hoc use of the in-between spaces that are not necessarily 'owned' or controlled by any faculties (Dugdale, 2009; Nordquist & Laing, 2015; Harrison & Hutton, 2014). The campus facilities are shared with the whole community (Dugdale, 2009), and the faculty- or field-specific communities enhance community identity (den Heijer, 2011). In a post-pandemic era, universities are re-evaluating the role of campuses and what constitutes both effective and efficient premises as the hybrid campus realises. Lundgren et al. (2022) found that the virtual and hybrid solutions partially replace even the physical shared spaces. However, the various aspects of sharing require further discussion as the campus community consists of many levels and practices of use, and the traditions of sharing are rare in faculty-orientated premises.

Given the multitude of viewpoints to consider, the shared use of academic environments could benefit from systematically defining related concepts and notions to support the design and development of campuses. This paper is founded on the assumption that shared use is an effective and efficient method of using facilities post-pandemic. The second assumption is that the motivation for sharing

varies depending on whether the driver is organisational, team or individual. Thus, this paper aims to define the aspects and related variables of shared use that can benefit the evaluation, design and development of academic facilities.

The research questions are:

1. Which aspects influence the shared use of academic premises (from users' viewpoints)?
2. What are the levels of shared use in academic premises and workspaces?

## **2 Literature / shared use of academic workspaces**

The shared use of facilities has gained new interest in general through the sharing economy (Brinkø et al., 2015; Reike et al., 2018). It is a business model where consumers pay for the function or utility instead of owning the products, which can lead to more efficient use (Ranjabi et al., 2018). In turn, the sharing economy facilitates access-based consumption (Curtis and Lehner, 2019) that in the built environment can be seen as short-term or flexible lease of spaces or spaces with a type of sharing aspect (Lundgren, 2023).

Brinkø et al. (2015) have defined shared use of facilities based on a. the *openness of the community*, b. *the types of shared facilities*, c. *the access to the spaces* and d. *the size of the user group*. These viewpoints are founded on the questions of

1. *what* is being shared, i.e., the physical space,
2. *when* the facilities are shared, i.e., if sharing is simultaneous or serial,
3. *why* facilities are shared,
4. *who* are sharing, i.e., who has initiated it and if the sharing partner is individuals or organizations, and
5. *how* the facilities are shared, i.e., the different, context-dependent configurations.

Brinkø et al. (2015) find the last viewpoint the most difficult.

Francart et al. (2018) highlight the importance of a holistic perspective of sharing spaces that entails both the tangible properties of shared spaces and social interactions within the user group. For building users, the tangible benefits include, e.g., lower costs and high quality of spaces, while social interactions include, e.g., the importance of group cohesion, trust, and creation of identity (Francart et al., 2018). Additionally, Francart et al. (2018) identified a third aspect related to the internal organisation of the space-sharing community, which includes, e.g., decision-making practices. Lundgren (2023) discovered that incorporating shared spaces in adaptive reuse projects contributes positively to, e.g., social sustainability, predominantly through creating the so-called 'vibe' and 'tribe'.

In academic workspaces, often owned by the organisation or leased in the long term, the shared use can be seen as a contemporary solution to the request for both effective and efficient workspaces. According to van Ree (2002), these aspects create a productive workplace. Efficient accommodation requires establishing a favourable gross/net ratio, providing uniform workplaces and reducing the space per person and number of workspaces. Then again, effective accommodation requires providing a varying work environment and 'interactive-stimulating' area, applying collective, supportive elements and providing informal spaces. (van Ree, 2002, p.361.) In a post-pandemic era, the situation

in academia is even more varied with flexible work arrangements and workers who divide their time in a hybrid manner according to space and time between office and home (Nenonen & Sankari, 2022).

The contemporary campus context is shared with various stakeholders and comprises various spaces and functions (Harrison & Hutton, 2014; den Heijer, 2011; Nenonen et al., 2016; Fisher, 2019). Over the past two decades, new space types for academic context have been introduced. For example, universities have been utilizing third-party accelerators/incubators and new working spaces far from the university sites, exploiting distance learning for their students and remote working for researchers and staff. (Bouncken, 2018; Orel & Bennis, 2020) Thus, in addition to the questions by Brinkø et al. (2015), *where* the sharing occurs has been added to the discussion of academic facilities (Poutanen 2024).

In the form of maker spaces, Fablabs and coworking spaces promote the “third mission” of universities by integrating new services that provide new meanings to higher education institutions (Lange, 2021). They can be defined as “hybrid” facilities, as spaces between campus, work, and social spaces, which not only host the traditional activities of university campuses, that is, teaching and research. All these locations allow different groups to share a place with fluid boundaries and functions. (Star, 2010.) The places are configured as emerging design and building practices characterized by in-betweenness and indeterminacy (Migliore et al., 2021). Dugdale (2009) has urged universities to create a campus strategy employing the in-between spaces located outside formally scheduled facilities.

Office spaces can roughly be categorised between own (single-occupancy) office and various types of shared office spaces with either allocated desks (shared 2-3 persons, S(mall), M(edium), L(arge) sized open plans or combi-offices) or non-allocated desks, i.e. hotdesking (activity-based offices or flex-offices) (e.g., Colenberg et al., 2021; Danielsson et al., 2015). Similar types are found in academic workspaces (Pinder et al., 2009). Danielsson et al. (2015) highlight that combi-office with personal workstations and activity-based- or flex-office without personal workstations offer a combination of back-up rooms for meetings and private conversations that typical open-plan offices lack. The shared amenities in offices typically consist of these as well as canteen or cafeteria spaces or social spaces. The benefits of an action-based environment in the academic workplace context have not been demonstrated in the scientific debate in a large scale (Engelen et al. 2018). Kinnunen et al. (2017) state that an activity-based office is poorly suited for academic work, but Nooij et al. (2023) state that the studies investigating academic workplace concepts have led to inconsistent findings that lack an underlying framework. Additionally, data collection tools for understanding the nature of academic work are still rather scarce in literature (Palvalin et al. 2015).

In terms of the effectiveness of the workplace, academics can typically choose their time and location for work, but according to Tagliaro et al. (2021), scholars adopted a more flexible work style and worked from home during the COVID-19 pandemic. The home was reportedly increasing individual productivity by providing privacy for those otherwise working in shared or open-plan offices on campus. On the other hand, the home conditions between respondents varied significantly. (Tagliaro et al., 2021.)

According to Palvalin (2019), knowledge workers’ well-being and work practices have the biggest impact on their productivity, while the role of the physical or virtual environments could not be confirmed. In turn, van der Voordt & Jensen (2021) concluded that the effect of the workplace on

productivity depends especially on the workstyles and activities and how well the environment supports those, while satisfaction with the workspace depends on the users' preferences concerning privacy and social contact (van der Voordt & Jensen, 2021). However, Colenberg et al. (2021) found that particularly open-plan offices, shared rooms and higher background noise negatively affect health, while other features of workspaces improve health.

### 3 Methodology

The data of this study was collected during the transition from the pandemic era to the post-pandemic era in the second-largest university in Finland. The individual and focus group interviews were conducted during 3-8/2022, i.e. the second semester when campuses were open without restrictions. Semi-structured interviews were conducted with 18 individuals on 3-4/2022 through Teams lasting between 45 and 90 minutes. The interviewees were chosen from two different faculties and represent the academic leadership (the deans, vice deans, head of units and degree programmes) and student unions' leadership (the chairs of unions). These faculties include various fields with different research traditions from experimental to desk-based, e.g., civil engineering, real estate economics, architecture, politics, business, and administration.

The interview questions were structured into four topics; 1. The organisational activities, 2. The effects of the pandemic on the organisation, return to campus and the future of academic work and learning, 3. The shared use of spaces and 4. The effects of the pandemic on the interviewee's own working styles. Additionally, ten workshops were organised face-to-face on work and learning environment topics (Table 1). The workshop participants represented all levels of academic staff and students from both faculties, and they volunteered based on open calls to participate. All workshop sessions lasted 1.5 hours. During the workshops, participants were divided into small groups and asked to discuss and ideate on given tasks that were formulated on the interview topics and early results drawn from interviews.

Both interviews and workshops were recorded and transcribed. All transcriptions were analysed using qualitative content analysis in Atlas.ti in several iteration rounds starting from interview data and increasing data on workshops' transcripts. The first round of analysis produced 109 codes in several areas of interest under six categories (1. Present situation, 2. Spaces in use, 3. Effects of the pandemic, 4. Needs & wishes, 5. Principles for shared use and 6. Future directions). In the following analysis rounds, the codes and categories were restructured into overarching themes and findings formulated in the iterative process. Some of these early results were tested in the workshops where participants commented and further developed the results, thus increasing the collected data. This paper presents part of the resulting themes, focusing on the aspects seen influencing the shared use of academic premises.

*Table 1. Workshop details*

Topic	Number	Date	Participants
Work Env. / The effects of pandemic	1	3/2022	7
Work Env. / The effects of pandemic	2	3/2022	3

Learning Env. / The effects of pandemic and solutions	3	3/2022	13
Learning Env. / The effects of pandemic and solutions	4	3/2022	5
Work Env. / Work modes & user personas	5	4/2022	8
Work Env. / Work modes & user personas	6	4/2022	2
Learning Env. / Teaching & studying weekly descriptions	7	5/2022	11
Learning Env. / Teaching & studying weekly descriptions	8	6/2022	5
Work & Learning Env. / Spaces	9	8/2022	5
Work & Learning Env. / Spaces	10	8/2022	7
<i>Total</i>			66

## 4 Results

The analysis of data produced three main thematic clusters influencing the shared use of academic workspaces:

1. Communities and times of sharing
2. Reasons to share
3. Ways to share

### 4.1 Communities and times of sharing

The first thematic cluster concerns the readiness and possibilities of sharing spaces. Table 2 illustrates three aspects that influence the readiness and possibilities. The first aspect concerns *the sharing partners*, the second aspect *the time and length of use*, and the third aspect includes *the access options*.

Table 2. Readiness and possibilities to share.

Aspect 1	Aspect 2	Aspect 3
Sharing partner level	Time and length of use	Access options
Individual	Simultaneous / serial	Private / allocated
Team / Research group	Continuous / periodical	Booking required
Unit / Department		Ad hoc / ID required
Faculty		Ad Hoc / anytime use
Whole campus / main organisation		

The partners sharing the places belong to the campus community, and one can identify five levels: 1. individual, 2. team or research group, 3. unit/department, 4. faculty, and 5. whole campus community/main organisation. The time and length of use include four dimensions: 1. simultaneous, 2. serial, 3. continuous, and 4. periodical. Finally, access options can be classified as 1. private, allocated, 2. booking required/bookable, 3. ad hoc use with limited access, and 4. ad hoc use without limitations.

#### **4.2 The four types of shared environments on campus**

The second thematic cluster concerned the reasons for sharing the campus environments. Four types of shared environments were identified:

1. Users' workplace profile-related environments
2. Team- or community-related environments
3. Boundary/interface-related environments
4. University organisation-related environments

The aspect of the sharing partner level is also connected to these types.

*Users' workplace profile-related environments* concern the needs and preferences of the individuals and how these individual needs are accommodated in the workplace. These environments consist of, e.g., individual workspaces, allocated desks, non-allocated desks (hot desks) and various types of backup spaces for discussion (on Zoom/Teams calls) rather than for concentration. Based on interviews, most interviewees either wanted to commit all tasks in one individual (allocated/personal) workspace they found a 'multi-use space', or they wanted to concentrate on their allocated desk and conduct collaboration and noisy activities elsewhere. The interviewees who preferred hot desking controlled their place of work and conducted concentrated activities at home or elsewhere. They also discussed the possibilities and limitations of sharing their dedicated workspace with others depending on serial and simultaneous use.

*Team- and community-related environments* are allocated to a team or a research group and intended to support team-based working. Noteworthy, within the team/group workspace, individuals may have differing workspace solutions: 1. allocated desk/space, 2. allocated desk shared with a specific team member (consecutive use), and 3. non-allocated hot desk for sporadic use. Furthermore, based on the interviews, we identified varying team circumstances that depend on individual- and team-based needs. The shared use of team-based environments is influenced firstly by how place-oriented or place-flexible an individual is (also to their group), and secondly, how (loosely or tightly) connected an individual is with the group and how campus-oriented or multi-locational the group is. These aspects are highly influenced by the shared rules of using the workspace(s). We identified individuals that are:

1. not a part of a group or the collaborators are outside the organisation,

2. loosely a part of a group or the group changes seasonally,
3. a part of a tight-knit group, and
4. they are a part of an intra-organisational multi-locational group whose members only sporadically visit the campus.

*Boundary/interface-related environments* consist of spaces that unite user groups and support their encounters, e.g., staff and students or researchers and teachers. Thus, these boundary environments are often shared within units or departments, such as canteens, group workspaces, and meeting rooms. Additionally, campus educational spaces are boundary environments shared simultaneously with teachers and students from the same field but serially with the whole campus community.

*University organisation-related environments* consist of spaces that support interaction within and between units and faculties, such as (shared) laboratories or faculty canteens. These environments also include spaces that are shared with the whole campus community, i.e. are intended for all, such as, academic libraries, restaurants, learning centres, and other open-access learning spaces. They include spaces that interviewees saw as crucial for the campus community and the atmosphere, and thus also spaces that are shared with only certain groups, such as student union spaces and group workspaces.

### **4.3 The nine modes of shared use of workspaces**

The third thematic cluster describes how academic workspaces could be shared when focusing on the interconnection of individual and team viewpoints. We formulated nine possible (work)modes for shared use of workspaces based on two variables: identified time and space variables that could increase the efficient use of academic spaces in the post-pandemic era while maintaining their effectiveness. Where Nenonen and Sankari (2021) defined worker profiles based on time spent between office and home, we focus on time spent on campus premises. Time variable includes how often campus is used: 1. Every day, 2. Approximately three days a week, and 3. Once a week or less. The space variable consists of spaces, which are used: A. Allocated office, B. Allocated desk (in e.g., Team workspace), and C. Hot-desking (in e.g., Activity-based environment). These nine work modes illustrate the possible ways of using and allocating the campus workspaces, but not the specific types of supply of spaces or the amount of each type. Table 3 explains the combinations of variables structured into nine different work modes. In the table, each column represents one time variable, and each row represents one space variable.

Table 3 Nine work modes

	1. Every day -variable	2. Thrice a week -variable	3. Once a week or less -variable
A. Allocated office -variable	<p>Every day, own office space.</p> <p>The person conducts most of their tasks in the office but can also meet people in other campus facilities.</p>	<p>Thrice a week, own office space shared with a colleague.</p> <p>The person conducts concentrated work at home and comes to campus to meet people. The person employs their office for meetings and, in turn, is employed by colleagues when vacant.</p>	<p>Once a week or less, own office space available to use by colleagues while vacant.</p> <p>The person uses their own office a maximum of once a week, and colleagues can use it while vacant. This allows the person to store their materials on campus and the space to be more efficiently used.</p>
B. Allocated desk -variable	<p>Every day, team space with an allocated desk.</p> <p>The person collaborates intensely with their team members, but they also conduct concentrated work in the team space.</p>	<p>Thrice a week, team space with allocated desk.</p> <p>The fifth mode is like the second; person's work consists of various tasks like the team and the workstation functions as a base camp, assuming the person conducts their concentrated work at home.</p>	<p>Once a week or less, team space with a hot desk.</p> <p>The person works mainly from home or other locations but visits the team space, where they have a hot desk, a maximum once a week.</p>
C. Hot desking -variable	<p>Every day, an allocated desk in a combi-office. The office is shared with colleagues from the same team/ unit.</p> <p>The person's work includes various tasks, both concentration and active collaboration. A supply of various spaces supports the working, but the environment includes a dedicated desk.</p>	<p>Thrice a week, hot desk in an activity-based office with colleagues from the same team/ unit.</p> <p>The sixth mode is similar to the third mode, likewise a community-oriented activity-based environment but without a dedicated desk</p>	<p>Once a week or less, a hot desk in an activity-based office that is shared with the unit.</p> <p>The person employs any location from a variety of activity-based supply of spaces when on campus once a week or less.</p>

## 5 Conclusions

The shared use of campus premises and academic workspaces consists of various aspects that this paper has identified and structured thematically. The sharing of campus premises is gaining new momentum in the post-pandemic era, and it is seen as a manner to increase efficiency while retaining the effectiveness and variation in the academic workspaces to match the variation in needs and preferences. While the activity-based working concepts seem not to adequately support academic working processes (Nooij et al., 2023), the shared use concepts propose next generation solutions to the workplace discussion. This paper was based on interviews with users of academic premises from different fields and levels of the community. The interviews revealed various perspectives, both the possibilities to share and the limitations. For example, the nine work modes were formulated based on the observations of how the interviewees approached their workspaces and sharing. Some interviewees had very positive experiences of shared team spaces and sharing their own office. In contrast, others illustrated the limitations to sharing, such as trust issues or the effects of simultaneous online calls.

In the end, the results responded to two main questions:

1. Which aspects influence the shared use of academic premises (from users' viewpoints)?
2. What are the levels of shared use in academic premises and workspaces?

The results of this paper highlight that the campus premises can be shared at many different levels, not only with the whole community, e.g., restaurants, but also in academic workspaces. The results show that the possibilities depend on the individual and community attributes and readiness to share. The thematic clusters intend to benefit the discussion by showing the variation in (approaches to) shared use.

The research topic suggests that universities should consider the facilities as shared resources. Based on the results, one can see that the question is also about the change of culture and change of attitude – it is an individual and community transformation. While this research investigated two faculties from different fields, more research is needed to identify the insights about the differences in different disciplines and faculties as, based on the interviews, the subcultures on campus vary. The current practices influenced the interviewees' readiness to share, but most acknowledged the post-pandemic inefficiency and ineffectiveness of the workplace and its practices.

The university's role as a role model for sustainability and responsible use of facilities provides possibilities for changes and transformation. For that, one needs more evidence, metrics, and practices – what makes sharing a sustainable experience. The motives and drivers for sharing on campus can be strengthened, but they need to be investigated more.

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## REFERENCES

- Alexander, B., Ashford-Rowe, K., Barajas-Murphy, N., Dobbin, G., Knott, J., McCormack, M., Pomerantz, J., Seilhamer, R. and Weber, N. (2019). Educause Horizon Report: 2019 Higher Education Edition”, Educause, available at: <https://library.educause.edu/resources/2019/4/2019-horizon-report> (accessed April 2024).
- Benneworth, P. (2014), “Decoding University Ideals by Reading Campuses Exploring Beyond the Democratic Mass University”, Temple P. (Ed.), *The physical university : Contours of space and place in higher education*, Taylor & Francis Group, London and New York, 217-241.
- Bouncken, R.B. (2018), “University coworking-spaces: mechanisms, examples, and suggestions for entrepreneurial universities”, *Int J Technol Manage*, 77(1–3), 38–56.
- Brinkø, R., Balslev Nielsen, S., and van Meel, J. (2015), “Access over ownership – a typology of shared space”, *Facilities*, 33(11/12), 736-751.
- Colenberg, S., Jylhä, T. and Arkesteijn, M. (2021), “The relationship between interior office space and employee health and well-being – a literature review”, *Building Research & Information*, 49:3, 352-366, <https://doi.org/10.1080/09613218.2019.1710098>
- Curtis, S.K. and Lehner, M. (2019), “Defining the sharing economy for Sustainability”, *Sustainability*, 11, 567. <https://doi.org/10.3390/su11030567>
- Danielsson, C.B., Bodin, L., Wulff, C. and Theorell, T. (2015), “The relation between office type and workplace conflict: A gender and noise perspective”, *Journal of Environmental Psychology*, 42, 161-171. <https://doi.org/10.1016/j.jenvp.2015.04.004>
- den Heijer, A. (2011), *Managing the university campus - Information to support real estate decisions*, Eburon Academic Publishers, Delft.
- Dugdale, S. (2009), “Space Strategies for the New Learning Landscape”, *EDUCAUSE review*, March/April, 50-63.
- Engelen, L., Chau, J., Young, S., Mackey, M., Jeyapalan, D., and Bauman, A. (2018), “Is activity-based working impacting health, work performance and perceptions? A systematic review.” *Building Research & Information*, 1-12. DOI:10.1080/09613218.2018.1440958
- Fisher, K. (2019), “Scoping the Future of the Higher Education Campus”, Fisher K. (Ed.), *The Translational Design of Universities: An Evidence-Based Approach*, BRILL, Leiden and Boston, 5-22.
- Francart, N., Höjer, M., Mjörnell, K., Orahim, A.S., von Platten, J. and Malmqvist, T. (2020), “Sharing indoor space: stakeholders’ perspectives and energy metrics”, *Buildings and Cities*, 1(1), 70–85. <https://doi.org/10.5334/bc.34>
- Goodyear, P. (2022), “Realising the Good University: Social Innovation, Care, Design Justice and Educational Infrastructure”, *Postdigital Science and Education*, 4, 33-56.
- Harrison, A., & Hutton, L. (2014), *Design for the Changing Educational Landscape* (1st edition ed.), Routledge, Abingdon, Oxon.
- Jandrić, P., Knox, J., Besley, T., Ryberg, T., Suoranta, J., and Hayes, S. (2018), “Postdigital science and education”, *Educational Philosophy and Theory*, 50(10), 893-899.
- JISC. (2006), “Designing Spaces for Effective Learning A guide to 21st century learning space design”, HEFCE, available at: <https://www.d41.org/cms/lib/IL01904672/Centricity/Domain/422/learningspaces.pdf> (accessed April 2024)
- Kinnunen, M., Lempiäinen, K., and Peteri, V. (2017),” Konttorista monitilatoimistoksi : työn tilojen etnografisen analyysi,” *Sosiologia* 54 (2017), 2, 110-127
- Lamb, J., Carvalho, L., Gallagher, M., and Knox, J. (2021), “The Postdigital Learning Spaces of Higher Education”, *Postdigital Science and Education*, 4, 1-12.

- Lange, B. (2021), "Framing third places for universities' third mission—Field Configuring Events as collaborative learning and transfer formats", *Int J Train Dev*, 25, 433–449. <https://doi.org/10.1111/ijtd.12239>
- Lundgren, R. (2023), *Adaptive reuse and shared spaces as circular business models*. Doctoral Thesis (compilation), Real Estate Science, Department of Technology and Society, Lund University.
- Lundgren, R., Kyrö, R., and Jylhä, T. (2022), "Access-Based Consumption in the Built Environment: Sharing Spaces", *Sustainability*, 14, 5550, <https://doi.org/10.3390/su14095550>
- Marmot, A. (2014), "Managing the Campus Facility Management and Design, the Student Experience and University Effectiveness", Temple, P. (Ed.), *The physical university: Contours of space and place in higher education*, Routledge, London and New York, 58-71.
- Migliore A, Ceinar IM, and Tagliaro C (2021), "Beyond coworking: from flexible to hybrid spaces", Orel, M., Dvoutletý, O., Ratten, V. (eds), *The flexible workplace*, Human Resource Management, Springer, Cham, 3–24. [https://doi.org/10.1007/978-3-030-62167-4\\_1](https://doi.org/10.1007/978-3-030-62167-4_1)
- Nenonen, S., Eriksson, R., Niemi, O., Junghans, A., Balslev Nielsen, S., and Lindahl, G. (2016), "Campus Retrofitting (CARE) Methodology: A Way to Co-Create Future Learning Environments", *Proceedings of the 20th CIB World Building Congress 2016*, CIB, available at: <https://orbit.dtu.dk/en/publications/campus-retrofitting-care-methodology-a-way-to-co-create-future-le> (accessed April 2024)
- Nenonen, S. and Sankari, I. (2022), "Hybrid profiles for knowledge workers – flexible workplace and time", in Jylhä, T. and Danivska, V. (Eds.), *Research papers for The 21st EuroFM Research Symposium 15-16 June 2022*, EuroFM. <https://doi.org/10.4233/uuid:49cd8030-329d-43f5-9040-b98ae5d5868c>
- Nooij, B. van Teunenbroek, C., C., Teelken, C. and Veenswijk, M. (2023), "Intended versus implemented workspace: a systematic literature review of the implementation of activity-based working in higher education", *Facilities*, Vol. 41 No. 7/8, pp. 526-544. <https://doi.org/10.1108/F-03-2022-0049>
- Nordquist, J., and Laing, A. (2015), "Designing spaces for the networked learning landscape", *Medical Teacher*, 37(4), 337-343.
- Orel M. and Bennis, W. (2020), "The perspective of a coworking space model in scholarly settings.", *On the Horizon*, 28(2), 101–111. <https://doi.org/10.1108/oth-10-2019-0074>
- Palvalin, M. (2019), "What matters for knowledge work productivity?", *Employee Relations*, 41, 1, 209–227, DOI 10.1108/ER-04-2017-0091
- Palvalin, M., Vuolle, M., Jääskeläinen, A., Laihonon, H., and Lönnqvist, A. (2015), "SmartWoW – constructing a tool for knowledge work performance analysis," *International Journal of Productivity and Performance Management*, Vol. 64, No. 4, pp. 479-498. DOI:10.1108/IJPPM-06-2013-0122
- Pinder, J., Parkin, J., Austin, S., Duggan, F., Lansdale, M., Dermian, P., Baguley, T. and Allenby, S. (2009), *The case for new academic workspaces*, Loughborough University, ISBN 978-1-897911-33-4
- Poutanen, J. (2024), *The Learning Landscape Dimensions – The Supply and Student Preferences on Campus Premises*. Doctoral Thesis (monograph), Faculty of Built Environment, Tampere University. ISBN 978-952-03-3309-6 (pdf)
- Ranjbari, M., Morales-Alonso, G. and Carrasco-Gallego, R. (2018), "Conceptualizing the sharing economy through presenting a comprehensive framework", *Sustainability*, 10, 2336. <https://doi.org/10.3390/su10072336>
- Reike, D., Vermeulen, W.J.V. and Witjes, S. (2018), "The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options", *Resources, Conservation and Recycling*, 135, 246–264. <https://doi.org/10.1016/j.resconrec.2017.08.027>
- Star, S.L. (2010), "This is not a boundary object: reflections on the origin of a concept", *Sci Technol Human Values*, 35(5), 601–617.
- Tagliaro, C., Migliore, A., Danivska, V., Poutanen, J., Pelsmakers, S., Kaasalainen, T. and Nenonen, S. (2022), "Home, university, and other spaces: Where Finnish and Italian academics did research prior

to and during the COVID-19 pandemic”, Di Marino, M. et al. (eds), *The COVID-19 Pandemic and the Future of Working Spaces*, Routledge, Abingdon and New York, 213-226.

Temple, P. (2014), “Space, Place and University Effectiveness”, Temple P. (Ed.), *The physical university : Contours of space and place in higher education*, Taylor & Francis Group, London and New York, 3-14.

van der Voordt, T., and Jensen, P.A. (2021), “The impact of healthy workplaces on employee satisfaction, productivity and costs”, *Journal of Corporate Real Estate*. DOI 10.1108/JCRE-03-2021-0012.

Van Ree, H. J. (2002), “The added value of office accommodation to organisational performance”, *Work Study*, 51, 7, 357-363.

Whitton, P. D. (2018). *The new university: space, place and identity* (Doctoral dissertation). Manchester Metropolitan University, available at: <https://e-space.mmu.ac.uk/620806/1/PhD%20Thesis%20PD%20Whitton.pdf> (accessed April 2024)