LTSHE

Learning and teaching space in higher education

Co-funded by the Erasmus+ Programme of the European Union

KEY ACTION

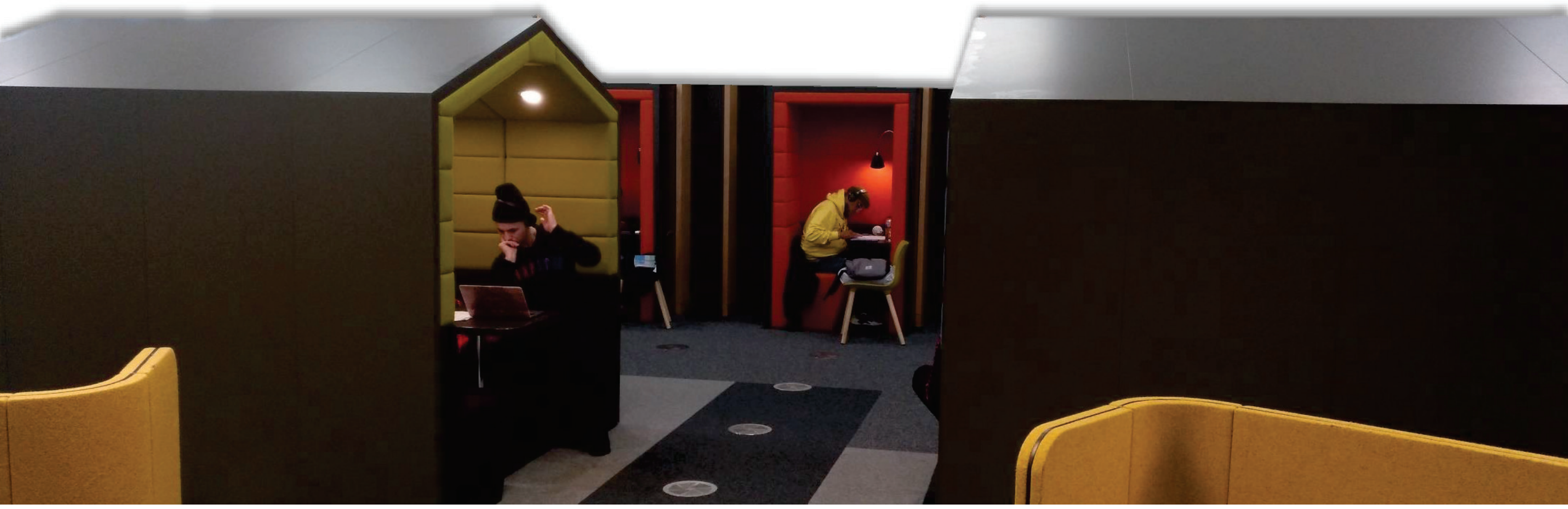
Cooperation for innovation and the exchange of good practices

ACTION TYPE

Strategic Partnerships for higher education

WEB INFORMATION

https://ec.europa.eu/programmes/erasmus-plus/projects/eplus-project-details/#project/2019-1-UK01-KA203-061968
https://www.evalag.de/ltshe



BIRMINGHAM CITY University

universidade de aveiro

JAGIELLONIAN UNIVERSITY IN KRAKÓW

Kolegji AAB CILËSI. LIDERSHIP. SUKSESI

UNIVERSITÀ DEGLI STUDI DI MILANO

evalag EVALUATIONSAGENTUR BADEN-WÜRTTEMBERG

upna Universidad Pública de Navarra Nafarroako Unibertsitate Publikoa

WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

INTELLECTUAL OUTPUT 2

Case Studies of Experience: designing and developing learning spaces in Austrian higher education

The Case of WU Vienna
(Vienna University of Economics and Business)

Hedda Zechner

Marina Hülssiep

Oliver Vettori

April 2022

For further information please contact:

Dr. James Williams
Project co-ordinator

Social Research and Evaluation Unit
Birmingham City University
B15 Bartholomew Row
Birmingham, United Kingdom
B5 5 JU

Tel: +441213315000 / +441213317602

james.williams@bcu.ac.uk

https://www.bcu.ac.uk/social-sciences/about-us/staff/criminology-and-sociology/james-williams

Table of contents

Executive Summary

This report presents in detail the results of the case study on the experiences at WU Vienna of designing and developing learning and teaching spaces. This is part of Intellectual Output 2 of the *Erasmus+ Learning and Teaching Spaces in Higher Education* (LTSHE) project.

WU Vienna has a rather new campus and is characterized by many innovative teaching and learning spaces. Especially because a lot of emphasis was already placed on educational design when planning the campus, it is an interesting case study. It is also special within the Austrian context because WU is one of the rare campus universities and all physical L&T spaces are located at one place. Although the campus was completed in 2013, the learning and teaching spaces at WU are still in a constant flux. Particularly important is the idea of seamlessly connecting physical and online spaces. The digitisation of teaching was an important issue even before the COVID 19 pandemic. However, the COVID 19 pandemic gave it an enormous boost. These developments lead to the creation of new innovative virtual teaching and learning spaces on the one hand, but also to a rethinking of physical teaching and learning spaces on the other.

The institutional case study of WU Vienna is based on extensive research. To cover various experiences, needs and insights into learning and teaching spaces 13 semi-structured interviews and three focus groups were conducted with six key stakeholder groups: students, teachers, non-teaching staff, Deans, Heads of Institutes and Academic Program Managers as well as members of the Senior Management. In order to gain an insight into the strategy and policy regarding learning and teaching spaces a content analysis of the institutional strategic documents was also part of the research.

The report shows, that a strong competitive spirit exists at WU. This spirit becomes clear from competitiveness as a key strategic value, but also when it comes to the continuous developments and need for innovation in teaching and learning. Hence the expansion of the digital learning environment has been clearly flagged out. Summarised, teaching and learning spaces are a competitive factor and a strategic asset.

Enabling seamless learning and connecting physical and digital spaces is a particularly important strategic goal. Relatedly, WU has implemented the FLEX project, which offers an innovative didactic architecture to foster innovative teaching and learning approaches and new learning experiences. Virtual teaching and learning spaces demand a complete rethinking of how “space” is conceptualised in teaching and learning – and, also how teaching and learning are conceptualised.

Regarding existing physical L&T spaces, the case study reveals that there is a high level of satisfaction among all stakeholders with only a few points of criticisms and suggestions for improvement. However, there seems to be a lack of awareness of how teaching and learning are affected by socio-spatial arrangements – and even if the awareness is there, at least a lack of knowledge and experience on how to deal with these effects in practice.

One of the key issues for the future is how to align the current trend towards individualised learning with the fact that any spatial structure will automatically favour some designs over others. The balance between flexibility and the need for standardisation and efficiency plays a central role. Support formats and processes will also have to find a balance here, based on the

realisation that administrative regulations and conditions will often strongly influence the possibility space for teachers and learners.

Concluding, four recommendations for institutional, national and supranational policy makers, but also for scholars of teaching and learning (spaces) and decision makers can be given:

- Since knowledge about the impact of spatial arrangement on teaching and learning is limited, it seems prudent to invest more in research and establish evidence-based training.
- With the consequences of the COVID-19 pandemic, it is advisable to extrapolate the added value of teaching and learning on campus and strategically pursue the concept of seamless learning.
- Technological, didactic and administrative objectives and requirements should be more holistically aligned to avoid unintended consequences.
- As digitisation is fundamentally changing higher education, more attention should be paid to the virtual L&T space and its potential (but also its risks) overall.

1. Introduction

This Intellectual Output (O2) of the LTSHE project explores the policy and practice of designing, developing and using learning and teaching (L&T) spaces at WU Vienna. Therefore, we focus on existing learning and teaching spaces as well as plans for future learning and teaching spaces.

1.1 Aims and objectives of Intellectual Output 2 of the LTSHE project

The report provides a detailed look into physical L&T spaces, e.g., classrooms, libraries, self-learning areas, outdoor areas, innovative new rooms, and online spaces, e.g., online learning environment (OLE). Yet, online teaching and learning spaces play a particular role in this report, too. Due the Covid 19 pandemic the digitalisation of teaching infrastructure has become an even higher priority from one day to the next, and online teaching became the interim normal. Hence, WU has to consider which teaching formats and what kind of physical, hybrid and online teaching spaces will be needed in the future.

In order to gain new insights into the use, development and design of existing and future virtual and physical teaching and learning spaces at WU, we worked along the following research questions:

- *What relevance do L&T spaces have for the university's strategy?*
- *How are existing physical L&T spaces used and valued?*
- *What will L&T spaces look like in the future and who will develop them further?*
- *How does the design of L&T spaces influence learning and teaching experiences?*
- *How are digital L&T spaces used?*

After this short introduction, chapter 2 lays out the general theoretical basis relevant for the design of L&T spaces while chapter 3 explains the methodological approach we used for our project. In chapters 4 and 5, the results from the interviews, focus groups and the analysis of the strategic documents are presented. The conclusions of our work as well as further recommendations will be summarized and presented in chapter 6.

1.2 WU Vienna: A innovative Campus built from scratch

WU Vienna has a very new campus, which was completed in 2013 and is characterized by many innovative teaching and learning spaces. In just four years (2009 - 2013), the largest university construction project in Austria in the recent years was realised. The total costs amounted to around 490 million euros. It is a unique new university building in Austria with around 100,000m2 of usable space (c.f. Bundes Immobilien Gesellschaft, 2013). Eleven Departments form the foundation of WU academic organizational structure, and are complemented by 15 Research Institutes and seven Competence Centers.

Table 1 | Departments of WU

Departments
Department of Economics

Department of Finance, Accounting and Statistics
Department of Foreign Language Business Communication
Department of Global Business and Trade
Department of Information Systems and Operations Management
Department of Management
Department of Marketing
Department of Private Law
Department of Public Law and Tax Law
Department of Socioeconomics
Department of Strategy and Innovation

Source | WU Vienna

These Departments are spread over eight buildings that not only contain office spaces but also learning and teaching spaces. The building complexes are designed by international star architects (e.g. Zaha Hadid) and are grouped around the central Library & Learning Center. 35,000m2 of the campus area is built up, the remaining 55,000 m2 are publicly accessible grounds (WU Vienna, a).

Picture 1 | Library and Learning Center designed by Zaha Hadid

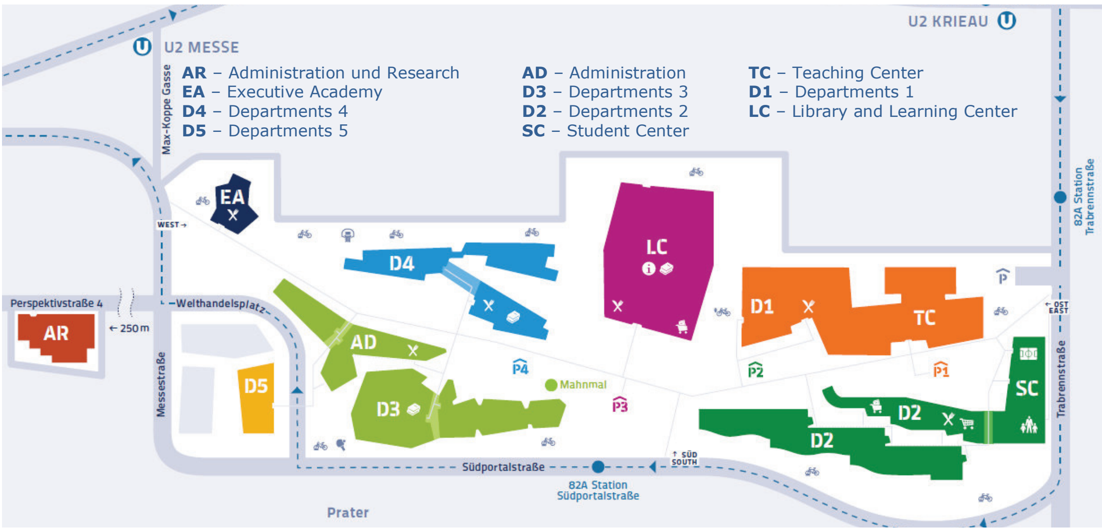
Source | Picture library WU Vienna

Picture 2 | Campus WU

Source | Picture library WU Vienna

WU is a campus university where all buildings are gathered within short walking distance. The various buildings and their functions were designed to reflect the three tiers of teaching and learning in the sense of the Bologna Process: The Teaching Center, which includes the largest lecture hall "Audimax", is intended mainly for bachelor degree students, while the master degree programs are taught primarily in the individual Department buildings. The Executive Academy building is home of continuing education and life-long learning programs (WU Vienna, b).

Illustration 1 | Site map Campus WU



Source | WU Vienna, a

Picture 3 | Student Center, Teaching Center and Executive Academy

Source | Picture library WU Vienna

The entire campus is barrier-free and the ways are wheelchair-accessible. There are also various cafés, restaurants and a canteen on campus, as well as indoor and outdoor sports areas, and a kindergarten. The campus is very centrally located in the city of Vienna and can be easily accessed by underground from both main entrances.

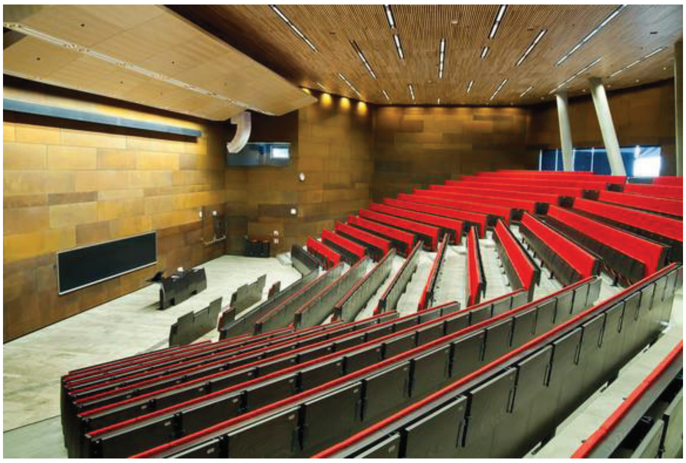
WU has nearly 100 teaching rooms. Teaching spaces, except the auditorium, are available in six size categories (180, 170, 120, 60, 30 and 20 seats).

Table 2 | Overview Teaching Spaces

Room category	Seats	Number of rooms
Seminar room /Project room L	20	4
Seminar room	30	48
Lecture hall	60	22
Lecture hall	120	4
Lecture hall	170	1
Lecture hall	180	4
Auditorium	650	1
Course lab		2
PC lab		4
Workstation room		3

Source | Teaching Coordination WU Vienna

Picture 4 | Auditorium



Source | Picture library WU Vienna

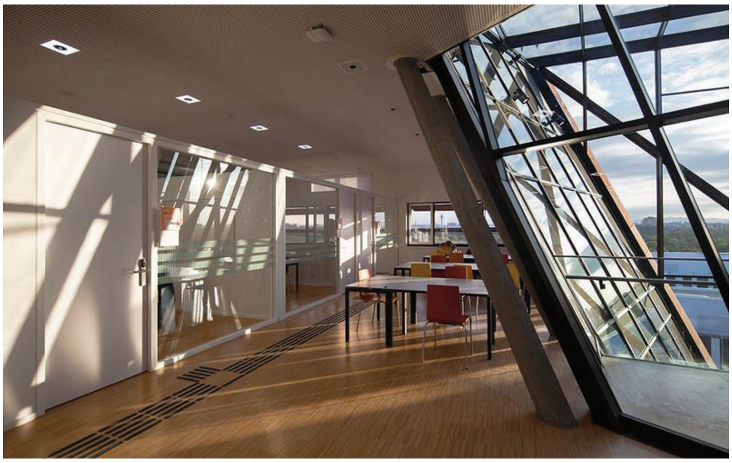
Furthermore WU offers self-study areas and project rooms, with around 3,000 student workstations across campus. There are quiet study areas where students can focus completely on studying without distractions, and there are also communicative areas where students can work in groups. Additionally, around 80 project rooms are available in different sizes (2-16 seats). Course instructors can use them for small-scale courses or break-out sessions, and students can book them for joint work or for studying in groups. There are also student lounges located in the ground-floor areas of the individual department buildings (WU Vienna, d).

Table 3 | Overview Learning Spaces

Room category	Seats	Number of rooms
Project room (small and medium)	2-16	78
Study areas		20
Lounges		8

Source | Teaching Coordination WU Vienna

Picture 5 | Learning Areas and Project Rooms



Source | Picture library WU Vienna

When planning WU's L&T spaces, attention was already paid to flexibility with regard to the furnishings and a high standard of media technology. Especially since the campus is very new and has already put a lot of emphasis on pedagogical design, it is an interesting case study. It is also special within the Austrian context because WU is one of the rare campus universities and all physical L&T spaces are located at one place.

2. Theoretical background

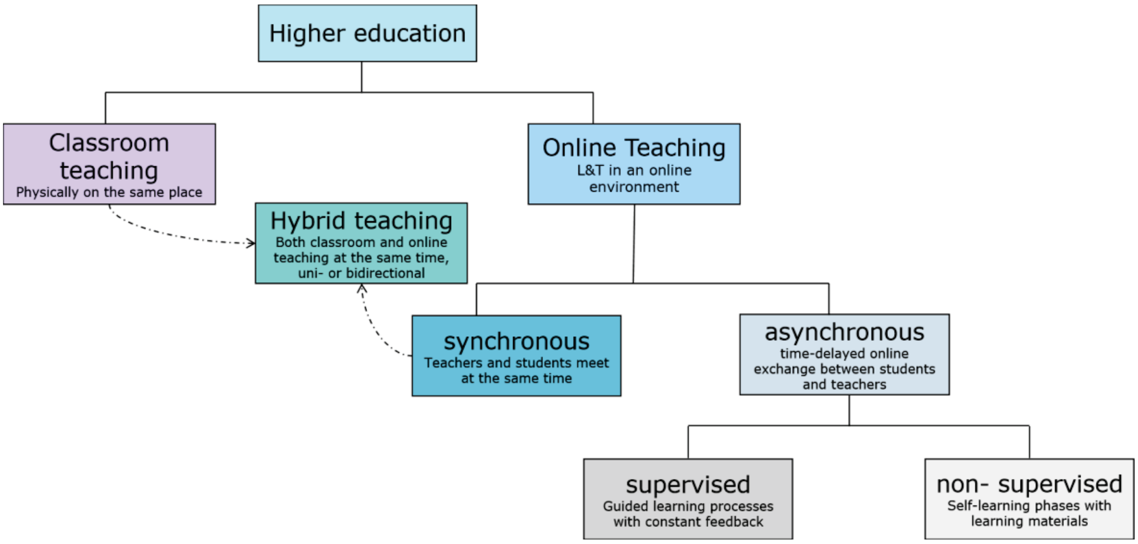
As we extensively described the impact of physical spaces on teaching and learning as well as principles on the design of physical learning spaces (cf. also Smith, 2017; Finkelstein at al., 2016) within the first intellectual output for the LTSHE project, we would like to supplement the previous contribution with a theoretical background on approaches to digital teaching and virtual learning spaces and how those environments affect teaching and learning. The current developments during the COVID 19 pandemic acted as a catalyst for digitalisation in teaching and learning – which was subjected to huge changes and developments since spring 2020. During the shift of learning and teaching to a fully online context, the necessity of careful design of online learning spaces became evident. The next step, however, is to consider how virtual and physical spaces can be combined in a meaningful way. Ninnemann et.al. points out that virtual and physical L&T spaces are still produced too separately and not in an integrated manner (c.f. Ninnemann et al. 2020, p. 25). Due to improving information and communication technologies (ICT) teaching and learning can take place independently of space and time. With the further development of online teaching also physical spaces on campus have to be rethought. If teaching and learning will no longer take place exclusively in the provided spaces on campus, the question arises as to what functions a physical campus should fulfil. Approaches are being developed in the literature on how new forms of teaching and learning affect a transformation of campuses. According to the literature, learning and teaching will not be limited to the campus and will more and more lead to a fusion of formal and informal learning spaces as well as online and offline (c.f. Ninnemann et al. 2020).

Online and physical L&T spaces can no longer considered independent of each other. Therefore we would like to briefly present the discourse from the literature on merged physical and virtual teaching and learning spaces. In the first part we give an overview of the different teaching and learning formats and spaces (2.1.). In the second part we show how a campus works as a hybrid learning environment (2.2).

2.1 Spaces for physical, hybrid and virtual teaching and learning

In the following section, we define terms related to the teaching designs within higher education, which have served as a base for this report. In the last month, a vivid dispute has arisen, especially concerning the definition of hybrid teaching (cf. Reinmann, 2021; Irvine, 2020; Vale/Oliber/Clemmer, 2020). We apply the classification created by Forum Neue Medien Austria (FNMA, 2021).

Graphic 1 | Classification of Teaching Formats



Source | FNMA, 2021, p.7, translated

Table 4 | Classification of Teaching Formats

Teaching format	Description
Classroom teaching	In the classical form of face-to-face teaching, students and teachers meet at the same time at a physical space, usually at the university campus.
Online teaching	Online teaching, on the other hand, is characterised by a spatial distance between students and teachers but not necessarily by a temporal distance. Hence, online teaching can take place in synchronous and asynchronous settings.
Synchronous, online teaching	In synchronous online teaching, teachers and students meet each other at a specific time in the virtual space. This form is often referred to as virtual face-to-face teaching. Video conferencing or streaming software enables both, video and audio transmission. A online course can take place either unidirectionally, e.g. in the case of streaming, or bidirectionally in the case of video conferences, which means that students can also interact with colleagues and teachers.
Asynchronous, online teaching	In asynchronous virtual teaching, the exchange between teachers and students in the virtual space is time-delayed. An essential component of asynchronous teaching is the provision of digital learning content for self-study via learning platforms. Possibilities for implementation can be found in the form of forums, supervised by teachers or written feedback processes for assignments in different social forms (individual work and group work) for example.
Hybrid teaching	Hybrid teaching takes place as face-to-face teaching in a physical space on campus and enables simultaneous virtual participation using streaming technology. Two different set-ups can be distinguished: 1. The activities from the teaching space are transmitted unidirectionally via live stream. The virtual participants are only passive consumers, i.e. they have

	no opportunity to interact with teachers and fellow students. This form is therefore primarily suitable for very lecture-heavy courses. 2. In bidirectional streaming interaction between virtual participants and participants in presence is possible by using video conferencing software. This form can be very challenging regarding didactics, organisation and technology.
Blended Learning	In blended learning, attendance phases are combined with virtual synchronous and/or asynchronous (supervised and unsupervised) phases in a didactically meaningful way that is oriented towards learning objectives.

Source | c.f. FMNA, 2021, p. 7f

While the concept of blended learning has been established for about two decades (cf. Colis/Moonen 2001, Rovai/Jorden 2004), hybrid teaching has evolved, mostly in the last two years, due to the urgency during the COVID 19 pandemic and innovative information and communication technology. Online L&T spaces in particular have been developed extremely further in recent months. While traditional university teaching has long been based on face-to-face meetings of teachers and students in a physical setting, the virtual space has become a fixed component of university teaching by now. Depending on which teaching and learning formats are chosen, there are different requirements for the spaces. The following distinction between physical, virtual and hybrid learning spaces that a university can provide should serve as an orientation.

Physical Learning and Teaching Spaces

Physical L&T spaces can be experienced visually, acoustically and haptically and refer to the architectural environment of a university. Students and teachers can experience physical learning spaces through their senses, move through them and act in them. Distinguishing and qualifying characteristics of physical learning spaces are:

- the type of room (e.g. seminar room, lecture room, learning areas, library, project rooms),
- the equipment and infrastructure (e.g. technical equipment, furniture),
- the quality and atmosphere (e.g. lighting conditions, acoustics) and
- the availability (e.g. embeddedness in the campus, proximity to other rooms).

The different teaching and learning methods place different demands on the physical design of a room (e.g. different settings for group work or discussions) (cf. Praß/Weber, 2021).

Virtual spaces and learning platforms

In order to communicate with each other via digital communication technologies a functioning digital device is necessary. Video conferencing systems in particular enable simultaneous exchange without physical contact. To ensure that teaching and learning processes work in virtual learning spaces, a technical infrastructure, for example in the form of learning platforms, is necessary. In this protected virtual space, learning processes can be organised, planned, performed, tested and evaluated. Learning management systems (LMS) and online learning environments (OLE) can be summarised under the term learning platforms (cf. Praß/Weber, 2021).

Hybrid L&T spaces

Hybrid teaching and learning spaces should create seamless learning environments (Wong & Looi, 2011). When designing the space, it is important to make transitions between physical and virtual learning environments as simple as possible or to dissolve them completely. In addition, learners should be given a high degree of autonomy and flexibility in the use of equipment. Digital collaborative furniture (multi-touch tables, hybrid objects, etc.) as well as mobile terminal devices (tablets, smartphones, etc.) create the conditions for acting simultaneously in both learning space settings – physical and virtual (cf. Hilli/Nørgård/Aaen, 2019).

Whether physical or online spaces, formal and informal learning will increasingly merge. A campus as a hybrid environment combines both formal and informal learning as well as online and face-to-face learning opportunities. This is the topic of the next section.

2.2 University Campuses as hybrid learning environments

Whether we look at the level of teaching formats, teaching infrastructure or the entire campus, the focus is increasingly on enabling seamless learning by linking online and offline spaces. Through the years, university campuses have housed generations of students and enabled an increasingly vivid academic community. Many efforts have been made to make a campus attractive to students, visitors and the neighbourhood (cf. Ninnemann et el. 2020). A campus can foster collaboration between students, scientists, entrepreneurs and other industry partners and enable different stakeholders to come together (cf. Huhtelin/Nenonen, 2015), and support student learning (cf. Brooks, 2012; McArthur, 2015). However, the question arises as to what functions a campus can assume as a result of the recent developments. Ninnemann et al. (2020) have developed a concept of the campus as a hybrid environment that combines informal and formal as well as digital and analogue learning:

> Hybrid environment as an approach to merging physical and virtual spaces and integrating formal and informal spaces to emphasise the need to overcome disciplinary and organisational boundaries. Activating multiple spaces – physical, virtual, informal, formal, outdoor and urban spaces – under the umbrella of the hybrid environment will support heterogeneous needs and innovative methods in teaching and learning processes as well as change the image of the university in our society. (Ninnemann et al., 2020, p. 7)

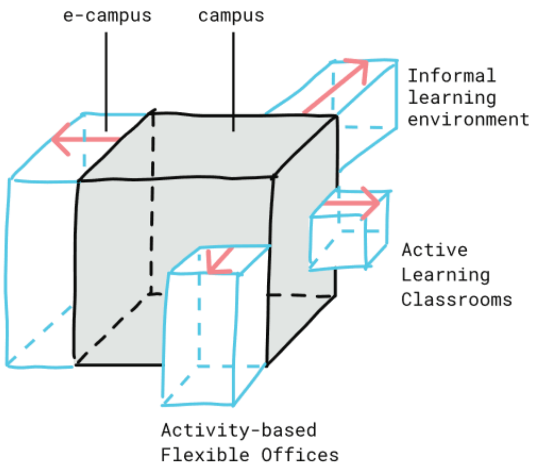
The conceptualised and implemented hybrid environments need to be reimagined at the level of cross-scale spatial structures, integrating buildings, campuses and urban and outdoor spaces. Therefore, four challenges to be addressed in the further development of campuses have been identified by Ninnemann et al. (2020):

- Implementing separate virtual learning and working spaces on campus leads to parallel spatial structures which strains resources at universities.
- Integrating virtual learning and working spaces brings about new needs and requirements for physical spaces, which then affect the space supply of a university.

- With the integration of information and communication technologies the distinction of formal and informal spaces is eroding due to the ability to learn and work independently of time, location and other people.
- An extended understanding of the university campus also involves grasping urban outdoor and living spaces as potential learning and working spaces. This incorporates the opportunity to link university and society.

In addition to the question of how to link online and offline, enable and foster seamless learning and an open university, the focus is increasingly shifting to the question of how a sustainable campus can be planned and created.

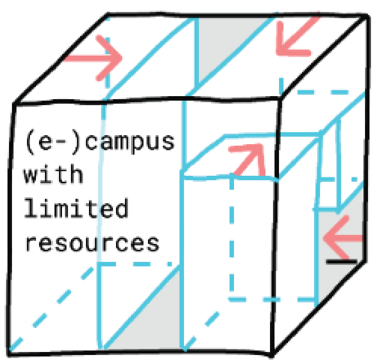
Illustration 2 | Parallel and additional space structures on campus



Source | Ninnemann et al.,2020, p.24

Illustration 1 demonstrates the parallel structures of virtual e-campus and physical campus infrastructures. Due to new needs and requirements, users tend to claim more space. Hybrid learning environments do not need more space, but new qualities of space.

Illustration 3 | (e-) campus with limited resources

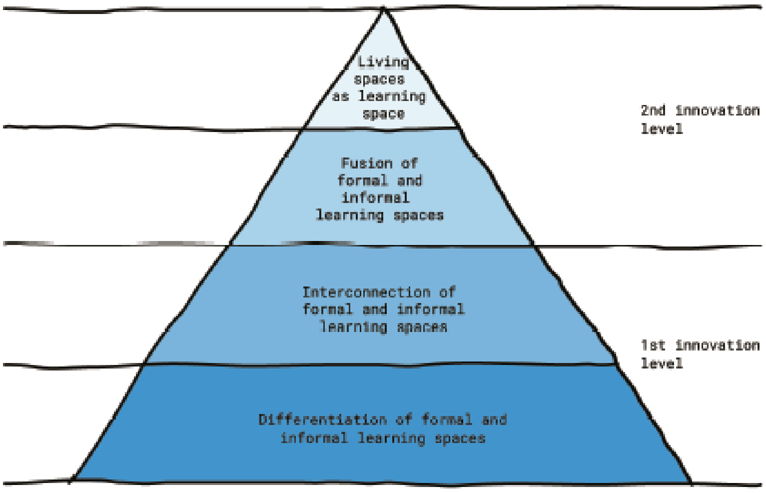


Source | Ninnemann et al.,2020, p.38

Illustration 2 demonstrates that a Campus must deal with limited resources that do not allow building up parallel structures of virtual and physical campus infrastructures as create more space due to new needs.

In addition to a sustainable development of the campus, the main aim is to provide possibilities for linking formal and informal learning. Based on empirical research, Ninnemann and Jahnke (2018) created a pyramid of innovations in the design of campuses, consisting of two levels. The bottom level, representing the needs of learners, addresses the differentiation between and the linkage of formal and informal learning spaces. The top level of the pyramid of focusses on awareness, by combining formal and informal learning spaces and making spaces of everyday life learning spaces.

Graphic 2 | Innovation Pyramid of Learning Environments



Source | Ninnemann et al. 2020, p. 30

In order to address the rising demand of informal learning spaces (bottom level of the pyramid: needs), existing physical places on campus can be redesigned. In recent years, this is often done by transforming university libraries into learning centres, rather than just information centres (cf. Ninnemann, 2021, p. 287).

As part of focussing on the awareness level of the pyramid (top level), spaces of everyday life can be used as learning spaces. As Ninnemann and Jahnke consider learners as the active producers of knowledge, whilst professors and lecturers are their "learning companions" (Ninnemann/Jahnke, 2018, p. 143), learning spaces off-campus are of increasing importance. By further integrating information and communication technology into the learning process, learning spaces can further be decentralised to spaces of everyday life around town (or even around the world) – those places can either be appropriated by students or actively promoted by the university (cf. Ninnemann, 2021, p. 288f.).

Digitalisation of teaching and learning processes is eroding the boundaries between classroom and online teaching and learning. It is therefore necessary to adapt existing physical spaces at universities and at the same time to consider which learning environments can be activated outside the campus (Ninnemann 2021, p. 295). It is an interesting approach to think about fluid boundaries between physical and virtual L&T spaces, how these can be combined to enable seamless learning and how formal and informal L&T spaces will increasingly merge with each other.

3. Data and Methodology

In this section we present our methodological approach. For the study, we conducted interviews and focus groups with key stakeholders, staff and students from WU and accompanied them with institutional documents. In the first subsection we present our research questions and research approach. This is followed by an overview of our date collection. We then show how we treated and analysed the data we collected. Finally, we discuss the difficulties we had in the research process.

3.1 Research Questions and Research Approach

In relation to the current discussion and developments on the impact and connection of physical and online L&T spaces, this study intends to answer the following questions:

What relevance do L&T spaces have for the university's strategy?

- Which strategies and policies exits to improve design and implementation of L&T spaces at WU?
- How is the further development of L&T spaces strategically anchored?

How are existing physical L&T spaces used and valued?

- What design elements and pedagogical approaches have proven successful in existing physical L&T spaces?
- Which shortcomings can be identified?

What will L&T spaces look like in the future and who will develop them further?

- What innovative development of the teaching and learning spaces is planned? (Physical and virtual)
- Who is involved in the further development processes?

How does the design of L&T spaces influence learning and teaching experiences?

- What impact do L&T spaces have on learning behavior and the development of new teaching approaches?
- What is the value of Campus WU as a physical learning space?

How are digital L&T spaces used?

- How advanced are the digital infrastructures to enable professional online teaching and blended learning?
- What aspects of online spaces need to be improved?
- What innovative spaces exist to combine online and face-to-face teaching?

To answer the research questions, we follow these five methodological principles.

1. **Multi-perspective approach**; since learning and teaching spaces in higher education are planned, designed, implemented, maintained and ultimately used by different stakeholders, the involvement of a wide variety of actors is required to obtain a comprehensive picture.
2. **Open qualitative approach**; in order to better explore the structures of relevance of the actors and stakeholders, semi-structured interviews and focus groups are chosen as research method.
3. **Qualitative approach to coding**; to take into account the depth of the material and certain cross-connections in the interviews, a grounded theory informed approach based on Strauss and Corbin (1998) is used to analyse the material.
4. **Validation via non-self-reporting data**; institutional strategy documents and institutional information about learning and teaching spaces on WU's website are also used to validate stakeholders' statements.

5. **Multi-method approach**; to obtain different perspectives on existing and future new learning spaces, including their characteristics and the way they promote quality improvement in learning and teaching, focus group, interviews and document analysis are undertaken.

Hereafter, the data collection, the data analysis and the challenges that arouse within the process are described.

3.2 Data collection

To cover various experiences, needs and insights into learning and teaching spaces we conducted 13 interviews and three focus groups with six key stakeholder groups: students, teachers, non-teaching staff, Deans, Heads of Institutes and Academic Program Managers as well as members of the Senior Management.

When selecting the interview partners, it was important to us that all participants are well-versed in physical and virtual spaces of WU. Among the academic staff (teachers, Deans, Heads of Institutes and Academic Program Managers), we selected persons who have been teaching at WU for a longer period of time and have experienced the development of the new campus, as well as junior teachers. We also made sure that the academic staff we interviewed work and teach in different departments and buildings at WU. Stakeholders for non-teaching staff included all areas that are in any way involved in the design, service and coordination of L&T spaces. At the Senior Management level, the two vice-rectors were elected, who are primarily responsible for the strategic direction of online and physical L&T spaces. In terms of the multi-perspective approach, it was essential for us to obtain a wide variety of stakeholders and to cover diversity issues such as include representatives from different subject fields, different departments, different study levels, different needs and different expectations with respect to L&T.

Table 5 | Overview of interviewees at WU

No.	Function	Gender	Interview/Focus Group
1	Student	Female	Focus group
2	Student	Female	Focus group
3	Student	Male	Focus group
4	Student	Male	Focus group
5	Student	Male	Focus group
6	Student	Male	Focus group
7	Teacher	Female	Interview
8	Teacher	Female	Interview
9	Teacher	Male	Interview
10	Teacher	Male	Interview
11	Non-Teaching Staff, Campus Management	Male	Focus group
12	Non-Teaching Staff, Campus Management	Male	Focus group
13	Non-Teaching Staff, Campus Management, Architect	Female	Focus group
14	Non-Teaching Staff, Digital Teaching Services	Female	Focus group
15	Non-Teaching Staff, Digital Teaching Services	Female	Focus group
16	Non-Teaching Staff, Eventmanagement	Female	Focus group

17	Non-Teaching Staff, IT-Services	Male	Focus group
18	Non-Teaching Staff, IT-Services	Male	Focus group
19	Non-Teaching Staff, Innovation Office	Female	Focus group
20	Non-Teaching Staff, Media Development	Male	Focus group
21	Non-Teaching Staff, Teaching Coordination	Female	Focus group
22	Non-Teaching Staff, Teaching Coordination	Female	Focus group
23	Non-Teaching Staff, QM Staff	Male	Focus group
24	Dean	Female	Interview
25	Head of Institute	Female	Interview
26	Head of Institute	Female	Interview
27	Head of Institute	Male	Interview
28	Program Director	Male	Interview
29	Program Director	Male	Interview
30	Program Director	Male	Interview
31	Vice-rector for Academic Programs and Student Affairs	female	Interview
32	Vice-Rector for Infrastructure and Digitalisation	female	Interview

All interviews and focus groups followed a semi-structured questionnaire, which was previously coordinated by all partners within the LTSHE project. However, questions were adapted to the course of conversation and to the individual experiences and fields of work in context of learning and teachings spaces. All interview composed two main topics:

1) Existing learning and teaching spaces at university level
2) Future/intended learning and teaching spaces at the university level

3.2.1 Semi-structured interviews

For the study, we conducted individual interviews with teachers, Head of Institutes, Deans, Program Directors and Vice-rectors. The focus was primarily on experiences with teaching and learning in existing virtual and physical L&T spaces, as well as wishes and imaginations for the further development of spaces. In order to achieve comparability also between the stakeholders and to enable cross-connections, five blocks were set in the interviews with teaching-staff:

- Satisfaction with the design and equipment of physical and virtual L&T spaces
- Impact of spaces on learning and teaching
- Needs for improvement in the design and equipment of the existing spaces
- Need for digital infrastructure and experience with online teaching
- Valuation and ideas of existing and planned innovative L&T spaces at WU

Specific questions were then asked depending on the stakeholder (see the questionnaire in the appendix). The interviews with senior management mainly covered questions on strategic orientation and planned innovations regarding L&T spaces.

Interviews with teaching staff

Besides students, teachers are the main users of learning and teaching spaces having their own unique view on and experiences with them. For our case study we interviewed four teachers

(two female and two male) belonging to three different departments (Department of Economics, Department of Management and Department of Strategy and Innovation).
The semi-structured interviews aimed to assess the role of physical, virtual and hybrid learning and teaching spaces, the use of learning and teaching spaces at WU and the (future) need for them.

Interviews with Dean, Heads of Institutes and Program Directors

For our case study we selected two Head of Institutes and one Director of a Competence Center and conducted semi-structured interviews with them. Additionally, we interviewed three Program Directors. The Program Directors, among other things, coordinate teaching and learning methods with regard to the programme objectives and thus, represent a valuable stakeholder group concerning needs and experiences for and with learning and teaching spaces.
To cover the views of WU Executive Academy, which offers Master programs and postgraduate courses for academics and non-academics with work experience, we conducted an interview with its Dean.
All seven semi-structured interviews focused on the institutions' policy and strategy concerning the design of physical, virtual and hybrid learning and teaching spaces, the usefulness and relevance of existing ones and (future) needs.

Interviews with Senior Management

The final interviews in our data collection process were held with the Vice-Rector for Academic Programs and Student Affairs and the Vice-Rector for Infrastructure and Digitalisation. Both semi-structured interviews focused on the strategic direction of WU regarding learning and teaching spaces and the processes leading to new spaces.

3.2.2 Guided focus group discussions

In addition to the semi-structured interviews, we decided to conduct two focus groups, one with students and one with the non-teaching staff. It was important for us to find participants who have expertise and interest in the topic and who are able to make a meaningful contribution to the discussions. Each participant should have something to say about L&T spaces.
Therefore, we designed the moderation in such a way that the participants feel comfortable talking to each other. Furthermore, by asking only a few open questions, we left a lot of space for interaction between the participants and hence encouraged spontaneous contributions to the discussion. Participants could freely engage in the discussion, without specified order or limitation (semi-structured).
Group dynamic processes should lead to a more intensive engagement with the topic. The participants have to explain their own opinions to the other participants and at the same time, the encounter of different perceptions and views leads to new stimuli. Important central aspects should therefore become clearer and more evident than in individual interviews (Krueger, 1994).
The focus was also primarily on experiences with teaching and learning in existing virtual and physical L&T spaces, as well as wishes and imaginations for the further development of spaces.
In order to achieve comparability also between the stakeholders and to enable cross-connections, five blocks were set in the interviews with teaching-staff, non-teaching staff and students:

- Satisfaction with the design and equipment of physical and virtual L&T spaces
- Impact of spaces on learning and teaching
- Needs for improvement in the design and equipment of the existing spaces
- Need for digital infrastructure and experience with online teaching
- Valuation and ideas of existing and planned innovative L&T spaces at WU

These five blocks were covered by a few open questions to left time and space for interaction.

Focus group with students

Students as the main users of learning and teaching spaces represent an important interest group whose perspectives are essential. To explore their needs and experiences, we held a focus group with six students. To get access to a diverse group of students, we contacted the Austrian Student Union (ÖH) asking for students willing to participate and fulfilling a set of criteria to make sure that diverse views and perspectives are represented. In the end, we selected students from various study programmes and at various stages of their studies. The final group consisted of four male students and two female students of which four were bachelor and two were master students, together covering four different study programmes.
The purpose of the discussion was to collect students' perceptions on WU's physical, virtual and hybrid learning and teaching spaces, wishes and needs regarding these as well as existing innovative spaces at WU.

Focus groups with non-teaching staff

Non-teaching staff plays a central role regarding learning and teaching spaces, especially with regard to the needs assessment for new spaces but also in the planning, the organization and maintenance in daily university life. At WU, several service/administrative units are involved in these processes. To include their varying perspectives we invited representatives of the Campus Management, Digital Teaching Services, Eventmanagement, IT-Services, Innovation Office, Media Development, Teaching Coordination, QM staff as well as an architect employed for assisting in developing of a new university building.
We held two focus groups with thirteen participants in total. The focus of the discussion were the (future) needs regarding physical, virtual and hybrid learning and teaching spaces, functional and non-functional rooms and the process of developing new spaces.

3.2.3 Content analysis of strategic documents

In order to gain an insight into the strategy and policy regarding learning and teaching spaces, digital structures, didactic approaches and curriculum design, we completed a content analysis of WU's Strategic Plan, Performance Agreements and Digitalisation Strategy Plan. These three documents were mentioned as central documents by key stakeholders involved in strategic planning processes at WU.

- Strategic Plan (2021): WU's main strategy document. The Strategic Plan provides the basis for the Performance Agreements for the periods 2022-2024 and 2025-2027.

- Performance Agreements (2021): administrative contract with the government stating which tasks and services WU has to perform on behalf of the government and which resources the government has to provide to WU in the period 2022-2024.

- Digitalisation Strategy Plan (2020): outlines the goals for digitalisation in research, teaching and studies as well as service units.

These papers determine the future direction of the university, the lines of innovation and the framework conditions for further developments. We approached our analysis with the following two main questions: What relevance is given to teaching and learning spaces in the documents? Which strategic goals are mentioned in the documents in relation to teaching and learning spaces?

Although some sections in these documents refer to learning and teaching spaces and their design and implementation, the interviews provided much more detailed insights in the policies and practices at WU. Especially with regard to the framework conditions of the strategic goals in relation to L&T spaces, we gained more insights from the interviews.

3.3 Data analysis

The analysis of all interviews and focus groups was guided along the methodological strategies of grounded theory. Grounded theory offers an inductive and comparative methodology. It can help to identify patterns in complex systems, analysis (social processes) and is useful in less researched contexts (Potter, 1998; Urquhart, 2013), thus making it a well suited methodology for our case study. It provides the researcher with systematic guidelines for gathering, synthesizing, analysing and conceptualizing qualitative data in order to reveal theoretical principles (Charmaz, 2001). These guidelines were followed ensuring that each piece of information is reviewed, compared and contrasted. Resulting from the iterative process, commonalities and dissimilarities among the developed categories became clear. While the open and axial coding process was done using the program Atlas.ti, we switched to MS Word for the selective coding. Accompanying the coding process, ideas, thoughts and patterns were recorded in the form of memos.

The very extensive data material (transcripts of interviews and focus groups, strategic documents) was coded in a bottom up approach, allowing codes to emerge from the data. The primary codes were then clustered, looking for similarities between codes as well as for structural variations that would justify new codes. The result was then discussed between the authors and finally 25 core categories could be identified. In order to ensure comparability with other reports from the LTSHE project, the categories were then grouped to six areas based on the guiding framework developed in the project. All categories are discussed in more detail in the results section (section 4 and 5).

Table 6 | Overview of Areas and Core Categories

Area	Core Category
Policy and strategy for the design and implementation of L&T spaces	Increase use of blended learning and online teaching
	Further development of e-learning infrastructure
	Competitiveness as a strategic goal of WU
	Innovative didactic architecture on Campus WU
	Expansion planned of Campus WU

(Further) development of physical L&T spaces	Involvement and participation processes
	Innovative L&T Space at WU
Supporting new L&T approaches	Impact of physical L&T spaces on learning and teaching
	Campus' contribution to student learning
Perceptions on Campus WU	Factors for satisfaction with Campus WU
	Campus as a place of interaction
	Promoting identification with the university
	Conflicts in the use of space
Characteristics of existent physical L&T spaces	L&T spaces integrated into Department buildings
	Various sizes of teaching spaces and lecture halls
	Self-study areas and project rooms
	Libraries as Learning Centers
	Pleasant room atmosphere
	Ideal room shape and simple adaptation options
	Different room settings and movable furniture
	High standard of technical equipment
	Central room management
Evaluation and development of online and hybrid L&T spaces	Decisive factors for the use of online, hybrid and classroom teaching
	Advantages and disadvantages of online and hybrid teaching
	Requirements for online teaching and online learning environments

Source | own elaboration

3.4 Challenges

In the process of collecting and analysing data, two challenges arose on different levels.

The first challenge regards the composition of the student focus group. We asked the Austrian Student Union to establish the contact with students interested in taking part in a focus group. Due to the small number of respondents and time issues (the focus groups needed to be held at the end of the semester which usually represents a very busy time for students), only one of two planned focus groups could be conducted. Thus, although we payed attention to put together a heterogeneous group with students at different levels and enrolled in different programs, the six participating students finally came from only four out of WU's eleven programs. Nevertheless, the student focus group still allowed us to get valuable insights into the experiences and needs of individual representatives of stakeholder groups at WU and to draw conclusions from these.

The second challenge was caused by the corona pandemic that was still ongoing during the phase of the data collection which started in May 2021 and ended in November 2021. Hence, all focus groups and interviews, apart from one, had to be held online via the video conference tool MS Teams. The online format made it difficult to interact with the case study participants. This was particularly noticeable in the discussion in the focus groups.

4. Institutional policy and practice for the design and implementation of L&T space at WU Vienna

In this section we provide information from key institutional documents from WU as well as results of the interviews with the senior management representatives. The section focuses on WU's strategic orientations regarding teaching and learning spaces. Therefore, the section is organised into three subsections, one dealing with policy and strategy for the development of learning and teaching spaces, another dealing with the development of new L&T spaces, and a third dealing specifically with innovative spaces. The results show the importance of L&T space for WU's strategic goals.

4.1 Policy and strategy for the design and implementation of L&T spaces

In this subsection we will provide findings from the analysis of the strategic documents and the interviews with the senior management representatives to show the importance of L&T spaces in WU’s policy and the priorities for WU's strategic direction. The interviews and the strategic documents identify certain aspects that are relevant for the design and implementation of the L&T spaces at WU.

4.1.1 Increase use of blended learning and online teaching

All documents analysed focus much more on further development of digital spaces and teaching and learning technologies than physical spaces. The strategic plan states that WU wants to expand its blended learning formats and is providing the appropriate technologies for this purpose:

> In the future, WU plans to increase its use of blended learning activities and other digital learning formats to accommodate the growing heterogeneity of learning needs and teaching designs, and to make learning more effective by combining online independent study phases and classroom units. … This also gives working students more opportunities to prepare or review for their classes and helps them plan their studies more flexibly. (Strategic Plan, 2021, p. 28)

In addition to blended learning, in the interviews it was also discussed how the **relationship between classroom and virtual teaching should be structured in the future**. Here, the opinions among the teachers and department heads are also very different. The strategy documents do not yet contain any regulations on this. Due to the different opinions in the faculties, one Vice-Rector assumes that “*20% online elements are realistic, we will probably not be able to integrate much more in the next 5-10 years.*” (Vice-Rector)

4.1.2. Further development of e-learning infrastructure

Investing in the expansion of the e-learning infrastructure was also agreed upon in the Performance Agreement with the government.

> The experience gained in the course of the COVID-19 epidemic as well as international developments in the field of teaching make it necessary to further develop WU's e-learning infrastructure in the direction of a comprehensive online learning environment, which in particular enables collaborative learning, efficient organisation of learning materials and effective examination. This cost-intensive development of a technically

> modern and easily expandable online learning environment, which also optimally combines classroom teaching and online teaching in the sense of the seamless learning idea, is to be advanced in the new term. (Performance Agreements, 2021, p. 38)

The importance of **seamless learning** is also pointed out in the digitalisation strategy.

> As part of a seamless learning approach, digital and real-world learning environments will be closely linked to enhance proper learning processes for students. A blended learning format created especially for WU will make teaching and learning more flexible in terms of time, and allow new teaching paths to be explored. … Formats based on purely virtual collaboration between students and faculty members are an opportunity for students to participate in shared learning across universities or continents and prepare. (Digitalisation Strategy, 2020, p.8f.)

Furthermore, WU's digitalisation strategy aims not only to make investments in university infrastructure, but also to create additional educational opportunities for faculty, teaching staff and students in order to allow them to acquire the skills to digitalise their courses. In the interview with the senior management representatives, it also emerged that the expansion of the infrastructure does not only concern hardware, but also often expensive software and licences, as well as investments in data protection.

4.1.3. Innovative didactic architecture on Campus WU

In terms of physical teaching and learning spaces, the emphasis is on equipping them with the **state-of-the-art technology**. Nothing is written about the **pedagogical design** of these, which is perhaps due to the already high standard, as becomes obvious from this point:

> It is important to maintain the excellent infrastructure currently available to students, develop it further, and make ideal use of these resources (e.g., modern teaching equipment, independent study areas, project rooms, PC labs, language resource center). (Strategic Plan, 2021, p. 28)

Even if the pedagogical design of teaching and learning spaces only plays a **secondary role**, it is made clear in the documents that there is a connection between learning experience and learning spaces.

4.1.4. Competitiveness as a strategic goal of WU

Another goal that came up in the interviews with the senior management representatives is the ambition to be internationally competitive. This target is also mentioned in the mission statement:

> WU is a leading academic institution and one of Europe's most attractive universities in business and economics. (WU Vienna, 2020a)

WU's claim is to be one of the best universities internationally. This applies to the campus, the infrastructure of teaching and learning spaces as well as the quality of teaching. Accordingly, the quality of teaching must continue to rise and teachers must adapt to new forms of learning.

One Vice-Rector expresses this as follows:

> So the first goal that you always have as a university is, of course, to remain competitive, which means that we also educate our students for the labour market, but also in competition with other universities in Austria, and of course also in other countries. (…) So that means that a university is in competition in terms of facilities, but also in terms of content, … (Vice-Rector)

Moreover the senior management representatives assumes that the ways in which knowledge is imparted will change significantly. In order to cope with these ambiguous transformations, WU needs openness in teaching and among the faculty. **Innovative enhancements** in teaching are essential to attract young people and to **remain competitive**:

> That means what drives us, of course, is that the university is so attractive that we can be competitive at all, i.e,. not just competitive with those who are on the market, but to be interesting for those who will join university in the future, but who are used to learning in a completely different way. (Vice-Rector)

In order to achieve the intended strategic aims, the rectorate operates with so-called "flagship projects". These serve as best-practice examples that can be highlighted and motivate other teachers to push ahead with further developments. Supporting innovation and driving change is a key objective. For this purpose, different motivation systems are considered, which are non-monetary or through teaching reductions.

Summary

Both in the interviews with the senior management representatives and in the strategy documents a strong competitive spirit emerges which positions WU as constantly in competition with other universities. This spirit becomes clear from **competitiveness as a key strategic value**, but also when it comes to the continuous developments and need for innovation in teaching. These key values require openness and adaptability among all staff members. With regard to physical spaces, it is noticeable that they do not appear in the key strategic documents and **further pedagogical development of existing spaces is hardly mentioned**. This might be due to the fact that there is no demand for further development in this field due to the assumed existing high standards. Another reason might be that facilities presumably do not tend to innovate or change quickly and are therefore not considered as relevant in the strategic documents, which cover short periods.

When it comes to digital teaching and learning spaces, the documents show WU’s tendency towards a strategic positioning through the **expansion of digital teaching technologies**. Both in the internal documents and in the agreements with the government, the expansion of the digital learning environment has been clearly flagged out. Contrary to the physical spaces, **online learning spaces are perceived as highly innovative** and in a constant state of flux.

4.2 Strategic Directions for the further Development of Campus WU

In this subsection, we look at the development of new learning spaces at Campus WU and the participatory process that goes along with it. From the interviews with senior management representatives and non-teaching staff, a prospective new building project at Campus WU were mentioned. We look at the factors that led to the new building project, as well as the participatory process by developing new L&T space.

4.2.1 Expansion planned of Campus WU

WU is currently planning to expand the campus by constructing another building. The reason for this is the demand due to **growing cohort sizes** in recent years and also the **vision to offer** students and lecturers spaces with the **most modern possibilities**. This project is according to the Vice-Rectors currently in the planning process, i.e. existing spaces and room sizes are being critically evaluated and best practices of other universities are being analysed. Both Vice-Rectors are in charge of this new building project. Currently, the project is in the phase of verifying the requirements. In parallel, discussions are being held with stakeholders. In short, visions for the new building therefore exist, but the question of feasibility and budget has not yet been clarified. Also private sponsors for the financing of an innovative new building are being requested.

> Well, the new building is not purely innovation-driven, I would say, but rather demand-driven. And the greatest need is, of course, for teaching. On the one hand, this has to do with the fact that we have given up some learning zones in the past, i.e. space for students, and of course we have also said that we want this space back. But it also has to do with the fact that the university has continued to grow, not only because of more staff, but also because there are more students or we want to enroll more students, so that our classrooms are not suitable. (Vice-Rector)

The intention of WU to create a new teaching and learning center is also mentioned in the Performance Agreement, but not described in more detail (Performance Agreement, 2021, p. 17)

4.2.2 Highly technology-oriented further development of L&T spaces

Although the campus is very modern, constant further development is planned. Spaces should be as flexible as possible in terms of use and equipment when developing the current campus and in the case of expansions. As a public facility, **open spaces** and learning areas should continue to be available to the public and be important areas for citizens to meet. In the further development of the teaching spaces, WU takes innovative teaching and learning spaces from the UK as a model, which above all offer a **high level of flexibility and adaptability**. In the current planning, future challenges and trends are already being considered according to the senior management:

> What will research look like in 10 years, how will we do research at WU, what do we require, what kind of facilities do we need? And what will teaching and learning look like? [...] our campus is now 8 years old and it is still beautiful, it is still great, and it is still really very generously built, but nevertheless we have to think about [...] when a student enters a room today, do they have state of the art technology to really study successfully? (Vice-Rector)

Certain minimum requirements for a new building on campus are mentioned in the interviews. According to the senior management representatives modern teaching rooms with **state of the art technology** are to be created. These also take into account new technologies such as virtual reality and augmented reality, as well as media equipment for blended learning. The new planed building should have plenty of space for social areas and offer room for "innovative ideas". Flexibility is the guiding principle. Flexible spaces or "disruption rooms" should allow various scenarios of use. It is emphasised that spaces that are built now are built for the next decades. This means that future developments, such as holographic teaching, must already be considered.

> Or even a space for hologram teaching. Yes, of course that costs a lot of money and is a huge investment, but where we could perhaps exchange ideas with other universities that already have it or are planning it. [...] And that has to be planned now, not that we then install something when the building is finished. The building then already has limitations that can't be overcome." (Vice-Rector)

4.2.3 Involvement and participation processes

In the interviews with senior management representatives, there is agreement that all relevant stakeholders should be involved in the design process of the new building. This has already been done in part in a participatory project of the Innovation Lab in 2020. In the past development phase of the Campus, the participation process was limited. The priority was to keep to the time and cost schedule, so there was no major participation process. The interviews show that only a few teachers and students were involved in the design of the teaching and learning spaces.

> So I don't think that teachers were involved back then. So my reaction when I saw the campus was wow, it all looks fantastic, a lot of things are good, absolutely, and above all they have been improved, [...] but there are also a few things, little things actually, that should have been taken into account from the beginning. (Head of Institute)

Some teachers noted certain misplanning that would not have happened if more teachers had been involved in the process of design. Despite a very high level of satisfaction among interviewees with the campus design, there is a **desire to be more involved in the processes for future enhancements** (both physical and digital teaching and learning spaces) and that all different stakeholders, in addition to teachers and students, should be taken into account. One teacher is complaining about this process:

> It always seems to me that the decision for this and that or that we redesign this space or use this equipment, often arrives much too late to the people who actually teach in it. I know direct communication is quite difficult, [...] so I would wish that people who really teach a lot are always proactively involved, already in the development phase. (Teacher)

Summary

The expansion of the campus is driven both by the need for physical L&T spaces and by a spirit of innovation. The **main goal** is to enable **seamless learning**. Consideration is already being given to how learning methods and learning styles change and are evolving. New physical spaces need to accommodate this developments. Due to the fact that funding has not yet been guaranteed, and the aim is only marginally stated in the strategic papers, there are no concrete plans for the design of the new L&T spaces yet. From the interviews, it becomes clear that **high technical standards** that WU has for teaching and learning spaces should continue to be fulfilled. WU also wants to be seen as innovative compared to other universities when it comes to new building projects.

The promotion of linking virtual and face-to-face teaching was also considered important by the teachers. This contribution by a teacher shows that there is an **innovative spirit and mind-set** at WU regarding L&T spaces:

> I think it could be a real and a virtual building. You could make the connection to the holodeck, that could be an environment where that is possible. Where you're in virtual

> space and some things are in present, some things are in the holodeck, […]. I can actually see it physically in front of me, I can imagine it well. (Teacher)

The focus of the interviews with the senior management representatives was primarily on technical innovations in the new building. It seems, the innovation spirit is likely to be more on technical visions than on **pedagogical designs** and didactic architecture. Also **accessibility and sustainable solutions** were only **hardly addressed** in the interviews. Perhaps this is because WU is already quite well positioned regarding accessibility (e.g. wheelchair spaces in all lecture halls, inductive audio systems and orientation and guidance systems for visually impaired people) and sustainability (e.g. use of groundwater for cold and heat generation, heat recovery in the data center). In terms of the participation process, it becomes apparent that the question of how we can create a hybrid and resource-saving campus based on a didactic architecture should be widely discussed with various stakeholders, especially with teachers and students.

4.3 New Innovative L&T space at WU

In this subsection we present the recently developed FLEX Center of WU. This FLEX Center is being created as part of a multi-year project with the aim of promoting innovation in teaching and learning through immersive and new technologies. This project is also anchored in WU's strategic documents. The subchapter highlights the goals of the FLEX project, the strategic anchoring, the new physical FLEX Center, and the currant development of a new virtual campus.

4.3.1. Future Learning Experience

The *Future Learning Experience* project runs from 2020 - 2023 under the responsibility of the Programme Management for Teaching and Learning Support Department. The project is mainly implemented by the team of the subunit Digital Teaching Services (DTS) in close cooperation with WU’s IT-Services.

The aim is to open up opportunities for experimentation and for the development and implementation of **new approaches to teaching and learning** through the use of cutting-edge technologies. The medium-term goal is to promote seamless learning scenarios by **interweaving physical and virtual learning and teaching environments**. By doing so, WU wants to empower its students to successfully master the demands and requirements of the world of future work. The main pillars of the project are the FLEX Center consisting two FLEX Studios and a FLEX Lab, and the FLEX Community. Through the input of experts from various disciplines, the FLEX Community ensures that innovations in teaching and learning take into account as many perspectives as possible and are widely disseminated throughout the university. Experts from other European higher education institutions and initiatives bring a broader international perspective to the FLEX Project FLEX stands not only for innovation, but also for integration, since new ways of teaching and learning require not only an interplay of different technologies and didactic approaches, but also a cooperation of different experts from science and administration.

Picture 6 | Learning with VR on Campus WU

Source | Picture library WU Vienna ©Raimo Rudi Rumpler

4.3.2. FLEX as part of WU's policy

The FLEX project is described in all central strategic documents and is thus an essential element in the development of L&T spaces and the promotion of new teaching approaches. E.g. in the Strategic Plan it becomes particularly apparent how **teaching and learning is linked to innovative didactic architectures**:

> The Flex Space project aims to apply cutting-edge methods of technology-aided learning to student-centered didactic approaches and forms of active learning. In this way, it is possible to create didactic architectures that combine virtual and physical learning environments. ... These new didactic formats have the potential to facilitate novel forms of teaching, learning, and applying the content learned. (Strategic Plan, 2021, p. 30)

4.3.3. FLEX Center

The FLEX Center is set up on the Campus WU and can be used from May 2022. They provide an easy access to the production of multimedia content and are characterised by a high level of automation and at the same time ensure professional product quality.

The FLEX Studios and the Lab are currently in the final stages of completion:

- **FLEX Video Studio**: Teachers can produce a variety of high-quality video formats in an One Button Studio. Lightboard, Green Screen and a variety of different setting to choose between are available to them.
- **FLEX Audio Studio**: The studio enables the production of podcasts either as simple audio reports or as more complex (hybrid) formats.
- **FLEX Lab**: The Lab is used to develop and test immersive teaching and learning spaces and technologies. 360°Videso with/without interactions, virtual or augmented reality technologies or a blend of these technologies can be developed and explored.

In the FLEX Center experiments are being undertaken to find out how cutting-edge technologies can promote learning. An experimental area for the teaching space of the future has been created, where new formats and digital technologies such as virtual or augmented reality can be tested. Teachers are supported by the Digital Teaching Services team in the application of the new technologies and in developing innovative teaching formats. In addition, **a special training programme** is being developed. Policies are currently being worked out to manage the booking and authorisation of the Studios.

Picture 7 | FLEX Center – Green Screen

Source | Picture library WU Vienna. ©Raimo Rudi Rumpler

Picture 8 | FLEX Center - Lightboard

Source | Picture library WU Vienna. ©Raimo Rudi Rumpler

4.3.4. Creating new virtual L&T Spaces

One of the main goals of FLEX is to build **immersive teaching and learning spaces**. Starting in spring of 2021, the FLEX team has been developing a virtual campus. Currently, the first L&T spaces have already been created. With the aim of providing learners with easy and free access to a virtual environment, the platform Mozilla Hubs was chosen. This open-source **social VR platform** enables social interactions by sharing and presenting their knowledge in an virtual space. Teachers and students are brought together in a **shared online learning-environment** and can enter easily via their desktop, just by clicking a link in their browser (no download or VR headset is necessary). A big advantage compared to other conference tools is the possibility to create conversation situations that are very similar to a physical space (e.g. you are able to hear and interact with others by moving your avatar closer to them).

The new virtual L&T spaces offer a similar experience to all students around the world and enable seamless learning. For hybrid learning this environment could be a space to meet online to work on projects as a virtual extension of the classroom. Various didactic architectures are currently being designed to facilitate formal and informal learning on the virtual campus. The campus will include teaching spaces as well as student areas and project spaces that invite students to **interact, swap ideas and learn collaboratively** at any time.

Picture 9 | New innovative virtual L&T Spaces

Source | FLEX Team, WU Vienna

Additionally WU created **virtual PC Rooms**, which make 200 virtual PC-workstations available. These are equipped with the same specialised software that is offered in the PC rooms on campus. Students and lecturers can access the virtual PCs remotely, e.g. from home. 77 of them are assigned to the virtual lab and are available to WU students at any time for practice. Through this option, the use of often very expensive specialised software, for example, is open to all students even outside the physical campus.

Summary

The FLEX project has succeeded in **creating innovative didactic architecture** that has a clear objective, namely to promote new approaches to teaching and learning. The innovation is essentially driven by exploring and assessing the potential of new technologies, e.g. virtual environments, with respect to fully **new learning experiences**. Furthermore the linking of physical and virtual spaces to enable seamless learning is the main focus of this project.

The creation of virtual teaching and learning spaces with a social VR platform, complemented by virtual PC rooms, provides completely new opportunities for learning and teaching. **Seamless learning** becomes possible through meaningful linking of online and physical learning environments and well planned didactic virtual design. Special care is taken to ensure that access is easy and free of charge so as not to exclude anyone. These new spaces allow for simultaneous presence on the physical campus or a learning space of one's choice as well as in the online environment. The **dichotomy of physical and virtual spaces** is therefore increasingly **dissolved**.

FLEX project started as an initiative of the Program Management for Teaching and Learning Support and has now become a **central strategic goal**. In the FLEX project, pilots and test procedures are carried out with teachers and students.

5. Perceptions on the design and implementation of L&T space at WU Vienna

Section five presents the results based on the interviews and focus groups. We have explored the perceptions of key stakeholders of learning and teaching spaces at WU. This section is divided into three subsections. In subsection 5.1. we look at the impact L&T spaces have on the quality of teaching and learning. Subsection 5.2 focuses on the purpose of the WU campus and the value it has for teachers and students in relation to the increase in online teaching. In section 5.4 we discuss the advantages and disadvantages of online teaching and requirements for online and hybrid L&T spaces.

5.1 Role of physical L&T spaces in supporting/promoting new approaches

In this subsection we explore the role of physical teaching spaces on teaching and learning and discuss the importance of the spatial dimension for learning in teaching. In the first part we look at the classroom setting and in the second part we look more broadly on the whole campus.

5.1.1. Impact of physical L&T spaces on learning

The interviewees' perceptions of the importance of physical learning and teaching spaces in promoting new approaches to L&T vary considerably. Some teachers assume that spaces have a major impact on teaching and learning, while others perceive this factor as not very influential.

One of the views that came up in the interviews is that the physical environment in which learning takes place significantly influences the learning process. **Learning environments provide incentives for different forms of learning**: "amphitheatres" can stimulate discussions encourage people to leave their comfort zone or promote creativity.

> Students probably need a good teaching space first of all so that the teachers can be as effective as possible. […] That's when they learn most and most effectively, when the teaching spaces are good. (Program Director)

> There are certainly great lecturers who you can put in any classroom and still get something out of it and still enjoy listening to them. But on the whole, I do believe that the teaching space can contribute to making the teaching experience better." (Teacher)

Others argue that the quality of teaching is mostly independent of the teaching space. Factors, such as the **teaching personality**, the **content** and the **way it is taught**, as well as the **successful interaction** with the students, are more important than the quality of space.

> It is a question of comfort, a question of how much I enjoy it and how much the students enjoy it, but for me it is not the space in which I teach that matters. For me, it's the interaction with the students. (…) I don't think we should mix that up with the quality of the content of the education. So you have more fun when it's nice? That's clear. You always have more fun when it's pretty. But that is not the factor that is decisive. (Program Director)

5.1.2. Campus' contribution to student learning

The campus could help students to put themselves in a learning mood. For example, students who are joining the university from a professional environment benefit from learning impulses and the **learning atmosphere at university**. The campus as a physical place cannot be transferred to virtual space, a physical place for learning is still needed. Above all, future skills, particularly soft skills, are also acquired in this place of learning.

> And it's the same with architecture, when you have a building that looks nice, and you go there, you feel good, you have the feeling that I can achieve something. And you get spurred. (Program Director)

Students mentioned the availability of **spaces for collaborative learning** as a great advantage of the campus. They also emphasised that the campus has a special atmosphere that stimulates learning. One student describes this atmosphere like this:

> I'm a person who likes to study on campus because you simply have contact with the other students there. When it comes to learning, "a problem shared is a problem halved". Even if it's fun, it's also a motivational aspect. (Student)

At the same time, other students have also reflected that they prefer to study at home and do not come to campus just for learning. In addition to the atmosphere and the teaching and learning opportunities on campus, classroom teaching per se also plays an important role in learning and teaching. All stakeholders agreed that classroom teaching should not be completely replaced by online teaching. Several **advantages of face-to-face teaching** were mentioned, e.g. that personal contact is particularly important for the success of group work, classroom teaching is more efficient for students' learning progress and classroom teaching promotes life skills. One teacher summarized that face-to-face teaching with convincing teachers is what characterises a university.

Summary

In the evaluation of the interviews it turned out that the role of physical L&T spaces in supporting and **promoting new approaches** to L&T was only marginally addressed. The importance of the spatial dimension was **mainly mentioned** in terms of movable furniture and certain room settings that facilitate discussions and group work. However, it seems that not all teachers have an explicit knowledge about the importance of the spatial dimension for teaching and learning. It also may possible that the long phase of purely online teaching has shifted this dimension into the background.

Flipped classroom and **blended learning formats** are mentioned as new teaching and learning approaches. Here, too, the spatial dimension of the physical space, which is supposed to enable deeper learning in the classroom, was not declared. Perhaps the spatial dimension was not specifically reflected because there is a high level of satisfaction with the physical L&T spaces at WU. Another indication that they do not attach so much importance to this dimension is that the teachers predominantly named subject knowledge and rhetorical skills as decisive criteria for learning success. There may be a need for teacher trainings on the understanding and application of the space as a so-called “Third Teacher”.

With regard to learning, it emerged in the focus groups with the students that **different learning styles** exist and therefore different learning spaces are preferred both on and off campus. Enabling seamless learning and linking informal and formal learning spaces must be taken into account when designing teaching and learning spaces.

5.2 Campus WU: Perceptions on the role of the physical campus

After looking at the impact of L&T spaces on learning and teaching in the previous subsection, we would like to look at other functions of the campus in the following section. This question became particularly relevant with the disruption of campus teaching during the COVID 19 pandemic. The section is divided into four parts. In the first subsection, we explore factors that promote satisfaction with the campus. In the second subsection, we analyse the importance of the campus for interaction. Then, in the fourth subsection, we look at the role the campus plays in identification with the university. Finally, we would like to briefly discuss conflicts in the use of the campus.

5.2.1. Determining factors for satisfaction with Campus WU

Campus WU is described as "well-balanced", with an excellent architecture and futuristic design, in the interviews with the teachers and students. It is characterised as inviting and overall there is a **high level of satisfaction** with the campus from all stakeholders. In some cases, no points of criticism is mentioned at all. If criticism is articulated, it is usually also admitted that this is "*complaining on a high comfort level*".

Apart from the teaching and learning spaces, these aspects in particular were mentioned in the interviews:

- The interview participants are also very satisfied with the **infrastructure on campus**. Both teaching and non-teaching staff emphasise that the nice indoor and outdoor areas to meet colleagues, the (individual) and well-equipped offices as well the kindergarten on campus, are reasons why they enjoy coming to campus.
- WU is perceived as a campus university with **short distances**. Students praise it as a "city within the city" that facilitates the entire daily routine of students on campus. There is also a high level of satisfaction among all stakeholders with the and the **public transport connections.**
- The **outdoor and green spaces** surrounding the campus are highlighted in particular. They also offer a lot of space and opportunity for sports, relaxing and socialising. Furthermore, the campus itself has many open spaces with areas to relax and learn. However, it is problematic that many of these open spaces on campus do not have shade, which is why they can only be used to a limited extent in summer.

Picture 10 | Outdoor Furniture Campus WU

Source | Picture library WU Vienna

5.2.2 Campus as a place of interaction

The campus is seen from all sides as a place of exchange. It fulfils an important function because it provides the **space for interaction**. It also enables people to meet in person and get to know each other – a point made by various stakeholders, highlighted in particular with reference to the COVID-19-pandemic.

The students also emphasise that they want personal interaction with each other and with the teachers, as studying consists not only of learning new things but also of social interaction and **building relationships**. For some students, social interaction is more important than the learning experience on campus:

> I wouldn't go to the university just to study. But of course I also find it very nice for hanging out. [...] I think it's very nice at WU that you have these areas outside where you can sit down in small groups during breaks and chat, and also that you have the opportunity to sit together in the TC where you can also chat with your peers, [...].” (Student)

Picture 11 | Outdoor Furniture Campus WU

Source | Picture library WU Vienna

5.2.3 Promoting identification with the university

From the interviews with the teaching staff it emerges that the campus helps students to identify with their university. This is an important function which distinguishes face-to-face universities from distance learning universities. The campus and the university are described as a place of social interaction. This is important in order **to feel connected to a university at all**. Affiliation with WU is achieved through relationships and the experiences made on campus. In addition, teachers emphasise that **"affiliation" can increase student activity**, especially at the beginning of their studies, students need this "campus feeling".

> I do think that this feeling of studying at a university and belonging to it is strongly influenced by whether I spend time there and really get to know people there, [...] I can exchange ideas with them, so that will definitely be necessary in order to create a feeling of belonging and identification with a place of study, and [...] because it is also very important for students' bonding with the university." (Head of Institute)

In the interviews, the campus is described as a **"feel-good place".** This feeling of well-being is important for students to "bring" them to the campus. Students need to feel comfortable with the campus buildings, the services offered, the atmosphere and the way they are approached in order to establish a connection to "their" university.

WU's attractive campus is not only a reason for students and teachers to come to the university but also a reason why students choose to study at WU in the first place, emphasises one student.

5.2.4 Conflicts in the use of space

Additionally to the teaching and learning spaces, WU also has a number of event spaces which can be used for both, academic and **public events.** In this way, WU wants to give something back to the community. However, this leads to a tension between holding events and teaching courses due to the existing **lack of space**. The administration therefore wants a clear separation between teaching and events.

> One interviewee emphasises that there is, a "conflict (..) between teaching and public events, [there are] also event rooms, which are then also partly used as teaching and examination rooms. That's really not funny, because the goal of the rectorate is 'We have a great campus. This is funded by public money and therefore it belongs.' So it's like, 'This is our asset, we'll play it for all it's worth'. And when a big head schedules a conference, you can partly avert it, partly not, but then a few thousand people come to the campus in the middle of the lecture period, (...). (Non-Teaching Staff)

Summary

During the pandemic, the question has arisen as to what role the campus will have as a physical space in the future. It is no longer taken for granted that teaching and learning must necessarily take place on campus. However, in the interviews with teachers and non-teaching staff, it became clear that the campus is already a **multi-functional campus** that offers more than formal teaching and learning spaces. It is described as a lively place that offers many possibilities for use, which also invite people to stay after work and lectures. It is an **open space** that is available to the neighbourhood and the citizens, which is not always easy to manage. WU has succeeded in creating an area that fulfils important functions for successful learning and teaching by **providing informal learning spaces** on campus and **linking** these **with formal learning spaces**, as well as a multi-functional and open campus. It will have to be discussed how this well-functioning physical space can be meaningfully combined with a "virtual campus" in the future.

5.3 Existing physical spaces: relevance and usefulness for L&T spaces

This section provides insights into different stakeholders' perceptions of the development of characteristics of the available learning and teaching spaces. When planning new teaching and learning spaces in 2013, a lot of attention was given to make them as flexible as possible. In the interviews with the different stakeholders, it becomes obvious which factors create a good teaching and learning environment.

5.3.1 L&T Spaces integrated into Department buildings

WU's Department-based organisational structure was also a contributing factor. In the past, the various Institutes that make up the Departments were scattered across different locations. Now they have been brought together in five Department buildings. This concept is well appreciated by teachers. They prefer teaching spaces in their own buildings because of time savings due to the elimination of distances, the possibility to adapt the rooms to the specific needs of the department and their right to pre-book the rooms. In addition, according to the teachers, the spatial proximity promotes the exchange with the students as interactions are not only reduced to lecture times.

5.3.2 Various sizes of teaching spaces and lecture halls

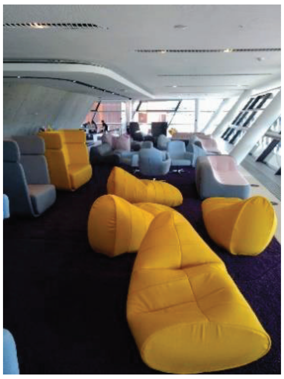
Both, academic staff and general staff, describe the room sizes as less than ideal. There is a consensus desire for teaching spaces with a seating capacity of 300 students. As cohort sizes and study programmes have increased, there is **need for more spaces at an intermediate size**. Due to these developments, some learning zones have already been converted into teaching rooms.

Due to the newly developed digital formats in teaching, opinions about future demands for teaching spaces are very different. On the one hand, it is assumed that large teaching rooms might be less important in the future. Rather, many small seminar rooms to make experiential learning more tangible would be needed. On the other hand, it is emphasised that first-semester students in particular should be taught (in large groups) on campus. In addition, the general staff fears that due to the increase in blended learning and online teaching, the official side will not see the need for existing rooms or the expansion of additional rooms.

5.3.3 Self-study areas and project rooms

In the interviews, it was emphasised that students are very happy to use project rooms for group work and as self-study areas. Furthermore, students would prefer if they would be better equipped with **multimedia devices** (e.g., cameras, projectors, smartboards) for presentation recordings as well as large screens. The fact that there is a demand for project rooms, despite the large number of rooms available, is evident in the interviews with students. The **increasing need for small study areas**, like niches, is also mentioned as they would simplify changes between classroom and online teaching on campus.

Picture 12 | Learning Areas at WU



Source | Picture library WU Vienna

5.3.4 Libraries as Learning Centers

WU' library is organised into three branch libraries on Campus WU. The central library is located in the Library & Learning Center, and the specialist libraries are based in different department buildings.

In addition to an extensive stock of books, the library also offers various **learning areas, project rooms and carrels** (i.e. small rooms for individual study that can be booked by WU students who are working on their master's or doctoral/PhD theses). In the focus groups with the students, different preferences become visible. Because of the **regulations** that are necessary in the library (e.g., transparent carrier bag, food prohibited), it is not a popular place of learning for some students. Others appreciate the **learning atmosphere** there, the view at the park and the air-conditioned temperatures in the hot summer months. Other students prefer the two specialised libraries as it is quieter usually there:

> My favourite place is definitely the library. I discovered the Law-Library, the library in D3, because (...) there's not so much going on, and it's still quiet. It's just such a vibe." (Student)

> For me it's definitely the LC, the 5th floor with the view over the Prater, I miss studying there so much because it's also just a cool place right now in summer. I miss it very much. (Student)

Picture 13 | Impressions of the Libraries

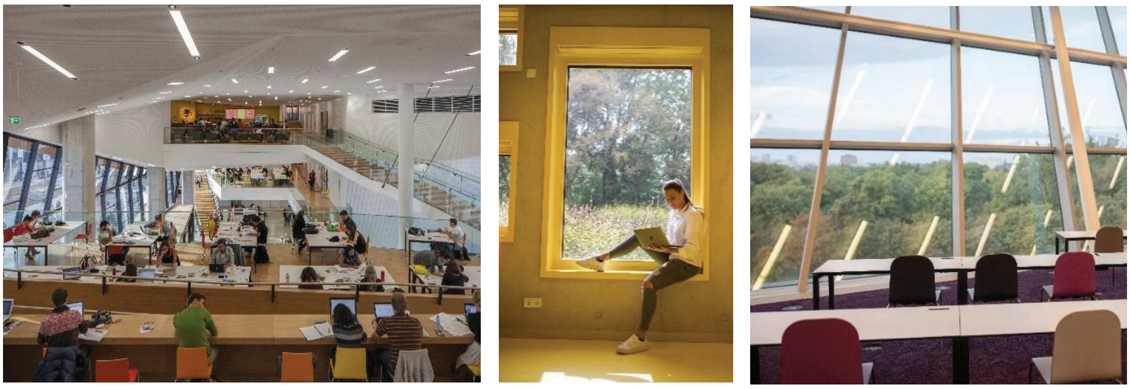
Source | Picture library WU Vienna

5.3.5 Pleasant room atmosphere

There is a great uniformity about how important **windows, fresh air and daylight** are in teaching and learning spaces. There is a desire for daylight not only in teaching rooms, but also in staff meeting rooms. The Campus Management also emphasises that interior meeting rooms and learning spaces without windows would not be built again in this way. In particular, a PC lab without windows is mentioned as a negative example. One teacher states: "*I don't like to teach in that room for a long time because it simply gets on my psyche. For me and for the students. That's when you see what has been messed up architecturally.*" (Teacher)

Rooms without windows are fortunately only the exception and many rooms are flooded with light. Both, students and teachers, rated the **view of the Prater, Vienna's largest park**, from the teaching and learning spaces as positive for the learning atmosphere.

Picture 14 | Open and light Learning Spaces



Source | Picture library WU Vienna

5.3.6 Ideal room shape and simple adaptation options

The format of the teaching and learning spaces plays a role in the interaction between students and teachers, i.e. visibility of the students is important here. Elongated teaching rooms are criticised because students are too far away from the teacher, while rooms that are too wide mean that the teacher cannot interact with all students simultaneously. As an innovative solution, the idea of being able to adapt the format of the rooms themselves is also expressed. **Flexible rooms**, e.g. with **movable walls** made of cardboard, would work well for group work. Through online teaching and the simplicity of virtual **break-out rooms**, their added value becomes apparent and it is therefore recognised that physical space lacks these possibilities. Small niches for group exchange as well as flexible spaces where spontaneous group work can be carried out in separate zones are desired in large teaching classrooms. Learning spaces should be flexibly adaptable to different forms of learning.

At WU, classrooms have been built that can be reduced from 60 to 30 seats by using a mobile wall. However, technical support and several days preparation time are required. This handling is therefore not very flexible and has hence not proven to be practicable.

5.3.7 Different room settings and movable furniture

Teaching and learning spaces at WU have different seating arrangements. These range from fixed (U-)rows with benches to (U-)rows with movable chairs to tables and chairs which can be freely arranged. In addition, the construction varies: some classrooms are highly stepped, others have only a few steps or no steps at all. Teachers have different preferences: while some prefer the U-shape as it encourages more exchange and discussion, others criticise it because it is not very useful for group work and students are sitting "behind your back" when walking around, which can feel uncomfortable. However, both, students and teachers, articulate a common demand for space between the rows to walk through. Architecturally non-hierarchical teaching spaces are also desired in some cases.

There are also divergences among the students: while some prefer the U-shape as it promotes exchange at eye level, others reject it because of the inflexible learning settings.

Picture 15 | Different room settings

Source | Picture library WU Vienna

Especially for group work, **movable chairs and tables** are preferred. Those can stimulate creative processes and **promote interaction in the groups**. Furthermore, movable furniture enables the use of different didactic methods. In some teaching spaces, however, the array of furniture is very rigid, for example in rooms which are too narrow and have a fixed U-shape. This limits the possibilities of different didactical designs. It shows that it is important to **offer different room settings and offer movable furniture** in order to meet individual preferences. Additionally, users of flexible rooms should be able to move the furniture by themselves as changing the setting should not be unnecessarily complicated for teachers. Support would also otherwise become very work-intensive.

5.3.8 High standard of technical equipment in the lecture halls

The aim of the new construction of the campus in 2013 was to bring the teaching rooms up to the latest **state of the art** in terms of **multimedia technology**. The comprehensive implementation was a major cost driver but it has proven to be successful. The teachers are mostly satisfied with the technical equipment. All lecture rooms have two projection screens for the projector, height-adjustable double magnetic whiteboards, loudspeakers and a mobile flipchart. Each seminar room is also equipped with a SMART Board.

Nevertheless, the rapid development of online teaching in recent years has also made it obvious that the technology in the lecture halls needs to be upgraded. These shortcomings are also mentioned in the interviews:

- **The availability of sockets** are a frequently mentioned topic among different stakeholders. Due to the increase in the use of technical devices, the need for sockets in lecture halls and learning zones has also risen. In particular, desks need to be equipped with sockets. WU has already upgraded some rooms but there is still a greater demand.
- A frequent point of criticism is that teaching spaces are not generally equipped with **microphones**. Non-standard equipment for the course can currently be pre-ordered online or picked up directly from the IT Service Desk in the Teaching Centre (TC) before the course. Equipment which does not need to be reserved includes microphones, wireless presenters, whiteboard and SMART Board pens, webcams, HDMI cables and adapters.
- Increasing use of technical devices (also in classroom teaching) requires a more stable **Wi-Fi-signal**. At the same time, it should be possible to deactivate Wi-Fi in certain contexts, such as during examinations.
- There is a desire for better **interfaces** in teaching and learning spaces, such as the possibility to connect student devices to teaching room devices.
- The COVID-19 situation also has increased the **technical requirements for hybrid teaching**, especially for the streaming technology in lecture halls. Until autumn 2021, it was only possible to stream courses in selected lecture halls. Lecture recording and web streaming are now possible in 14 lecture rooms. Additional teaching rooms have been equipped with ceiling cameras and ceiling microphones. This is especially necessary to enable bidirectional synchronous hybrid teaching. Therefore, some participants can attend the course on campus while it is simultaneously streamed to others at their place of choice (e.g. their apartment). With the appropriate hardware and software, virtual participants and those in attendance can interact with each other. Both, the teachers and the IT support emphasise that very simple solutions are needed for recording and streaming.
- The more flexible the rooms are, the more difficult it is to have adequate technical equipment (e.g. power supply with all workstations). Flexible spaces also need good acoustics to suit the different settings. In general, however, it is important to the interview participants that there is **identical standard equipment in every teaching room,** allowing them to use the rooms intuitively. In addition, analogue components, such as moderation cards, should not be missing.

5.2.9 Central room management

At WU a central room management was introduced with the new campus in 2013. This means that the teaching rooms are no longer the “property” of the academic unites and can therefore be used more efficiently. **Standard sizes** were also established (lecture halls with 30, 60, 120, 180 seats). On one hand, the introduction of standard sizes led to a decrease in flexibility and variance, however, it also induced standardisation and equal use everywhere on campus. The lack of flexibility in terms of room bookings is criticised by the teachers because the shortage of teaching space prevents commitment from teachers to hold spontaneous classes for students.

Students can book their project rooms via the central booking system. Some students are demanding a "fair booking system" that does justice to the different needs during different study phases, i.e., giving Master’s students larger booking contingents. They also criticise that it is difficult to book group rooms for longer periods of time.

> One student affirms: “ .... Master's students should have their own contingent of rooms and certain pre-booking rights, because they simply have a lot more group work. And in general, if there are these rooms with special equipment with cameras or something, ... then you have to somehow see how you can work out a policy and implement it so that such rooms are not blocked by people who just want to study inside, but only by those working in groups.” (Student)

Teachers and students therefore want more **freedom and flexibility** when **booking rooms**. However, the administration cannot meet the individual wishes, as one interviewee says:

> Part of what is really worse is this rigidity that we have inside, 30, 60, 180, (...) we limit ourselves. But we also can't give the flexibility, (...) because we are not yet so far that we could implement it that way. (Non-Teaching Staff)

As already mentioned, equipment outside the standard equipment of rooms has to be organised separately via a ticket system. Teachers therefore want to simplify this process, allowing them to book equipment together with classrooms.

Summary

Through the different informal and formal teaching and learning spaces, the campus opens up a variety of possibilities for different learning styles. At the same time, a variety of classroom settings also create opportunities for different approaches to teaching. In the interviews, it turns out that the existing L&T spaces fulfils a function for the development of an appropriate and high-quality L&T process. Even though flexibility was considered in the planning of the campus, this is the main issue that concerns teaching staff and non-teaching staff. Standardised room sizes have created uniform processes, which on the one hand enable effective space management, but on the other hand reduce flexibility. It is necessary to consider how existing spaces can be used more flexibly (movable dividing wall, pop-up break-up rooms, etc.).

Another aspect is the linking of physical spaces with virtual spaces. This requires both an expansion of technical equipment in the teaching and learning spaces as well as solutions for creating possibilities for students to be on campus and in virtual spaces at the same time.

In summary, it shows that various aspects are considered to be innovative at WU regarding physical L&T spaces:

- The concept of the **campus university** including the existing infrastructure,
- the **architecture** of the campus and the **outdoor areas**,
- the **design** of the teaching and learning spaces,
- the amount of **space for students** to work individually and in groups,
- the **media technology** in the lecture halls (double projection of slides, smartscreen, smartboards, etc.),
- the **room booking management** and the standardised room sizes.

The following in particular are considered to be improvable:

- Simple solutions for **flexibly adapting rooms** to the teaching and learning setting,
- **supplementary teaching rooms** that are detached from the standard sizes, as well as more rooms for approx. 300 students,
- **solutions** (IT, technical infrastructure) for better **linking online and physical L&T spaces**,
- spatial solutions to enable students undisturbed **participation in online lectures on campus**.

5.4. The digital structures needed for blended learning and teaching

Due to the necessity during the COVID 19 pandemic, digital teaching at WU has developed enormously in the last two years. The experiences with online teaching are very different. Advantages and disadvantages of online and hybrid teaching and learning have been experienced. But overall the benefits of combining digital and on site lectures are now much more recognised and blended learning has been well received. According to teachers and students blended learning has great potential if the teaching material is meaningfully linked with supervised exchange formats on site. For most of the teachers interviewed, the future is a combination of online teaching and learning and teaching and learning on campus.

This section is divided into three parts. First, we look at the decisive factors for the choice of teaching format. In the second part, we look at the advantages and disadvantages of online and hybrid teaching and learning. In the third part we look at the necessary requirements for online L&T spaces.

5.4.1 Decisive factors for the use of online, hybrid and classroom teaching

In the interviews, different criteria are mentioned that are relevant when selecting a space for teaching. In principle, there is a broad consensus among teachers that the decision to teach virtually, in presence or hybrid depends on **learning content, learning setting and learning objectives** as well as the importance of personal exchange. The choice should not be dogmatic but **benefit-centred**.

There are different opinions about when online teaching is best used in the academic process. In general, it is emphasised that first-year students in particular should be taught in the classroom in the initial phase. Some students want as much flexibility as possible and therefore appreciate the possibility to have both, online and face-to-face classes.

> I really think that in the future it will end up in this hybrid mode. [...] It really depends on the course, for certain courses it works really well online, and for certain courses the personal aspect is still really important. That's why it's truly customised, it depends on the course, how it's organised, yes, but nevertheless I think that in the future it will be more hybrid-like, because you're more flexible, you can fulfil the needs of the students who want to learn at home, and at the same time, a compromise is made. A compromise that actually has advantages for most. (Student)

5.4.2 Advantages and disadvantages of online and hybrid teaching

Many advantages were mentioned in the interviews with teaching staff and students. Especially for students online formats enables location-independent learning. As one student expressed it:

> With online lectures, it doesn't matter whether you're on campus or whether you're using headphones, a laptop, a tablet or whatever. Everyone can now experience the lecture from anywhere. (Student)

Moreover, online teaching and learning reaches target groups that would otherwise remain untapped, thereby making it possible for more people to study. Through digitisation, teaching can be internationalised and virtual spaces can create exchange opportunities for international students. It also makes cooperation with other universities possible, e.g. when it comes to establishing joint courses or joint curricula. One head of institut expresses an idea:

> If WU now wants to internationalise teaching further and also make the experience abroad possible for more students, beyond the exchange semester, because many cannot afford it and this creates a social problem, [...] we at the department have already considered [...] whether online courses can be offered for this purpose, with colleagues from other universities. [...] and the idea now is that we could possibly do relatively standardised courses that they do in Norway and here, together, and bring the students together online, perhaps also physically. (Head of Insitute)

Besides the flexibility and international opportunities, some teachers report more interaction in large and anonymous classes as there is less inhibition to ask questions. It is also mentioned in the interviews that online question sessions are better attended, too.

Students report that the recordings enable them to learn more efficiently and that they appreciate the fact that they could acquire knowledge regardless of time and place. Some students even find it easier to work in groups during online teaching. Particularly frontal lectures are well feasible for students as an online format. Students appreciate the mix of asynchronous and synchronous online teaching ("flipped classroom").

The advantages for online/hybrid teaching and learning can be summarised as follows:

- Online formats enable to **teach and learn independent of time and space**. This also allows **easier access to education**, e.g. for working students.
- As there are no space restrictions, offers can also be opened to a **larger target group**, e.g. citizens and non-students.
- Especially **international students**, lecturers and external guests can be involved in online or hybrid formats if an on-site visit is not possible (e.g. due to pandemics, wars, low-income students).

- Online teaching can easier create **virtual, cross-university initiatives** that connect students and teachers even without physical mobility.
- Online teaching and learning formats are another offer for **different learning styles**. Students appreciate the recordings and the possibility to play them back several times.

In addition to these positive aspects, some disadvantages of online teaching and learning were also mentioned. While for some students group work online is easier, it is also highlighted by others that it does not work well online. Group work tends to be cooperative rather than collaborative. Additionally, online lectures tends to lead students to superficial learning (e.g. by playing teaching videos at an increased pace). It is also more difficult for teachers to keep track of students' learning progress and, as already mentioned, interaction with students and the building of relationships is difficult in online formats, especially when students do not turn on their camera, or in large digital courses.

Especially hybrid teaching is seen as challenging by the lecturers: the lack of technical solutions leads to unequal participation of online and on-site participants. In particular, the divided attention between the different groups is demanding, which is why it was emphasised that hybrid teaching is hardly manageable alone and requires team teaching. In addition, assistants are needed to supervise the chat if no audio exchange is possible with the students participating online. Teachers emphasise that professional hybrid teaching is extremely demanding and that courses which entirely take place on site or online are much easier to implement didactically.

The disadvantages for online/hybrid teaching and learning can be summarised as follows:

- **Social interaction** between teachers and students is more difficult in online spaces.
- **Collaborative learning** between students is challenging and mostly remains cooperative processes. Also, freeriders cannot be identified and addressed as quickly.
- **Deeper learning** is harder to achieve and learning processes cannot be tracked as well.
- In **hybrid teaching**, it is particularly difficult to teach both groups (online and on-site) in the same quality.

5.4.3. Requirements for online teaching and learning

Requirements for technical possibilities are increasing and the desire for rapid innovation in interactive online tools is partially expressed. Online learning environments should be visually attractive, seamlessly integrated with other tools and structured along the lines of familiar (social media) sites. Ideally, there should be only one platform that integrates all relevant aspects and also enables interaction. It is important for the teachers to use as few different communication tools as possible. WU is using the online learning environment LEARN, which was developed in-house and is constantly being adapted. In principle, this is assessed very positively:

> What we have certainly achieved at WU, and what I think works very well, is that we have a uniform platform through which a lot can be done. I don't want to say everything, but you can use it for a lot of things. (Program Director)

Nevertheless, the limits of the platform have been reached and WU is currently establishing a new online learning environment. It is considered important to pay attention to inclusion when using new technology (costs for technical equipment, enough workplaces on campus for participation in virtual worlds).

Besides creating a new online learning environment to facilitate seamless learning, a few technical needs for successful online teaching and learning were also identified.

- Teachers and IT support emphasise the need for very **simple solutions for recording** and streaming technologies. The technical quality of lecture casts and teaching videos must be high, and this requires professional equipment.
- Generally, **acquiring licences for technical tools** is a time-consuming and also costly process. This licence approval process makes experimentation difficult. Teachers would like to see better solutions here.
- As already mentioned, direct communication must be possible via a **chat function** in online teaching. Often, the chat provides the connection to students in the online space. Accessibility is important for effective online teaching and enhances student activity. If a lecture is recorded not all students dare to ask questions using the microphone.
- At WU, some teachers experience that cheating is easier in the online space. While the prevention of cheating in the digital space can succeed through personal contact, it still requires technical equipment for **proctoring**.

Summary

During the pandemic, WU switched to online teaching and learning very quickly and fairly smoothly. This worked very well, not least because there was already before a **professional digital infrastructure and support team** in operation. In addition, teachers were continuously informed and trained about the didactic applications of the platforms LEARN, MSTeams, Zoom and other helpful tools during the pandemic. Furthermore, an **online examination environment** was set up at very short notice, although this was also planned before the pandemic. All stakeholders were generally satisfied with the rapid provides support and digital infrastructure. In contrast, the technical equipment of the classrooms, especially for hybrid formats and lecture casts, took more time.

In practice, however, the **implementation of seamless learning was not quite so simple**. Many teachers were confronted with online teaching for the first time. It was not easy for everyone to implement good concepts with a mix of self-study, synchronous and asynchronous units, as well as a varied, structured and interactive setting right from the start.

There were different problems depending on the teaching format:

- **Lecture casts**: In the case of lecture casts, the lack of **technical equipment** was criticised above all. According to the program directors they need to have a didactic and design quality. DTS is counteracting this problem by setting up the FLEX Studios and training courses for teaching videos.

- **Online teaching**: It appears that the use of online conferencing tools has worked well. Nevertheless, it is a challenge to **activate students and build a relationship** despite the physical distance. Since social exchange in particular is not as successful as on-site, blended learning formats will be considered for the future semesters. DTS also offers training for enhancing interaction in online formats and advises on blended learning.

- **Hybrid teaching**: In hybrid teaching, the simultaneous teaching of students on-site and online is particularly challenging. To create a truly **seamless learning environment** that also enables collaborative learning between the different groups, enhanced technical equipment and support for didactically meaningful teaching formats are still required. In this case, too, current developments within the FLEX will offer new solutions.

6. Conclusions and recommendations

Concluding, we want to highlight the following findings from our study:

- **Teaching and learning spaces are a competitive factor and a strategic asset.** Considering the importance students' learning experience and wellbeing have within an increasingly competitive global higher education system, **the role of teaching and learning spaces will likely even grow in the near future**; not only in terms of aesthetics, but also regarding the actual impact on learning effectiveness and student satisfaction. Ironically, for many higher education institutions in a post-pandemic world, this might mean to rethink the role and added value of "on campus teaching" rather than focusing on digitalisation of teaching and learning only.

- **Learning and teaching spaces at WU are in a constant flux.** Even though the campus itself is still rather new, requirements keep changing. This can be partly attributed to the fact that new elements emerge from practice – and were not heeded that much during the design phase. More importantly, however, seems the impact digitalisation (and the experiences from the COVID-19 pandemic) had on the use of teaching spaces. The entire notion of **seamlessly connecting physical and digital (virtual) spaces** creates lots of opportunities, but also considerable challenges, and not only from a practical point of view: Virtual teaching and learning spaces (if we take the example of the FLEX Center and the virtual PC classrooms at WU) **demand a complete rethinking of how "space" is conceptualised in teaching and learning – and, also how teaching and learning are conceptualised as well**.

- **Stakeholders perceptions and awareness differ greatly.** The study has clearly shown – as was to be expected – that different stakeholders, but also various actors within the stakeholder groups, have different requirements and needs. There are, however, also considerable differences regarding the importance that is ascribed to the actual teaching and learning environment. We consider this to be closely connected to the **predominance of technological considerations over pedagogical or didactic ones**, when designing teaching and learning spaces. There seems to be a **general lack of awareness of how teaching and learning are affected by socio-spatial arrangements** – and even if the awareness is there, at least a lack of knowledge and experience on how to deal with these effects in practice.

- One of the key challenges for the future in our view is how to align the current trend towards individualised learning with the fact that any spatial structure will automatically favour some designs over others. **Balancing flexibility with the need for standardisation and efficiency** certainly plays a pivotal role in this regard. Support formats and processes will need to strike a balance here as well, starting with the realisation that administrative regulations and conditions will often have a strong impact on the space of possibility for teachers and learners.

From these conclusions we derive a number of tentative recommendations for institutional, national and supranational policy makers, but also for scholars of teaching and learning (spaces) and decision makers:

- Considering the lack of knowledge and awareness among teachers and support staff regarding the impact of – physical and well as virtual – spatial arrangements on teaching and learning, it seems prudent to invest more time and effort into corresponding research as well as to set up evidence-based trainings and support materials.
- Considering the complex aftermath of the COVID-19 pandemic, it seems advisable to extrapolate the added value of on campus teaching and learning and to strategically pursue the notion of seamless learning far beyond technological and procedural implications.
- Considering the strong impact of regulations and administrative arrangements on teaching and learning, we would recommend to better align technological, didactic and administrative objectives and requirements in a more holistic manner in order to avoid creating unintended consequences.
- Considering how digitalisation is changing higher education in fundamental ways, we would suggest to pay more attention overall to the idea of virtual space and its potential (but also risks) for teaching and learning.

Bibliography

Brooks, D. C., 2012. ‘Space and consequences: The impact of different formal learning spaces on instructor and student behaviour’, *Journal of Learning Spaces,* [online], 1(2). Available at: http://libjournal.uncg.edu/jls/article/view/285 [Accessed 21 March 2022].

Bundes Immobilien Gesellschaft, 2013. ‘Neubau Campus Wirtschaftsuniversität’. Available at: https://www.big.at/fileadmin/user_upload/03_Projekte/058_campus-wu/Folder_Campus_WU.pdf [Accessed 1 April 2022].

Charmaz, K., 2001. ‘Grounded Theory: Methodology and Theory Construction’, In: Neil J. Smelser, Paul B. Baltes (eds.), *International Encyclopedia of the Social & Behavioral Sciences* Pergamon, pp.6396-6399.

Colis, B., and Moonen, J., 2001. *Flexible learning in a digital world: Experiences and expectations*. London: Kogan-Page.

Finkelstein, A., Ferris, J., Winer, L. and Weston, C., 2016. ‘Research-informed principles for (re-) designing teaching and Learning Spaces’, *Journal of Learning Spaces,* [online], 5 (1), pp.26–40.

FNMA, 2021. ‘Whitepaper Quantifizierung von virtueller Lehre an österreichischen Hochschulen’. Available at: https://fnma.at/content/download/2310/12854 [Accessed 21 March 2022].

Hilli, C., Nørgård, R., Aaen, J., 2019. ‘Designing Hybrid Learning Spaces in Higher Education‘, *Dansk Universitetspaedagogisk Tidsskrift*, [online], 27, pp.66-82. Available at: 10.1016/S2212-5671(15)00160-4 [Accessed 21 March 2022].

Huhtelin, M., Nenonen, S., 2015. ‘A Co-creation Centre for University–Industry Collaboration – A Framework for Concept Development’, *Procedia Economics and Finance,* [online], 21, pp.137-145 Available at: 10.1016/S2212-5671(15)00160-4 [Accessed 21 March 2022].

Irvine, V., 2020. ‘The landscape of merging modalities.’, *Educause Review*, [online], 4, pp.41-58 Available at: https://er.educause.edu/-/media/files/articles/2020/10/er20_4103.pdf [Accessed 21 March 2022].

Krueger, R., 1994: *Focus Groups*, London, UK: Sage.

McArthur, J. A., 2015. ‘Matching instructors and spaces of learning: The impact of space on behavioural, affective and cognitive learning’, *Journal of Learning Spaces,* [online], 4(1), pp. 1-16. Available at: http://libjournal.uncg.edu/jls/article/view/766 [Accessed 21 March 2022].

Ninnemann, K., 2021. ‘Onlife Learning Spaces. Handlungsperspektiven hybrider Lernumgebungen an Hochschulen‘. In: Geschäftsstelle beim Stifterverband, eds. *Digitalisierung in Studium und Lehre gemeinsam gestalten*. Wiesbaden: Springer VS, pp283-299. Available at: https://doi.org/10.1007/978-3-658-32849-8_17 [Accessed 21 March 2022].

Ninnemann, K., Liedtke, B., den Heijer, A., Gothe, K., Loidl-Reisch, C., Nenonen, S., Nestler, J., Tieva, Å., Wallenborg, C., 2020. *Hybrid environments for universities. A shared commitment to campus innovation and sustainability*. Münster/New York: Waxmann.

Ninnemann, K., Jahnke I., 2018. ‘Den dritten Pädagogen neu denken. Wie CrossActionSpaces Perspektiven der Lernraumgestaltung verändern’. In: B. Getto, P. Hintze & M. Kerres , ebd. *Digitalisierung und Hochschulentwicklung*. Preceedings zur 26. Tagung der Gesellschaft für Medien in der Wissenschaft e.V.. Münster/New York: Waxmann, pp.135–147.

Potter, J. A., 1998. ‘Qualitative and Discourse Analysis’. In: Alan S. Bellack, Michel Hersen (eds.), *Comprehensive Clinical Psychology*, Pergamon, pp.117-144.

Praß, M., Weber A., 2021. *Lehr-Lern-Räume gestalten*. [online] Available at: https://www.uni-bremen.de/informationsportal-hochschullehre/lehre-gestalten/phase-2-vorbereitung/lehr-lern-raeume-gestalten [Accessed 21 March 2022].

Reinmann, G., 2021. ‘Hybride Lehre. Ein Begriff und seine Zukunft für Forschung und Praxis‘, *Impact Free* [online], (35). Available at: https://gabi-reinmann.de/wp-content/uploads/2021/02/Impact_Free_35.pdf [Accessed 21 March 2022].

Rovai, A., Jorden, H., 2004. ‘Blended Learning and Sense of Community: A comparative analysis with traditional and fully online graduate courses‘, *International Review of Research in Open and Distance Learning*, [online], *5*(2), pp.1-13, Available at: https://doi.org/10.19173/irrodl.v5i2.192 [Accessed 21 March 2022].

Smith, C., 2017. ‘The Influence of Hierarchy and Layout Geometry in the Design of Learning Spaces’, *Journal of Learning Spaces*, 6 (3).

Strauss, A., Corbin, J. 1998. *Basics of Qualitative Research – Techniques and Procedures for Developing Grounded Theory*. London, UK: Sage.

Urquhart, C., 2013. *Grounded Theory for qualitative research: A practical guide*. London, UK: Sage.

Vale, J., Oliber, M., Clemmer, R.M.C., 2020. ‘The influence of attendance, communication, and distractions on the student learning experience using blended synchronous learning. ’, *The Canadian Journal for the Scholarship of Teaching and Learning*, 11 (2).

Wong, L., Looi, C., 2011. ‘What seams do we remove in mobile-assisted seamless learning? A critical review of the literature.’, *Computers & Education*, [online], 57. Available at: https://doi.org/10.1016/j.compedu.2011.06.007 [Accessed 21 March 2022].

WU Web Pages

WU Vienna, 2020. *WU’s Strategy*, Available at: https://www.wu.ac.at/en/the-university/about-wu/strategy [Accessed 21 March 2022].

WU Vienna, a, *Site*, Available at: https://www.wu.ac.at/en/business-taxation/department/contact/site [Accessed 21 March 2022].

WU Vienna, b, *Campus*, Available at: https://www.wu.ac.at/en/the-university/campus [Accessed 21 March 2022].

WU Vienna, c, *Architecture & Buildings*, Available at: https://www.wu.ac.at/en/the-university/campus/architecture-buildings [Accessed 21 March 2022].

WU Vienna, d, *Studying on Campus*, Available at: https://www.wu.ac.at/en/students/wu-campus/studying-on-campus [Accessed 21 March 2022].

WU Documents

WU Vienna, 2001. *Strategic Plan*, Available at: https://www.wu.ac.at/fileadmin/wu/h/strategy/documents/EN_WU_Entwicklungsplan_ab_01.06.2021.pdf [Accessed 21 March 2022].

WU Vienna, 2021. Performance Agreements, Available at: https://www.wu.ac.at/fileadmin/wu/h/strategy/documents/WU_Leistungsvereinbarung_2022-2024.pdf [Accessed 21 March 2022].

WU Vienna, 2020. Digitalization Strategy, Available at: https://www.wu.ac.at/en/digitalization/digitalization-strategy [Accessed 21 March 2022].

Appendices

A Guiding questions Semi-structured interview with teachers

- In which L&T space do you prefer to teach? What characterises this space?
  - When you reflect on L&T spaces in which you don't like to teach that much. In what ways could these spaces be improved?
  - What impact does the design and equipment of L&T spaces have on designing courses?
  - What importance does the spatial dimension have in your teaching?
- What do you need to use spaces for teaching optimally? (e.g. technical support, trainings)
- How far do you see newly designed or equipped spaces as an incentive to try out new approaches in teaching?
- What is new or innovative at WU - compared to other universities - in terms of teaching and learning spaces?
- Do L&T spaces have an impact on promoting good teaching? What effect do spaces have on teaching and learning?

- What virtual learning environments do you currently use in your teaching?
- What do you think works particularly well in the virtual learning environments at WU?
- What does not work?
- What are your wishes? (e.g. in terms of digital structures or technologies?)

- Finally: Imagine you could create the campus again without any restrictions: What would you avoid, keep, implement new?

B Guiding questions Semi-structured interview with Senior Management (Vice-rector for Academic Programs and Student Affairs)

- What are WU's strategic goals with regard to teaching and learning?
- Where are these goals defined?
- How far are teaching and learning spaces taken into account in this?
- Who is responsible for the development of new teaching and learning spaces?
    - Follow-up question: Process of development
- What are the needs for planning and implementing new teaching and learning spaces?
- What physical and virtual innovative spaces are being planned?
- What direction does WU want to take - in terms of face-to-face, online, hybrid teaching?
- How will online teaching be integrated into the curriculum?
- What structural challenges are there for the long-term integration of online teaching?
- Are there intentions to expand the digital structures?
    - What is needed for the expansion of digital structures for blended learning as well as hybrid teaching and learning?
- Can new teaching and learning spaces be designed to promote innovative teaching? Is this a goal of WU in the development of new spaces?
- Which (other) objectives does WU have for the development of new teaching spaces?

C Guiding questions Semi-structured interview with Senior Management (Vice-rector for Infrastructure and Digitalisation)

- What are WU's goals with regard to its strategic positioning?
- What role does teaching play in the development of the campus?
- How is the tension between events/conferences and teaching dealt with and what strategies exist for this issue?
- A new building is currently being planned, what functions will this new building fulfil?
    a. Who is responsible for the development of new teaching and learning spaces?
    b. Who is involved?
    c. What led to the planning of a new building?
    d. Is the new building being thought of purely pragmatically, or is there also space for innovation here?
    e. How far do innovative spaces play a role here?
- What are the strategic pillars for the expansion of virtual learning spaces?
- What direction does WU want to take - in terms of face-to-face, online and hybrid teaching?
- What structural challenges are there for the long-term integration of online teaching?
- What plans exit to expand digital structures?
- What is needed for the expansion of digital structures for blended learning as well as hybrid teaching and learning?

D Guiding questions Semi-structured interview with Deans, Head of Institutes, Program Director

- In which L&T space do you prefer to teach? What characterises this space?
- What is particularly important to you as a manager when it comes to teaching spaces?
- What about learning spaces for students?
- What do teachers and students in your department/institute need to make the best use of the spaces? (e.g. Smartboard training, booking system, technical support, pedagogical support, IT support, resources ...)
- WU has had various physical, virtual and hybrid teaching and learning spaces designed and implemented in the past. How satisfied are you with the process and the implementation?
- In your opinion, what is novel or innovative about WU - compared to other universities - in terms of teaching and learning spaces?
- Thinking about the existing teaching and learning spaces, in all variants, i.e. physical, virtual and hybrid, at WU, what is the relevance of teaching spaces for good teaching?
- What role do you think teaching and learning spaces play as an incentive to try something new in teaching?
- If you now think more about teaching: Are there any teaching and learning approaches that your institute particularly promotes?
- 8 years ago WU moved from the 9th district to the newly built campus. Imagine being able to build the campus again without any restrictions:
    a. What would you like to see new in terms of teaching and learning spaces now? For whom should these be and for what purpose? What should these offer and/or contain?
    b. What would you keep in the teaching and learning spaces? Why?
    c. What would you avoid in the teaching and learning spaces? Why?
- If you mentally travel 20 years into the future, how do you imagine a campus will look like. What environments will be there by default?
- So far we have mainly discussed physical learning spaces, now let's turn to virtual environments. One year of distance learning has brought many changes in this regard.
    a. What do you think works particularly well in WU's virtual learning environments (MS Teams, ZOOM, Learn etc.)?
    b. What does not work?
    c. What are your wishes? E.g. in terms of digital structures or technologies?
    d. What digital structures are needed for both blended learning and hybrid teaching and learning?

E Guiding questions Focus group with non-teaching staff

• What is your favourite place at WU? • Which places do you think teachers and students prefer (for teaching or learning)?
If you imagine you could rebuild the campus without any restrictions, what would you want now in terms of new teaching and learning spaces? • What would you like to see new in terms of teaching and learning spaces? • What would you keep in the teaching and learning spaces and why?/what works well?/why do you think that works well, what should be kept? • What would you avoid in the teaching and learning spaces and why?/what doesn't work so well
For the next question, we would like to go into two break-out rooms to think more about a future vision of the campus. • Travel mentally to the year 2041, how do you imagine what constitutes the campus? (physical and virtual) • Imagine that you have no time and financial restrictions: what support for the use of the spaces could you offer or would be helpful? (e.g. technical support, didactic support, resources ...) • You are already partly involved in the design and use of the spaces. Which stakeholders at WU should still be involved in further development processes?
Final: What is already novel or innovative at WU - compared to other universities - in terms of teaching and learning spaces?

F Guiding questions Focus group with students

Where do you particularly like to be at WU?
You have probably had courses in a variety of different spaces. • Which classrooms do you particularly enjoy being in? Which ones not so much? Why? • In which areas do you particularly like to study? In which not so? Why? • Which spaces do you miss at WU? For which activities? What do you miss in the L&T spaces?
What is already novel or innovative at WU - compared to other universities - in terms of teaching and learning spaces?
For the next question we would like to go into two break-out rooms. • I would like you to think about what courses you have attended that you would say were innovative or special - not in terms of content, but in terms of didactic implementation? • What impact did the space have on these courses? How was the space used? • If you mentally travel 20 years into the future, how do you imagine what a campus will look like. What environments will be there by default?
So far we have mainly discussed physical learning spaces, now we want to turn to virtual environments. One year of distance learning has brought many experiences and changes in this respect. • What do you think works particularly well in the virtual environments at WU? • What does not work? • What are your wishes? • How would you like to see teaching and learning in the future? Hybrid, virtual, presence?