Report Users' Perspective Analysis

Project Result 2 - Users' perspective analysis: usage, perception, and impact of informal learning spaces

Institution: University for Continuing Education Krems

Country: Austria

Authors: Sonja Brachtl, Christina Ipser, Filiz Keser Aschenberger, Gregor Radinger
Krems, 13.10.2023

Content

List of Figures

List of Tables

Introduction

The University for Continuing Education Krems (UWK), Austria, is specialised in academic continuing education. Consequently, it has a different student body compared with traditional higher education institutions. Currently, about 8000 students are enrolled in the university's more than 200 study programmes. The average age of students is about 40 years and most of the students at UWK are employed while studying, with several years of work experience. Figure 1 shows the campus map of UWK.

Figure 1. Campus Map of UWK. Source: UWK 2022 (https://www.donau-uni.ac.at/en/university/campus-krems/campus-map.html)

The campus covers an area of about 34,000 m² and is shared by three higher education institutions: the University for Continuing Education Krems (UWK), the IMC University of Applied Sciences Krems (IMC) and the Karl Landsteiner University of Health Sciences (KL).

The formal learning spaces at UWK consist mainly of around 40 seminar rooms with movable furniture (tables and chairs) for 24 to 50 people, which corresponds to the typical group size of students in the offered courses. Each seminar room is equipped with a beamer or large screen, internet connection and W-Lan, floor sockets, flipchart stands, magnetic boards and a water dispenser. During the pandemic, almost all seminar rooms were further equipped with a touch screen control interface, a presentation laptop, ceiling-mounted room

microphones, loudspeakers and an additional large mobile screen to enable teaching in hybrid mode. Figure 2 shows typical seminar rooms at UWK.

Figure 2: Typical seminar room in the historic building (left) and the new building (right), Photo credit: Skokanitsch, W. (2022). Imagefotos – Lehrsituationen – Studierende Seminarraum

The most important informal learning spaces at UWK are the library with a number of work and reading desks for individual learning activities, as well as the ÖH-Lounge, which was implemented and provided by the students' union at the UWK and can be used for collaborative learning activities, group work and informal exchange. In addition, there are a couple of seating arrangements and acoustic booths in corridors and halls scattered around the campus, which can be used as informal learning spaces. Figure 3 shows examples of the informal learning spaces at UWK.
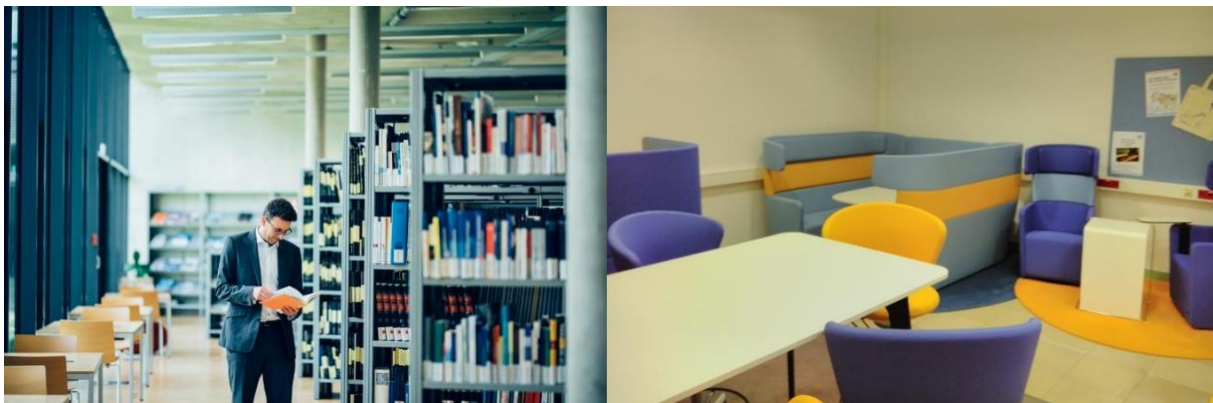
Figure 3: Informal learning spaces at the UWK, reading desks at the library (left) and the ÖH-Lounge (right), Photo credit left: Skokanitsch, W. (2017). Imagefotos – Bibliothek Photo credit right: Ipser, C. (2019)

Methodology (student survey and focus groups)

The research approach combined quantitative (student survey) and qualitative (focus groups) methods. The investigated variables are in line with the goals of the projects as they are described in the project handbook. Table 1 below outlines which variables are included in the survey and/or in the focus groups.

Table 1: Research approach overview and variables included in the survey and focus groups (self-created, 2023).

Survey (Quantitative method)	Focus Groups (Qualitative method)
a) **Availability, accessibility**, spatial characteristics, equipment and use of **informal** or nonconventional **learning spaces by different student groups** (self-developed scale for availability and accessibility)	
b) Analysing and categorization of users' perceptions and experiences regarding the **fit of learning strategies and learning spaces** (differentiation into focused and collaborative learning)	• In-depth analysis of focused and collaborative learning environments
c) **Impact** of the used informal or non-conventional learning spaces on **students' well-being, knowledge acquisition and university sense of belonging**	
● **Satisfaction** with campus and knowledge acquisition (self-developed scale) ● **Sense of belonging:** Affective commitment to the university (Allen and Meyer, 1990) ● **Interpersonal relations** (French & Oakes, 2004) ● **Well-Being:** WHO-5 Well-Being Index (Topp, Oestergaard, Soendergaard & Bech, 2015)	• In-depth analysis of satisfaction with the support and the learning environment
d) Existing **inequalities and barriers** related to informal or non-conventional learning spaces, including access to technical equipment and internet as well as to physical-spatial environments conducive to learning and well-being (self-developed items for barriers)	
	e) **Students' and lecturers' awareness and enabling strategies** to deal with existing inequalities and barriers • Future scenarios regarding hybrid learning and technological support

Further information regarding the implementation (procedure, instructions and questions) are documented in the survey and in the interview guide for the focus groups (see Appendix).

This report presents the findings of the quantitative and qualitative data collection process to identify the user perspective and it is structured as follows:

(1) The first part describes the results of the students' survey (quantitative data collection), including the descriptive results and the results of the hypotheses testing.

(2) In the second part we describe the key findings of the students' and lecturers' focus groups (qualitative data collection).

(3) Key findings of the quantitative and qualitative part are summarised in the third part of the report.

Student survey: thematic structure of the survey

Student survey was comprised of six main parts as it can be seen in Figure 4. First two parts provide a detailed description about the participants and their living and study conditions, while the following parts inquire students' use of spaces in relation to different learning activities and their relations to campus and colleagues as well as their well-being.

1. Sociodemographic data
(i.e. age, gender, fewer opportunities)

2. Questions about your studies
(i.e. study model, BA/MA, full- vs. part-time)

3. Focused Learning Activities
(i.e. use of places, availability, accessibility, barriers, satisfaction)

4. Collaborative Learning Activities
(i.e. use of places, availability, accessibility, barriers, satisfaction)

5. Hybrid Learning Activities
(i.e. availability of technological devices, virtual places, barriers)

6. University Campus
(i.e. satisfaction with campus, sense of belonging, interpersonal relationships, well-being – sum score)

Figure 4: Thematic structure of the survey (blue marked variables are subjective variables which are summarized to a scale after an item and scale analysis) (self-created, 2023).

Descriptive analysis of the student survey

Firstly, data was transferred from the survey tool (Unipark) into a SPSS-file. We added all variable names and questions out of the survey as well as answer categories for every item into the SPSS file. We checked for missing data and set up the correct scale levels. Coding for most items was aligned and coded in the same direction (e.g. fully agree = 5, fully disagree = 1).

For the central independent variables (availability, accessibility, satisfaction for focused and collaborative learning environments) and central dependent variables (satisfaction, sense of belonging, interpersonal relations and well-being) we conducted an item and scale analysis and created scales.

In the **item analysis** every item was checked for the following criteria:

- **Mean** between **1,8 and 4,2** (to prevent floor and ceiling effects for five-point Likert scale, all scales except Well-being). Well-being is a **six-point Likert-scale** coded between $0 - 5$, the **mean** has to be between **1 and 4** to prevent floor and ceiling effects.

- **Normal distribution**: checked by visual inspection
- **Corrected item-total-correlation**: between **0,30 and 0,80**

In the **scale analysis** the reliability was measured via **Cronbach´s alpha**. It should be **at least 0,70**.

Sociodemographic data

At University for Continuing Education Krems (UWK) **115** students participated in the survey. Sample size may vary slightly among questions, since not every question was answered by every participant.

Regarding the gender, 37% of the participants were female and 61% of the participants were male students. About 2% chose the options "diverse" or "prefer not to say". About 23% are between 26 and 30 years old, and 2% are between 21 and 25 years old. Most students are aged between 30 and 50: 14% are between 31 – 35 years old, 23% are between 36 – 40 years old, 15% are between 41 – 45 years old and 15% are between 46 – 50 years old. Another 5% of students are between 51 and 55 years old and 3% are between 56 and 60 years old. Approximately half of the students (43%) report that they live in a household with minor children or persons in need of care.

Figure 5 provides an overview of students' living arrangements. The majority of students (69%) live with their partner, husband or wife, and 23% live alone in their own apartment. Only a small number live in a student dormitory (3%), share a flat with others (2%) or live with their parents'/relatives' (3%).
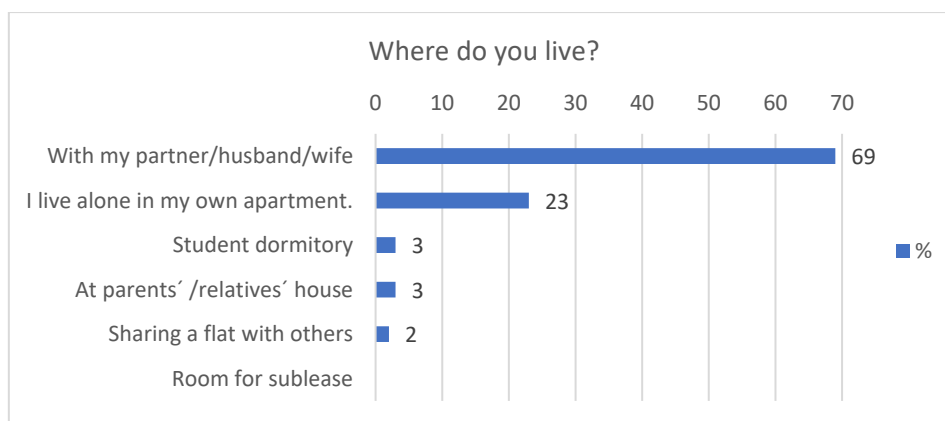
Figure 5: Living situation (n = 115).

The personal challenges faced by students are shown in Figure 6. The most prominent one is the "need to work for a living while studying" (63%), followed by "family related obstacles" such as having responsibilities for children (22%). Some students reported having to deal with "geographical obstacles" (16%) or economic obstacles, such as financial barriers (10%). Challenges such as language, age, cultural differences, mental diseases, chronic somatic diseases and physical impairment are experienced by between 4 and 6% of the participants. Only 24% percent report experiencing "none of these" challenges.
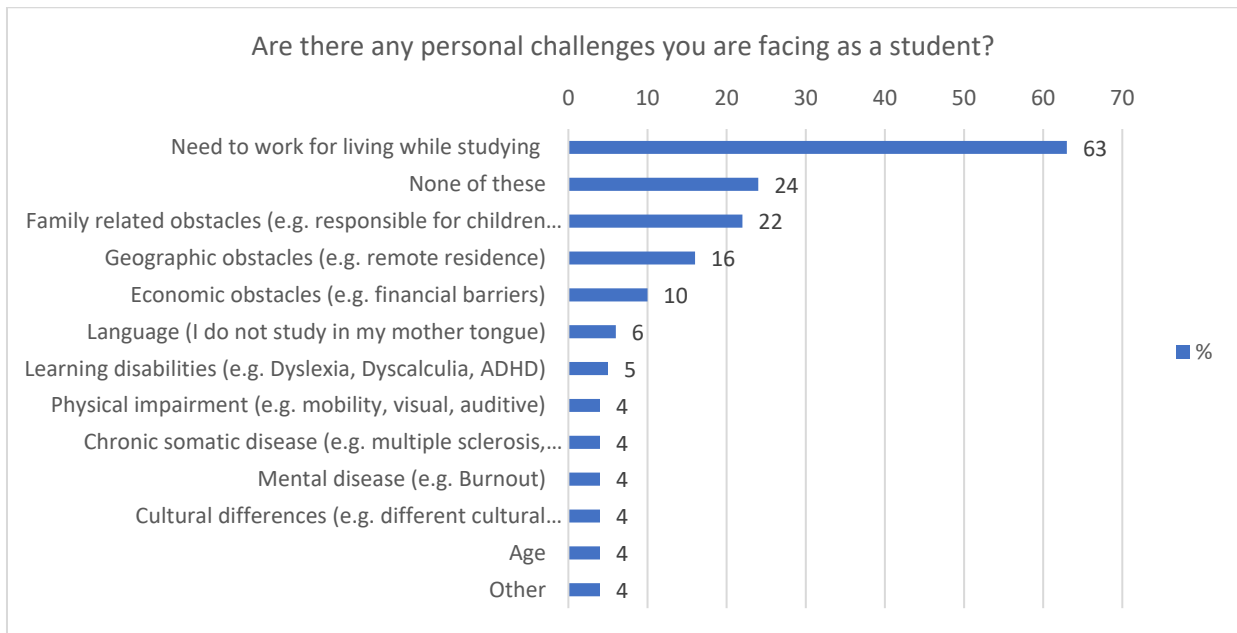
Figure 6: Personal challenges (students with fewer opportunities) (n = 115).

Questions about studies

Regarding the "distance to university", most students commute more than 200 km (42%), followed by 101 – 200 km (23%) and 61 – 100 km (22%) to their campus. About 6% reported 31 – 60 km and 4% stated 11 – 30 km. Only a minority (4%) live nearby (0 – 4 km) or 5 - 10 km (1%).

Most of the students are pursuing a master's degree (91%), 7% are pursuing another degree, and 2% are pursuing short-term degrees. Most of students study part-time (94%) and with regular attendance phases at the university campus (62%) or distance learning with presence offers on campus (29%).

Most students state that they spend about 11-15 hours per week on their studies (33%), followed by 6-10 hours per week (24%), 16-20 hours per week (18%) and up to 5 hours per week (17%). Only 4% report 21-30 hours per week and 3% report studying more than 30 hours per week. Students were enrolled mostly in 2021 (57%), 2022 (20%), 2020 (12%) or 2019 (3%).

The prominent fields of study in this sample (see Figure 7) are "Business, Administration and Law" (29%) and "Other" (24%). Regarding other fields of study, the following were mentioned: "Educational Leadership, Fire Safety Management, Digital Learning Design, Energy Innovation, Learn Operations Management, Management and Organization, Real Estate Management, School Management and Business." About 16% of the students are studying "Information and Communication Technologies", 10% are studying "Engineering, Manufacturing and Construction", and another 10% are studying "Health and Welfare".

What is your field of study?
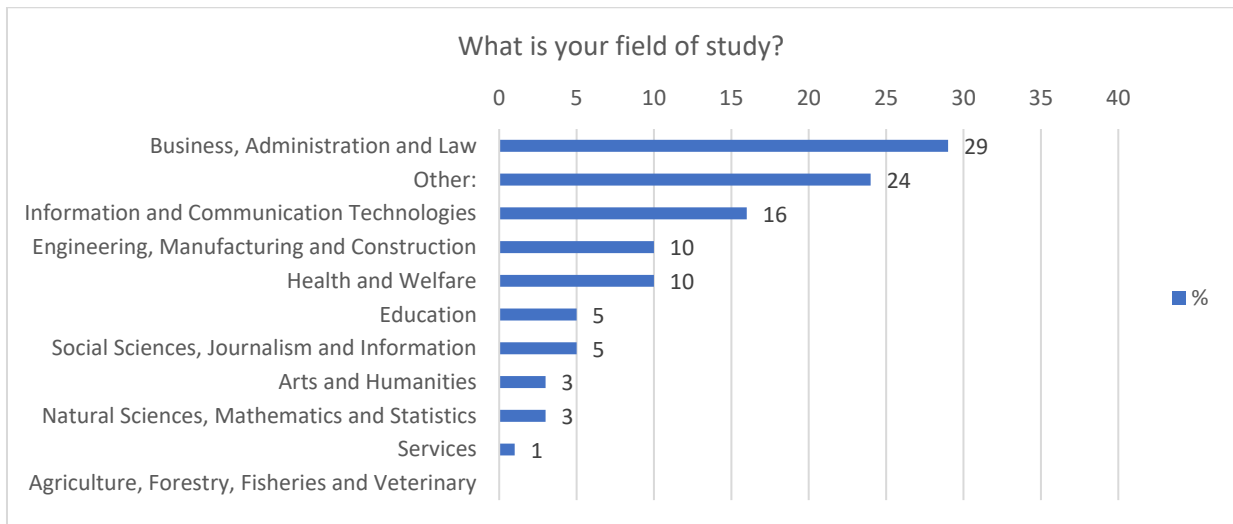
Figure 7: Field of study (n = 115)

Focused learning activities

Students were asked to identify the places where they engage in focused learning activities (see Figure 8). According to the students, the most important place for focused learning is "the place where I live" (*M* = 4,8, *SD* = 0,48), followed by "other" (*M* = 3,2, *SD* = 1,28). As "other" focused learning place used, students primarily mentioned their offices at work. All other places are less frequently mentioned, such as "temporary accommodation, e.g. hotel or guest house" (*M* = 2,3, *SD* = 1,18), "nature, e.g. park, beach, forest and lake" (*M* = 2,1, *SD* =1,08) or "seminar rooms" (*M* = 2,0, *SD* = 1,1).

Which places do you use for focused learning activities and how often? Please answer the question thinking about the last month of your studies.

Figure 8: Places used for focused learning activities (n = 115)
Notes: 1 = never, 2 = rarely, 3 = occasionally, 4 = often, 5 = very often

Item and scale analyses were conducted, and the results are shown in Table 2. Students were asked to rate the availability and accessibility of focused learning spaces and their satisfaction with these spaces at university. As shown in

Table 3, accessibility (*M* = 3,35, *SD* = 0,88) is rated slightly higher than and availability (*M* = 3,16, *SD* = 0,98). In addition, students report a medium level of satisfaction with the available spaces for focused learning (*M* = 3,38, *SD* = 0,91).

Table 2: Item and scale analysis for focused learning activities

Name of Scale	Number of Items	Mean	Distribution	item-total-correlation	Reliability of scale (Cronbach's Alpha)
FL_Availability	3	ok	ok	ok	0.78
FL_Accessibility	4	ok	ok	ok, except FL_AC_1 0,82, alpha without FL_AC_2 0,88; and FL_AC_2 0,90, alpha without FL_AC_2 0,86	0.91
FL_Satisfaction	2	ok	ok	ok	0.82

Table 3: Descriptive statistics of focused learning activities

Name of Scale	Mean	SD
FL_Availability	3.16	0.98
FL_Accessibility	3.35	0.88
FL_Satisfaction	3.38	0.91

Notes: 1 = totally disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = totally agree

Students' perceived barriers to focused learning activities at university are shown in Figure 9. About half (48%) mention the "Opening Hours" and 35% feel that focused learning spaces are "limited available or too crowded". Another 17% cite "Other Obstacles", 5% cite "Registration" and 4% mention "Difficult Access" due to physical barriers or controlled access. As "Other Obstacles", students cited the distance of the university from their homes and the fact that they are rarely at university, making it difficult to know about available places for focused learning activities.
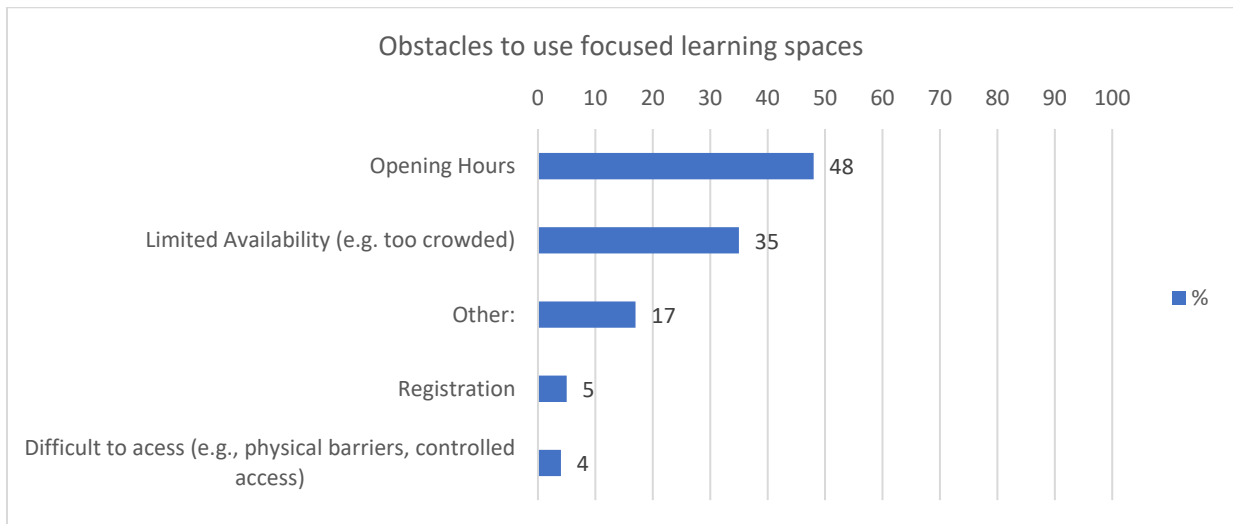
Figure 9. Obstacles to use focused learning activities

Collaborative learning activities

Students were asked to report the frequency of using spaces where they engage in collaborative learning activities (see Figure 10). The most frequently mentioned place for collaborative learning was "the place where I live" (M = 3,5, SD = 1,43), followed by "other" (M = 2,7, SD = 1,94) and "seminar rooms" (M = 2,5, SD = 1,23). The "Other places" students mentioned were offices and online meetings.
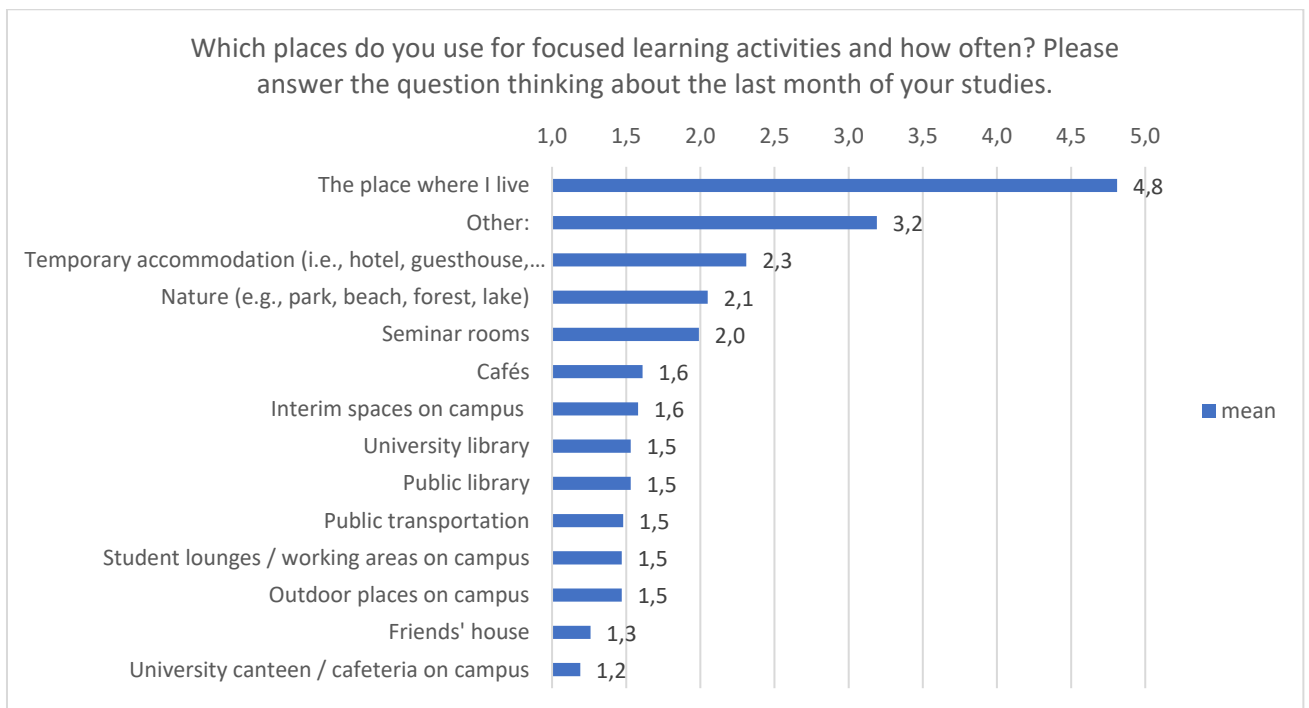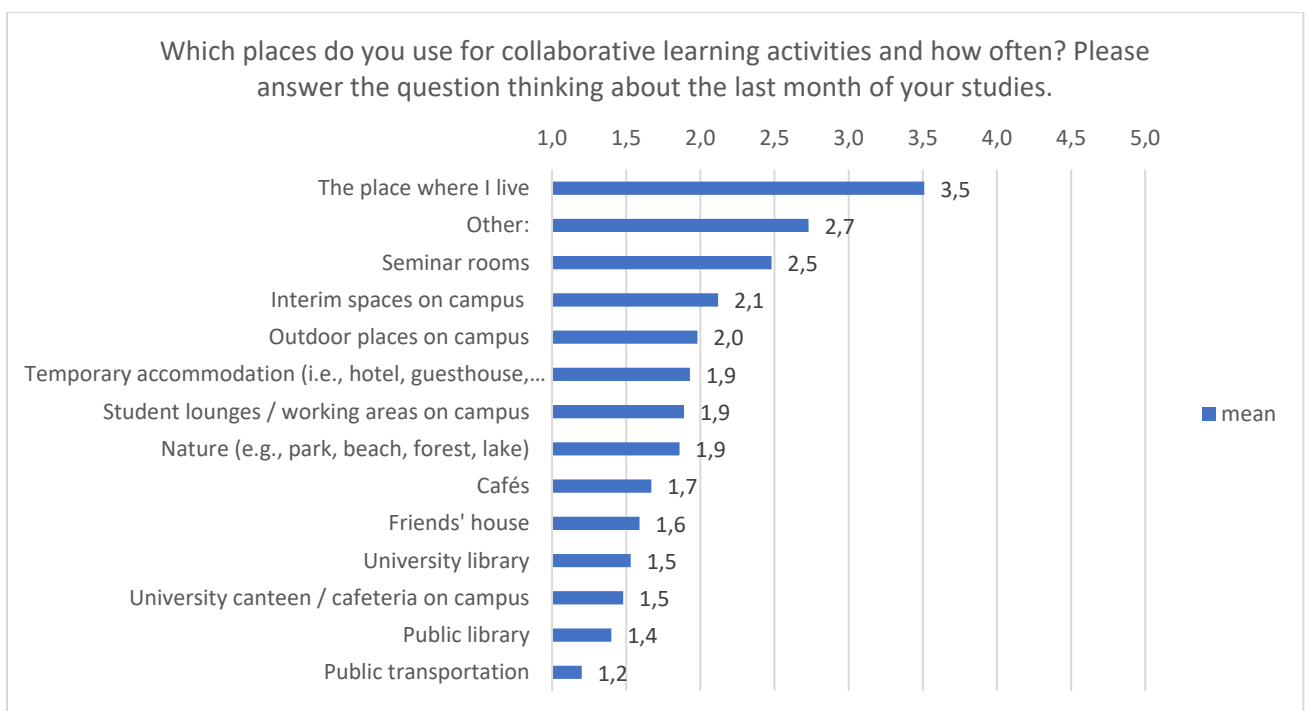

Figure 10: Places used for collaborative learning activities (n = 115)
Notes: 1 = never, 2 = rarely, 3 = occasionally, 4 = often, 5 = very often

Item and scale analyses were conducted, and the results are shown in Table 4. All three items show high item-total correlations, indicating that items do not vary regarding their content as

much as wanted. Nevertheless, all items were included in the scales. Students were asked to rate the availability and accessibility of collaborative learning spaces and their satisfaction with these spaces at their university (see Table 5). Accessibility (*M* = 3,44, *SD* = 0,88) is rated slightly higher than and availability (*M* = 3,39, *SD* = 1,03). In addition, students report a medium level of satisfaction with the available spaces for collaborative learning (*M* = 3,51, *SD* = 0,95).

Table 4: Item and scale analysis of collaborative learning activities

Name of Scale	Number of Items	Mean	Distribution	item-total-correlation	Reliability of scale (Cronbach's Alpha)
CL_Availability	3	ok	ok	Ok, except CL_AV_1 0,85, alpha without CL_AV_2 0,85; and CL_AV_2 0,84, alpha without CL_AV_2 0,86	0.91
CL_Accessibility	4	ok	ok	Ok, except CL_AC_1 0,87, alpha without CL_AC_2 0,90; and CL_AC_2 0,870, alpha without CL_AC_2 0,70	0.96
CL_Satisfaction	2	ok	ok	Not ok, CL_Satisfaction_1 0,81, and CL_Satisfaction_2 0,81	0.89

Table 5: Descriptive statistics of collaborative learning activities

Name of Scale	Mean	SD
CL_Availability	3.39	1.03
CL_Accessibility	3.44	0.88
CL_Satisfaction	3.51	0.95

Notes: 1 = totally disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = totally agree

Students' perceived barriers to collaborative learning activities are shown in Figure 11. Half of the students (50%) mention the "Opening Hours" and 34% feel that collaborative learning spaces are "limited available or too crowded". Another 13% cite "Other Obstacles", 8% cite "Registration" and 6% mention "Difficult Access" due to physical barriers or controlled access. Under "Other Obstacles", students cited the distance of the university from their homes and the fact that they are rarely at university, which makes it difficult to know about available places for collaborative learning activities. One person mentioned a poor Internet connection.
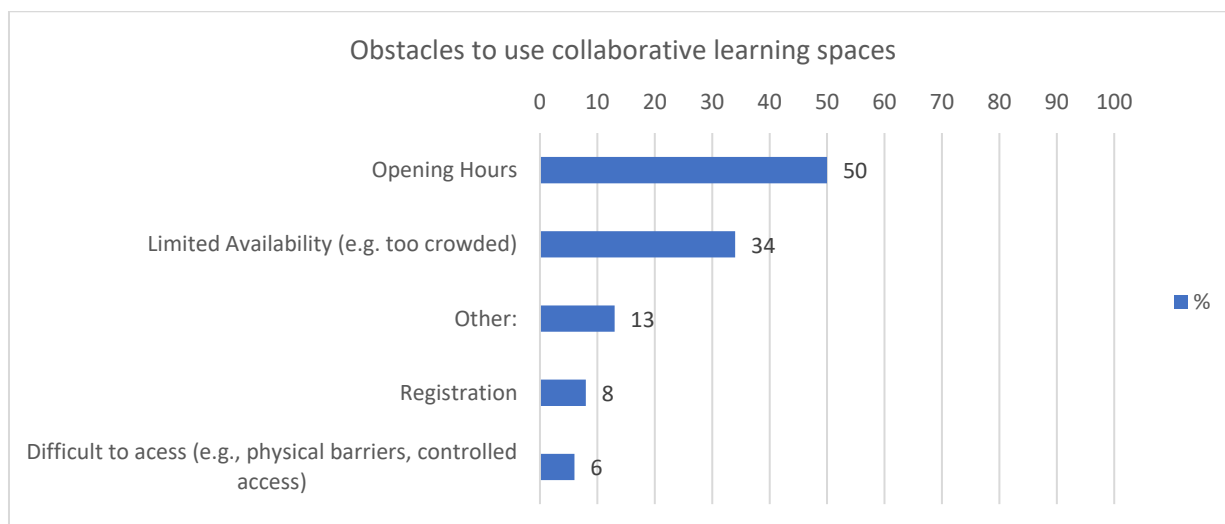
Figure 11: Obstacles to use collaborative learning activities

Hybrid learning activities

Students were asked about the devices they use to study. About 97% report having a laptop/notebook/netbook, 83% a smartphone, 56% a tablet, and 21% an e-book reader. Other devices (3%) are less frequently mentioned.

About 85% of the students state that they have access to WIFI on campus, 10% state that WIFI is partially available (not everywhere/not anytime), and 5% do not know if they have access to WIFI. Most students are satisfied with the quality of WIFI on campus, with 32% agreeing and 37% totally agreeing.

When it comes to using virtual spaces for studying, most students use "Learning Management Systems, i.e. Moodle" (M = 4,1, SD = 1,09), "Video communication, i.e. Zoom" (M = 4,0, SD = 1,03), "Messenger Services, i.e. WhatsApp" (M = 3,9, SD = 1,20), "Online document management platforms, i.e. Google docs" (M = 3,4, SD = 1,22) or "Other" (M = 3,0, SD = 1,41). "Other" spaces students use is the online library. Social media, online forums, online chats and augmented/virtual reality are less frequently mentioned.

Most students (66%) indicate that there are no obstacles in regard with technology.

Dependent variables (satisfaction, sense of belonging, interpersonal relations, well-being)

Item and scale analyses were conducted for measuring the internal consistency of the scales measuring satisfaction, sense of belonging, interpersonal relations and well-being. Results are shown in Table 6. For most scales, analysis results were satisfying. Only one item (B_U_2) had to be excluded.

Students were asked to rate their satisfaction with the university campus, their sense of belonging to the university and their satisfaction with interpersonal relationships with other students. Students' well-being was also assessed using the WHO-5 Well-being Index. The means and standard deviations for these variables are presented in Table 7. Students report high satisfaction with the university campus (M = 4.00, SD = 0.70), indicate a middle level of sense of belonging (M = 3.31, SD = 0.84) and rather agree with their interpersonal

relationships on campus (M = 3.81, SD = 0.89). Students' well-being is in the upper middle range (M = 67.42, SD = 19.54).

Table 6: Item and scale analysis of central dependent variables

Name of Scale	Number of Items	Mean	Distribution	item-total-correlation	Reliability of scale (Cronbach's Alpha)
Satisfaction	6	ok	ok	ok	0.88
Sense of belonging	6	ok	ok	Ok, except B_U_2 0,17, alpha without B_U_2 0,82	0.78 (6 item scale) 0.82 (5 item scale)
Interpersonal relationships	6	ok	ok	ok	0.89
Well-Being	5	ok	ok	Ok, except W_2 0,87 and W_3 0,85, accepted	0.90

Table 7: Descriptive statistics of central dependent variables

Name of Scale	Mean	SD
Satisfaction	4.00	0.70
Sense of Belonging	3.31	0.84
Interpersonal Relationships	3.81	0.89
Well-Being	67.43	19.54

Notes: Satisfaction, Sense of Belonging, Interpersonal Relationships: 1 = totally disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = totally agree; Well-being: 0 worst well-being – 100 best well-being, a cut-off score of ≤ 50 is used to assign a "screening diagnosis" of depression)

Conclusion of the descriptive results

Our sample at UWK Krems basically reflects the characteristics of the student population at UWK Krems in terms of age and field of study. Most students (67%) are between 30 and 50 years old. Gender, on the other hand, shows a different distribution where the two third is male participants and one third is female participants as opposed to the distribution of gender in the student population at UWK which is approximately balanced with 54% women and 46% men (see Universität für Weiterbildung Krems, 2021). The majority of students (69%) live with their partner, husband or wife. About half of the participants (43%) report living in a household with minor children or persons in need of care. The predominant challenge faced by UWK students is the need to work for a living while studying. Most students are studying part-time (94%) and are pursuing a master's degree (91%). About half of the students report a distance to the university of more than 200 km (42%).

The majority of students use their own homes and offices for focused and collaborative learning activities. In terms of barriers to using focused or collaborative learning spaces on

campus, students most often cited opening hours, limited availability of spaces, and the distance of the university from their homes.

Hypotheses testing

The hypotheses testing describes the relation between the use of informal or non-conventional learning spaces and students' sense of belonging, interpersonal relationships, well-being and university campus satisfaction. Four hypotheses are derived based on the literature and previous data collected within the project.

Hypotheses 1a, 1b, 1c and 1d

Hypothesis 1a: The higher the availability and accessibility of informal learning spaces on campus, the higher the university sense of belonging.
Hypothesis 1b: The higher the availability and accessibility of informal learning spaces on campus, the higher the interpersonal relationships.
Hypothesis 1c: The higher the availability and accessibility of informal learning spaces on campus, the higher the well-being of students.
Hypothesis 1d: The higher the availability and accessibility of informal learning spaces on campus, the higher the university campus satisfaction.

Table 8: Results of hypotheses 1a, 1b and 1c

	Sense of Belonging	Interpersonal Relationships	Well-Being	University Campus Satisfaction
Availability	$r = .23$ $p\ .018$	$r = .24$ $p = .013$	$r = .01$ $p = .893$	$r = .26$ $p = .007$
Accessibility	$r = .27$ $p = .010$	$r = .31$ $p = .002$	$r = .11$ $p = .280$	$r = .46$ $p < 0.001$

Hypotheses 1a, 1b and 1d are supported, while hypothesis 1c is rejected.

The results indicate that there is a significant positive correlation between the availability and accessibility of informal learning spaces on campus with university sense of belonging (1a), interpersonal relationships (1b), and university campus satisfaction (1d). No significant correlation was found between the availability and accessibility of informal learning spaces and well-being (1c) in our sample.

However, our results do not imply a causal relationship. It may also be true that positive interpersonal relationships lead to greater use of informal learning spaces, thereby increasing perceptions of availability and accessibility.

The results suggest that the university should invest in its informal learning spaces to increase positive outcomes. In addition, other aspects such as a higher sense of belonging will lead to a lower intention to quit and to recommend the university. Furthermore, positive interpersonal relationships will enhance students' inclusion, which in turn will lead to better knowledge acquisition.

In conclusion, improving informal learning spaces on campus is an intervention that is significantly associated with positive effects. The availability and accessibility of informal learning spaces on campus should be promoted.

Hypothesis 2

In addition to relationship between the use of space and dependent variables, in Hypothesis 2, we wanted to see if there were any differences in availability, accessibility, and satisfaction between informal focused learning spaces and informal collaborative learning spaces. Universities have traditionally focused on cognitive and functional competencies, which are related to individual, focused learning spaces (e.g. reading, writing). The focus on social and personal competencies, which are trained in collaborative learning spaces, is increasing in recent years, but is still less present (cf. Bohlinger, 2008). Therefore, we assumed that there is a higher availability, accessibility, and satisfaction for focused learning spaces and derived the following hypothesis:

Hypothesis 2: The availability, accessibility and satisfaction with informal focused learning spaces is higher than of informal collaborative learning spaces.

Table 9: Results of hypothesis 2

	Mean	SD	n	T-Test	Effect size Cohen´s d
Availability_FL	3.21	1.97	90	$t(89) = -2.02, p = .046$	-.21
Availability_CL	3.39	1,01	90		
Accessibility_FL	3.42	0.85	78	$t(77) = .27$, n.s.	.03
Accessibility_CL	3.40	0.87	78		
Satisfaction_FL	3.40	0,94	71	$t(70) = -1.06$, n.s.	-.13
Satisfaction_CL	3.49	0,98	71		

Notes: 1 = totally disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = totally agree

Analysis indicated that there were no significant differences between informal focused learning spaces and informal collaborative learning spaces in terms of accessibility and satisfaction. However, we found a statistically significant difference between the availability of learning spaces (see Table 9). Contrary to our assumption, students rated the availability of collaborative learning spaces at the university higher than the availability of focused learning spaces.

Hypotheses 3a, 3b, 3c and 3d

Hypothesis 3a, 3b and 3c: Informal collaborative learning spaces are more relevant to enhance university sense of belonging, interpersonal relationships, well-being and university campus satisfaction than informal focused learning spaces. (There is a stronger relationship between informal collaborative learning spaces and university sense of belonging (3a), interpersonal relationships (3b), well-being (3c) and university campus satisfaction (3d) than between informal focused learning spaces and university sense of belonging, interpersonal relationships, well-being and university campus satisfaction.)

Table 10: Results of hypotheses 3a, 3b and 3c

	Sense of Belonging	Interpersonal Relationships	Well-Being	University Campus Satisfaction
Availability_FL	$r = .18$ $p = .083$	$r = .11$ $p = .284$	$r = -.07$ $p = .504$	$r = .20$ $p = .058$
Availability_CL	$r = .21$ $p = .042^*$	$r = .26$ $p = .010^*$	$r = .00$ $p = 1.00$	$r = .31$ $p = .002^{**}$
Accessibility_FL	$r = .19$ $p = .085$	$r = .18$ $p = .102$	$r = .003$ $p = .982$	$r = .40$ $p < .001^*$
Accessibility_CL	$r = .30$ $p = .006^{**}$	$r = .38$ $p < .001^{***}$	$r = .10$ $p = .359$	$r = .48$ $p < .001^{***}$

$^*p < .05$, $^{**} p < .01$, $^{***} p < .001$

All requirements are fulfilled.

Hypotheses 3 assumed that there are more positive outcomes when looking at informal collaborative learning spaces compared to informal focused learning spaces. We tested these hypotheses by comparing the correlation coefficients between availability of informal learning spaces for focused learning (Av_FL) and availability of informal learning spaces for collaborative learning (Av_CL) and accessibility of informal learning spaces for focused learning (Acc_FL) with availability of informal learning spaces for collaborative learning (Acc_CL) in relation to sense of belonging, interpersonal relations, well-being and satisfaction with campus. The results support Hypothesis 3a (Av_FL vs. Av_CL and Acc_FL vs. Acc_CL) on sense of belonging, Hypotheses 3b (Av_FL vs. Av_CL and Acc_FL vs. Acc_CL) on interpersonal relations and Hypothesis 3d (Av_FL vs. Av_CL) on satisfaction with campus is partly confirmed. Hypothesis 3c is rejected because no significant correlations were found between availability or accessibility with informal collaborative learning spaces and with informal collaborative learning spaces concerning well-being. Hypothesis 3d (Acc_FL vs. Acc_CL) is rejected because regardless of informal focused learning spaces or informal collaborative learning spaces, the correlations with satisfaction with the university campus were significant.

Hypothesis 3a_Sense of belonging:

There is a statistically significant correlation between the importance of the availability of informal collaborative learning spaces and sense of belonging, but no statistically significant correlation between the importance of the availability of informal focused learning spaces and sense of belonging. There is a significant correlation between the importance of accessibility of informal collaborative learning spaces and sense of belonging, but no significant correlation between the importance of accessibility of informal focused learning spaces and sense of belonging.

Hypothesis 3b_Interpersonal relationships:

There is a statistically significant correlation between the importance of the availability of informal collaborative learning spaces and interpersonal relationships and no statistically significant correlation between the importance of the availability of informal focused learning spaces and interpersonal relationships. There is a statistically significant correlation between the importance of the accessibility of informal collaborative learning spaces and interpersonal relationships and no statistically significant correlation between the importance of the accessibility of informal focused learning spaces and interpersonal relationships.

Hypothesis 3c_Well-being:

No statistically significant correlations were found between the importance of the availability and the accessibility of informal collaborative learning spaces, and the availability of informal focused learning spaces and well-being.

Hypothesis 3d_University campus satisfaction:

There is a statistically significant correlation between the importance of the availability of informal collaborative learning spaces and satisfaction with the university campus. There is no statistically significant correlation between the importance of the availability of informal focused learning spaces and satisfaction with the university campus. There is a statistically significant correlation between the importance of the availability of informal collaborative learning spaces and satisfaction with the university campus, and there is a statistically significant correlation between the accessibility of informal focused learning spaces and satisfaction with the university campus.

Discussion hypotheses testing

Hypotheses 1a, 1b and 1d are supported, indicating positive outcomes in relation to improving availability and accessibility of informal learning spaces. Hypothesis 1 c is rejected, indicating that the availability and the accessibility of informal learning spaces has no effect on students' well-being.

Hypothesis 2 is rejected. We found that neither availability, accessibility, nor satisfaction were higher for informal focused learning spaces than for informal collaborative learning spaces. Surprisingly, we found a statistically significant difference in the availability of learning spaces, but with a higher rating for the availability of informal collaborative learning spaces.

Hypotheses 3a and 3b are supported. The availability and accessibility of informal collaborative learning spaces are more relevant to students' sense of belonging and interpersonal relationships than the availability and accessibility of informal focused learning spaces. Hypothesis 3c is rejected because we found that neither the availability nor the accessibility of informal focused and collaborative learning spaces has an impact on students' well-being. Hypothesis 3d is supported regarding the availability of learning spaces. The availability of collaborative learning spaces correlates with satisfaction with the university campus. No significant correlation was found between the availability of focused learning spaces and satisfaction with the university campus. Hypothesis 3d is rejected regarding the accessibility of informal focused learning spaces and collaborative learning spaces, as both factors are significant in relation to satisfaction with the university campus.

Conclusion of quantitative data analysis

The results clearly show that improving the availability and accessibility of informal learning spaces is a clear factor in increasing belonging, interpersonal relationships, and satisfaction with the university campus. Furthermore, we found that students perceive the availability of informal collaborative learning spaces at the university to be higher than the availability of informal focused learning spaces. In addition, the availability and accessibility of informal collaborative learning spaces are relevant to students' sense of belonging and interpersonal relationships. The availability of collaborative learning spaces also correlates with satisfaction with the university campus.

Focus groups/interviews: deductive themes

Table 11 displays the frame of the focus group interview guide, and simultaneously, the **four deductive themes** for both focus groups (students and lecturers):

Table 11: Deductive themes of the focus group interviews (for students and lecturers)

1. Impact of the used informal or non-conventional learning spaces on students' knowledge acquisition and satisfaction with support and the learning environment.
2. Existing inequalities and barriers related to informal or non-conventional learning spaces, including access to tangible and intangible technical equipment (i.e., sockets, WIFI) as well as to physical-spatial environments conducive to learning and well-being.
3. Students' and lecturers' awareness and enabling strategies to deal with existing inequalities and barriers.
4. Hybrid and virtual learning activities.

An English version of the interview guide was developed by HTW Berlin as the lead partner of PR2. The interview guide was revised two times following the suggestions and comments of the project partners in a participatory process. Final guidelines, including interview questions

and some instructions concerning the interview process, were translated into the respective languages (see Appendix).

It was aimed to conduct at least one focus group interview with students (5-7 students, including 3 students with fewer opportunities) and at least one with lecturers (5-7 lecturers) from each university in each country. Data was transcribed, coded and analysed according to guidelines developed by HTW Berlin in cooperation with the partners (see Appendix).

Student focus groups/interviews

Implementation

We conducted a student focus group interview with seven participants (one female and six male) from the Faculty of Education, Arts and Architecture on 23rd June 2022 in a face-to-face setting. All students are pursuing a masters' degree and are studying part-time with presence phases in the "Engineering, manufacturing and construction" program. Regarding personal challenges related to studying, three students mentioned having to work to support themselves during their studies or being affected by family obstacles, such as childcare or caregiving needs. One student cites learning difficulties, such as dyslexia, dyscalculia, or ADHD, and another student cites language challenges, as studying is not in their native language. Only two students report not facing any challenges during their studies. All focus group participants are familiar with the UWK campus situation. Table 12 provides an overview of the focus group participants.

Table 12: Overview of the focus group participants – students

Students	age	gender	living situation	living with children	distance to campus	start of study	average study time
Student 1 (S1) TS	36-40	m	in a room in sublet	yes	61-100 km	2020	21-30h / week
Student 2 (S2) SB	31-35	m	shared flat	no	61-100 km	2022	21-30h / week
Student 3 (S3) DP	31-35	w	with the partner	no	> 200 km	2017	6-10h / week
Student 4 (S4) AB	56-60	m	with the partner	yes	> 200 km	2021	6-10h / week
Student 5 (S5) HS	26-30	m	with the partner	no	> 200 km	2021	6-10h / week
Student 6 (S6) MU	26-30	m	with the partner	no	101-200 km	2021	11-15h / week
Student 7 (S7) AM	21-25	m	with the partner	no	0-4 km	2021	61-20h / week

Results

The findings and key insights from the student focus group are presented below in the order of the four interview themes.

1. Impact of the used informal or non-conventional learning spaces on students' knowledge acquisition and satisfaction with support and the learning environment

In the course of the interview, a campus map was presented to the students. The students were asked to mark the learning places that they considered important with numbers. A distinction was made between learning places for concentrated work (green numbers) and learning places for collaborative work (blue numbers). Figure 12 shows the campus map with the marked learning locations by students.

Figure 12 Campus map with numbering of important learning places by students.

Table 13 provides a description of the informal learning places at UWK that students rated as important.

Table 13: Important informal learning spaces at UWK as identified by students

Campus/ Building	Label	Notes / Description	Indoor	Outdoor	Off campus	Focused learning	Collaborative Learning	Reference
G	Outdoor area at the IMC	Outdoor area around the buildings of the neighbouring university of applied sciences		x	x		x	No 1

K, B	Mensa Café Virginier and Mensa Restaurant (canteen)	Cafe and restaurant operated by the Mensa GmbH with indoor and outdoor areas, the use of the indoor areas is limited by opening hours	x	x		x	x	No 2, 12, 13
S, E	Cafés and restaurants on campus and near the campus ("2-Stein" & "Filmbar")	Privately operated restaurants, cafés and bars on campus and near the campus	x	x	x		x	No 3, 18
B, C	Outdoor space next to the Mensa Restaurant (canteen)	It is used for group work; students enjoy it in spring/summer because of the sun and shadow		x			x	No 4
C, L	Seminar rooms on the 3rd floor	Students sometimes stay in seminar rooms during breaks or directly after lessons to use the room for individual studying and/or collaborative work	x			x	x	No 5, 6, 8
E	Outdoor space next to the "Kesselhaus"	There is seating or students sit in the grass		x	(x)		x	No 7
City Center	Bars and restaurants in the city centre ("Hofbräuhaus", "Leopold", "Mayer Resch")	Privately operated restaurants and bars in the city centre and campus surrounding, 15 minutes walking distance from campus	x	x	x	x	x	No 9, 10, 11
C	Seating group in the foyer of the library	Acoustic booths with tables and benches in the foyer of the library	x			x	(x)	No 14
K	ÖH Lounge	Freely accessible working area for students, furnished with bar tables, seating areas and acoustic elements. Preferably used for phone calls.	x			x		No 15
W	Acoustic booths campus West	Small acoustic booth in the corridor in front of the seminar rooms at campus west for just one person, without seating, preferably used for phone calls.	x			x		No 16
S	Benches next to campus west	Bench in a quiet location in the outdoor space at campus west		x		x		No 17

The students named the restaurant "2-Stein" and the seminar room on the 3rd floor of Campus C as their favourite or most important places to learn. Both places are preferably used for collaborative work.

Satisfaction with the used learning location

Strengths:

In terms of learning spaces at UWK, the following strengths are cited by students:

- the availability of places that can be used for making phone calls (such as the ÖH lounge and acoustic furniture); students usually need to be contactable, so they also need places where they can make business calls (87 – 97)
- restaurants/cafes on campus and in the immediate vicinity; these places are mainly used by students to reflect on the day and to network (115)
- the possibility to borrow a key (chip) to the seminar rooms to use these rooms for group work even after the course (44 – 45)
- the possibility to study outdoors (260)

Weaknesses:

The following weaknesses are cited by students

- the informal learning places are not always accessible and are locked at certain times, e.g. library (79)
- students are not aware that their student ID card locks the doors to the campus outside of opening hours. (222)
- the number of informal learning places for focused learning is small, e.g. the ÖH lounge consists of 2 benches, so it is difficult for three or more people to find a place to concentrate. (162)
- outdoor facilities: no comfortable place with shade, no benches with backrests, no tables. (269)
- since the campus is very transparent, it is easy to get distracted while studying. (278)
- the names of the buildings are not meaningful for the rooms (e.g. I, K, L, ...) (459)

2. **Existing inequalities and barriers related to informal or non-conventional learning spaces, including access to technical equipment, internet and physical-spatial environments conducive to learning and well-being**

The following barriers to accessing informal learning spaces are identified by students:

- Informal learning spaces are locked at certain times (e.g., library, locked seminar rooms after classes) (79)
- Some doors are not accessible, making it difficult to reach informal learning spaces (students were not aware, however, that they could unlock these doors with their student ID) (193)
- When using restaurants/cafes as informal learning spaces, drinks/food must be consumed (so these learning spaces are not free, and money is needed) (307)

- The high sound level in the restaurants, which restricts speech intelligibility and thus does not allow for good communication (especially affects the restaurant "2-Stein") (252)
- Especially during the week of September, it is difficult for students to find a room for the module week, as the available accommodations are often fully booked at that time

The following barriers regarding the availability of informal learning spaces are mentioned by students:

- Too few informal learning spaces at the university (232)
- There is no large study hall on campus (235)
- When using restaurants/cafes, money is required for consumption
- There is no comfortable place with shade and the benches are in the blazing sun. Furthermore, the benches do not have a backrest. (267-270)
- WLAN access is partly complex (access to DUK or Eduroam), different access data for the library, for moodle etc.

3. Students' perception on awareness and enabling strategies to deal with existing inequalities and barriers

Students are not aware of any strategies used by lectures and university administrators to deal with existing barriers. Furthermore, students are not aware of any current or potential plans to reduce these barriers.

I think they (lectures and university administration) are aware of the barriers, but they don't see it as a problem. (423)

4. Hybrid and virtual learning activities

The following options are described by students to overcome barriers in the virtual space:

- In the course of online meetings (e.g. via Zoom) virtual whiteboards could be used, in which the room is displayed as the virtual whiteboard (427).
- To meet with students on campus in physical or hybrid space, an interactive map could be created in which learning zones are marked. The tool "wonderme" is mentioned as an example, whereby users can contact each other by means of avatar (475, 477). If this tool were offered as an app, moodle and the map could be integrated, and it can be displayed where the lecture is taking place (482).

The following options are described by students on how an online platform could enhance interactions within a physical space:

- Regarding communication in forums: communication should be separated from the different modules. Currently there is a separate forum for each module, which is often confusing. Communication should therefore take place separately from these (413, 419). Furthermore, the attachment size for uploading documents should be increased (420).

- The online platform should be easy to use without having to generate a new link beforehand (449), similar to a virtual classroom (451).
- a platform for room searches on campus could be created: this could include an overview of which rooms are available, where to find them and whether they are free (this could be marked with the colours e.g. green and red). Furthermore, it could be indicated for how long the rooms are occupied (455). It could also be indicated whether there are sockets available (457).

The following options are described by students on how an online platform could enhance collaborative hybrid groupwork:

- Group work is organized by students via Zoom. However, the various functions of Zoom and its innovations should be explained in the context of the course (439).
- To be able to interact with students virtually/hybrid, a kind of "Tinder variant" is proposed. It could be displayed which students are studying in which departments. Students should be able to register for it voluntarily (like on Facebook), as in the former StudyVZ (485-492).

Lecturers focus groups/interviews

Implementation

The focus group with lectures from UWK was conducted in a face-to-face setting on 30th June 2022. Eight lectures from two UWK faculties and one staff member of the "Office for Equality, Gender and Diversity" participated, as shown in Table 14.

Table 14: Overview of focus group participants - lecturers

Lecturers	Campus	Faculty	Department	Center	Teaching assignments
Lecturer 1 (L1)	UWK			Office for Equality, Gender and Diversity	Programme management, teaching
Lecturer 2 (L2)	UWK	Faculty of Education, Arts and Architecture	Department for Continuing Education Research and Educational Technologies	Center for Technology-enhanced Learning and Educational Information Systems	Programme management, teaching
Lecturer 3 (L3)	UWK	Faculty of Education, Arts and Architecture	Department for Arts and Cultural Studies	Center for Image Science	Teaching
Lecturer 4 (L4)	UWK	Faculty of Education, Arts and Architecture	Department for Continuing Education Research and Educational Technologies	Center for transdisciplinary Continuing Education Research	Programme management, teaching

Lecturer 5 (L5)	UWK	Faculty of Business and Globalisation	Department for E-Governance and Administration	Center for E-Governance	Programme management, teaching
Lecturer 6 (L6)	UWK	Faculty of Education, Arts and Architecture	Department for Building and Environment	Center for Real Estate and Facility Management	Programme coordination, teaching
Lecturer 7 (L7)	UWK	Faculty of Education, Arts and Architecture	Department for Building and Environment	Center for Real Estate and Facility Management	Programme management, teaching
Lecturer 8 (L8)	UWK	Faculty of Business and Globalisation	Department for Management and Economics	Center for General Management	Programme management, teaching

Results

In the following, the results and key findings from the focus group with lecturers are presented according to the order of the four interview themes, which follows the same structure as the one of the previously analysed student focus groups.

1.   Impact of the used informal or non-conventional learning spaces on lecturers' knowledge acquisition

During the interview, a campus map was presented to the lectures. The lectures were asked to mark the learning places that they considered important for students with numbers. A distinction was made between learning places for concentrated work (green numbers) and learning places for collaborative work (blue numbers). Figure 13 shows the campus map with the marked learning locations by lectures.
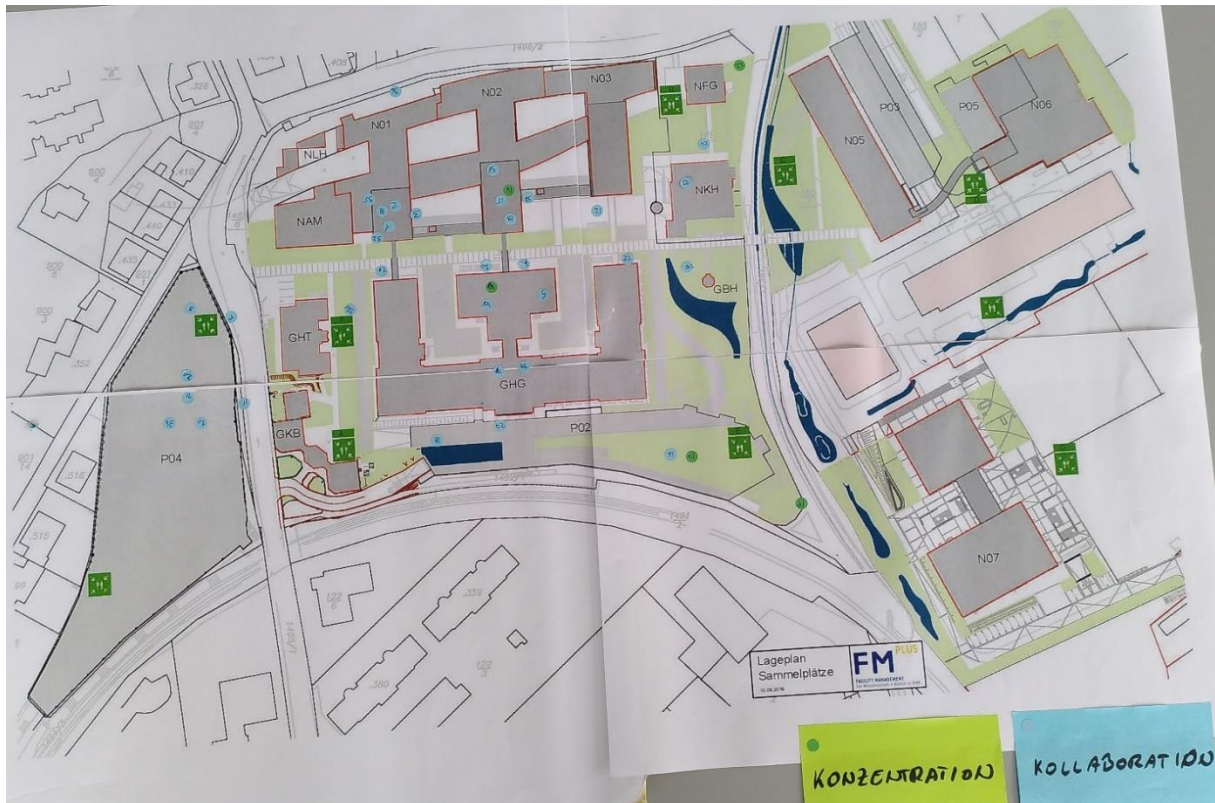
Figure 13. Campus map with numbering of important learning places by lectures.

The informal learning places at UWK that lectures identified as important for students are described in Table 15.

Table 15: Important informal learning spaces at UWK as identified by lecturers

Campus /Building	Label	Notes / Description	Indoor	Outdoor	Off campus	Focused learning	Collaborative Learning	Reference
B, K	Mensa Café Virginier and Mensa Restaurant (canteen)	Cafe and restaurant operated by the Mensa GmbH with indoor and outdoor areas, the use of the indoor areas is limited by opening hours	x	x			x	No 1, 2, 3, 4, 5
K	ÖH Lounge	Freely accessible working area for students, furnished with bar tables, seating areas and acoustic elements.	x			x	x	No 6

J	Acoustic booths	Acoustic booth on the 2nd floor with tables and benches	x				x	No 7
S, E	Restaurants/Cafés on or near the campus ("2-Stein", "Arte", "MOYOme" and "Kesselhaus")	Privately operated restaurants near the campus	x	x	x		x	No 8, 9, 10, 11, 20, 21, 23, 24
D	Mosaic tile carpets	Art installation (on the ground) in the central campus outdoor area, the "carpets" are used by students to sit on the floor		x			x	No 12
C	Seating group on the 2nd floor	Seating group for collaborative working	x				x	No 13
C	First floor reading room in the library	Separate reading room on the first floor of the library, former computer lab, accessible from the library and from the foyer	x			x		No 14
C	Seating group in the foyer of the library	Acoustic booths with tables and benches in the foyer of the library	x				x	No 15
J	Outdoor area in front of the campus	Outdoor area in front of the main campus entrance		x		x	x	No 16, 17
J, L	The pool	Pool in front of the main entrance		x			x	No 18
Y	Tree and benches in front of Karl Landsteiner			x	x	x		No 19
E	Slope next to "Kesselhaus"	Students sit in the grass		x	x	x		No 22
H, E	At the pond	Area around a small pond at the campus site		x	x		x	No 25
N	Outdoor area in front of FMplus			x	x		x	No 26
J	Stairs in front of the main entrance			x			x	No 27

M, H, K	Smoking areas			x			x	No 28, 29, 30
B	Tableau at DBU	Long wooden desk for collaborative meetings	x				x	No 31
B	Meeting room at DBU		x				x	No 32
J	Hall on the 2nd floor	There are standing desks available for collaborative meetings	x				x	No 33
S	Workbench from E-Governance		x				x	No 34
B	Golden benches behind the Mensa			x			x	No 35
B, C	Benches at "Alauntalstraße"			x			x	No 36
C	Standing desks on the bridge 2nd floor		x				x	No 37
C	Staircase	Students sometimes sit on the stairs in the secondary staircase	x				x	No 38

Satisfaction with the used learning location

Strengths:

In terms of learning spaces at UWK, the following strengths are cited by lectures:

- The garden by the Mensa in summer (70)
- The extension and the anteroom of the library (i.e. the reading room above the library) (106)
- The green strip near Karl Landsteiner University (especially the benches there and the tree) (129)

Weaknesses:

The following weaknesses are cited by lectures:

- there are few shady places on campus (168)
- there are too few informal learning places at the university (244)
   I have a group of students who have never seen each other before due to the Covid situation. And to start a semester with them, in a classroom situation, absolutely requires somehow an informal learning space, so that they can talk to each other again. (396)
- the entrances opposite the library are not handicapped accessible (as an example it is mentioned that if one wants to enter with a trolley that it is difficult to open the doors) (286)

- there is no available seating in the entrance area of the university. As a suggestion it is stated that a lounge could be built in this area (301)
- in the outdoor area, there are more collaboration opportunities but fewer areas for concentration. Indoors, it is the other way around, with more areas for concentration and fewer for collaboration. (325)
- There are few or no plug sockets at the informal learning spaces. (339)
- The reading room above the library is not used by UWK students. (347)

2. **Existing inequalities and barriers related to informal or non-conventional learning spaces, including access to technical equipment, internet and physical-spatial environments conducive to learning and well-being**

The following barriers to accessing informal learning spaces are identified by lectures:

- Some places can be reached easily, but there is an obstacle to get back to the university afterwards (as an example the golden bench is mentioned as well as the benches at the Alauntalstraße) (278, 280)
- The entrances opposite the library are not handicapped accessible (as an example it is mentioned that if one wants to enter with a trolley that it is difficult to open the doors) (286)
- The entrance in the old building is not maintained and is mostly covered with IMC advertising. One of the lecturers recommends putting up neutral posters. (287)
- The entree by the loop is not used, although it could be a learning space. (288, 289)
- It is unclear where the main entrance is at the university. (317) Orientation is a certain obstacle in the spatial layout and design, and people do not know which building they are in. (319)

The following barriers regarding the availability of informal learning spaces are mentioned by lectures:

- There are too few informal learning spaces at the university. This affects especially the winter, as the outdoor area can be used in the summer.
  Then there is only the ÖH-Lounge, there on the 2nd floor, they stay in the room, or they do then somewhere in the hallway then somehow together, take a chair then in the hallway out or something. (322)
- There is not enough equipment and seating.
  I have the impression that they often have to take something with them, they have to take a chair, they have to put tables together, they need the space to put something down, and above all, it is simply uncomfortable for people who do not want to stand all the time. (323)
- There are too few meeting areas on campus where students can feel comfortable and have a drink.
  When you meet, you want to have a cosy coffee or a glass of wine or something else, and the campus lacks exactly these rooms where you can do something like that. And especially on weekends you are missing these rooms. (387)
  Sometimes they don't even get a cup of coffee, because the coffee machine has been removed and that's terrible. (351, 353)

- On weekends it is especially bad for students that the pubs are not open.
    Students say you are doing courses or classes on the weekend and there is nothing open except the "2-Stein" and no other place to go. (350)

3. Lecturers' awareness and enabling strategies to deal with existing inequalities and barriers

The lecturers believe that in-house decision makers are unaware of the potential barriers and obstacles as well as the lack of availability of informal learning spaces. (405, 406)

4. Hybrid and virtual learning activities

The following options are described by lectures to overcome barriers in the virtual space:

- With regard to hybrid meetings, one lecturer mentions that meetings are only offered in analogue or digital form, as hybrid presentations cannot be expected of the lecturers, as technical support is required in the process. (398)
    If you offer a hybrid course, in addition to the lecturer you would also have to have someone who permanently supervises the chat. (409)
- Outside of teaching, it will become even more important that the places where students can meet have sockets so that they can connect someone via WhatsApp, for example. (412)
- The question arose as to how someone can be part of the student group who no longer wants to come to campus, but just wants to be connected hybrid. (413)
    The start of the course should always take place as a face-to-face event, this is very helpful if not all students are present in the further course. (413)
    Another helpful aspect is the group works in which the students can also work together virtually and also exchange information informally. (413)
- One suggestion from the lecturers is to create a virtual tour of the university, showing students where the seminar rooms are located. (416) In this tour, the informal spaces should also be addressed, and possible meeting places presented. (425)
- Lecturers mentioned that students often exchange information via WhatsApp groups. However, this has the disadvantage that misinformation is also often spread as a result. (436)
- One lecturer recommended the use of the "wonderme" tool for virtual kick-off meetings. Within this, small groups can also be formed, which can exchange information together virtually. (451)
- The most common online tools used by students for group exercises and other exchanges, according to lecturers, are Facebook, Instagram, LinkedIn, and Mural (464, 466)

The following options are described by lectures on how an online platform could enhance interactions within a physical space and collaborative hybrid group work:

- One lecturer recommends the tool "wonderme". With the help of this tool, the restaurant "2-Stein" has already been virtually recreated to facilitate interaction in the physical space on campus for students. (431)
- Another lecturer mentions Zoom, which is well suited for collaboration, even outside of the module week. (452, 456)

Conclusion of qualitative data analysis

The main issues cited by students were that the number of informal learning spaces on campus is low and that it is difficult to find a place for three or more people to study in a concentrated manner, and that there is also a lack of a large study hall on campus. When the weather is suitable, students prefer the outdoor area as an informal learning space to study in a concentrated manner or to interact with other students. However, students indicated that shaded outdoor seating is lacking, benches do not have backrests, and there are no tables for studying. Indoors on campus, students prefer informal learning spaces such as the library or seminar rooms. Students indicate that these spaces are locked at certain times, which does not allow for unrestricted use of these spaces. Therefore, students often use restaurants and cafes around campus as informal learning spaces. However, the disadvantage is that these places cannot be used for free, as drinks or food must be consumed. Regarding the use of online platforms, students mention communication in the forums as a challenge because a separate forum is used for each module. Students suggest separating communication between modules. Students also suggest providing a room search platform on campus that gives an overview of the availability of different rooms, indicating if they are free, how long they are occupied, and if there are sockets available.

Lecturers also cited the outdoor area of the campus as a strength for informal learning spaces where students can focus their learning or interact with other students. Indoors, lecturers cited the library extension and anteroom as particular strengths. Like students, lecturers indicated that there are too few informal learning spaces on the university campus and that there are few shaded spaces in the outdoor area. Lecturers also mentioned the accessibility of some informal learning spaces on campus as a challenge, for example, that the entrances across from the library are not handicapped accessible. Some places are also probably not used by students because they may not be familiar with them, which may be due to orientation issues in the various buildings. Lecturers also pointed out that there is not enough equipment and seating available for informal learning, and that there are not enough places for students to go for a drink on campus when the restaurants/cafes are not open, which is especially the case on weekends. For hybrid and virtual learning activities, lecturers mentioned the importance of virtual tools for interaction between students.

In summary, students and lecturers agree that the availability of more informal learning spaces on campus would be a great benefit. The outdoor space of the university is highly appreciated by both lecturers and students, although it was mentioned that this area could be more intensively equipped with informal learning places.

Summary: Key findings regarding user's perspective

Most students use their own homes and offices for focused and collaborative learning activities. Almost half of the students cited opening hours and the fact that learning spaces are limited as barriers to using on-campus spaces. Another reason is the distance to the university, as about half of the students commute more than 200 km from home to campus. A significant positive relationship was found between the availability and accessibility of informal learning spaces on campus and the sense of belonging, interpersonal relationships, and satisfaction with the university campus. It was further found that the availability and accessibility of informal collaborative learning spaces is more relevant to students' sense of belonging and interpersonal relationships than the availability and accessibility of informal focused learning spaces. Further, the availability of collaborative learning spaces correlated with satisfaction with the university campus.

As mentioned in the previous chapter, students and lectures feel that there are too few informal learning spaces on campus and that the availability should be expanded. Thus, in summary, it can be recommended that an expansion in informal learning spaces on campus would have a positive impact on students in terms of their satisfaction, which would further strengthen the sense of belonging to UWK.

References

Bohlinger, S. (2008). Competences as the Core Element of the European Qualifications Framework. *European Journal of Vocational Training*, *42*(1), 96-112.

Universität für Weiterbildung Krems (2021). Gleichstellung in Zahlen, 2021.

Appendix A – Student survey

Item and scale analysis for University for Continuing Education Krems (UWK)

Name of Scale	Number of Items	Mean	Distribution	item-total-correlation	Reliability of scale (Cronbach's Alpha)
FL_Availability	3	ok	ok	ok	0,78
FL_Accessibility	4	ok	ok	Ok, except FL_AC_1 0,82, alpha without FL_AC_2 0,88; and FL_AC_2 0,90, alpha without FL_AC_2 0,86	0,91
FL_Satisfaction	2	ok	ok	ok	0,82
CL_Availability	3	ok	ok	Ok, except CL_AV_1 0,85, alpha without CL_AV_2 0,85; and CL_AV_2 0,84, alpha without CL_AV_2 0,86	0,91
CL_Accessibility	4	ok	ok	Ok, except CL_AC_1 0,87, alpha without CL_AC_2 0,90; and CL_AC_2 0,870, alpha without CL_AC_2 0,70	0,96
CL_Satisfaction	2	ok	ok	Not ok, CL_Satisfaction_1 0,81, and CL_Satisfaction_2 0,81	0,89
Satisfaction university campus	6	ok	ok	ok	0,88
Sense of belonging to your university	6	ok	ok	Ok, except B_U_2 0,17, alpha without B_U_2 0,82	0,78
Satisfaction with interpersonal relationships	6	ok	ok	ok	0,89
Well-Being	5	ok	ok	Ok, except W_2 0,87 and W_3 0,85, accepted	0,90

Appendix B – Focus groups/interviews

Interview guide – Students

Questions for the focus group interviews with students

Duration of focus groups: 100 minutes

In advance	**In advance, students get the campus maps, information regarding the project, and aspects which will be discussed in the focus groups**
	One/two weeks before the focus group: Contact the participants and
	➢ Definition of informal learning places and focused/collaborative learning, ➢ ask them to fill out the survey (Word, PDF, paper & pencil) ➢ ask them to take pictures of their preferred learning places on campus ➢ send the Consent Form
Welcome, presentation of the project, agenda for the focus group	**15 min** Welcome! - Project NIILS (informal, inclusive learning environments) - Participants with fewer opportunities - Voluntariness, anonymity, confidentiality of all statements Short self-presentation of participants (warm-up) Name, study program, semester, where do I live, Show your picture(s) of your preferred learning places on campus
c) **used informal or non-conventional learning spaces** on students' knowledge acquisition: **Satisfaction** with the support and the learning environment **Map and Photos at MURAL-Board**	**Informal learning environments (20 min)** Definition "Informal learning spaces, […], are places of learning which can be selected independently by differentiated and self-organizing actors […]." (translated from Ninnemann & Jahnke, 2018, p.141) What places do you use for informal learning? ➢ a map of the campus and mapping of the important learning places ➢ Photos of preferred learning spaces on campus ➢ green cards for focused learning activities ➢ blue cards for collaborative learning activities

	*find the Link to the MURAL Board at the end of this document In-depth questions (supported quantitatively, if necessary, or via point polling on the facilitation wall/flipchart): ➢ red dots for important places to learn ➢ Frequency of use in the last four weeks (favorite or most important place to learn?) ➢ Satisfaction with the most important/most frequently used learning location (strengths/weaknesses)
d) Existing **inequalities and barriers** related to informal or non-conventional learning spaces, including access to technical equipment and the internet as well as to physical-spatial environments conducive to learning and well-being	**In-depth inequalities and barriers (20 min)** ➢ Look at the most frequently / preferred learning places and tell us about the existing barriers: ➢ What are the barriers that you face in accessing informal learning places? o Possible answers: opening hours, registration /controlled access, physical barriers) ➢ Are there any obstacles regarding the availability of informal learning places? o Possible answers: not enough places, too crowded, environmental factors (light, temperature, acoustic, air), atmosphere/well-being, technological infrastructure (plugs, wifi) ➢ In the project, we also focus on students with "fewer opportunities". We have a broad perception of fewer opportunities, including a wide range of aspects: Physical impairment (e.g. mobility, visual, auditive); Chronic somatic disease (e.g. multiple sclerosis, cancer, diabetes); Mental disease (e.g. Burnout); Learning disabilities (e.g. Dyslexia, Dyscalculia, ADHD); Cultural differences (e.g. different cultural background to my university); Language (I do not study in my mother tongue.); Economic obstacles (e.g. financial barriers); Need to work for a living while studying; Family-related obstacles (e.g. responsible for children or nursing cases); Geographic obstacles (e.g. remote residence); Age: Think again, what are the barriers? What have you experienced yourselves?
e) Students' and lecturers' **awareness and enabling strategies** to deal with existing inequalities and barriers	**Awareness and existing strategies to decrease inequalities (15 min)** ➢ What do you think: Are your lecturers and the university administration know these barriers? ➢ Are you aware, or do you know if anything is being done to break down these barriers? ➢ What could be done in the future to reduce these barriers?

| Hybrid and virtual learning activities | **Definition Hybrid Activities:** combining activities concerning space (physical <u>and</u> virtual spaces) and time (synchronous <u>and</u> asynchronous activities; see Reinmann, 2021, S. 4)

Examples: students meet partly physical and remote to discuss a presentation (e.g. Zoom), and students work together on a document (e.g. file sharing). Students get course material after class via the university provided learning platform (e.g. Moodle)

Hybrid and virtual learning activities (20 min)

Hand out the following questions as a questionnaire or prepare them in the MURAL Board or on the moderation wall.

In-depth questions:

1. Can integrating services in the virtual space (apps, etc.) help you overcome barriers you are facing when using the campus?
2. How could an online platform make interacting within a physical space easier?
3. If you are in a physical environment, how could an online platform make it easier to interact with other students or colleagues who are over distance? |
| Summary, open questions by the participants, acknow-ledgement, and farewell | **10 min** |

Interview guide – Lecturers

	Questions for the focus group interviews with lecturers

Duration of focus groups: 90 minutes

| Welcome, presentation of the project, agenda for the focus group | **Welcome 15 min**

– Welcome the participants
– Collect the Consent Form
– Start the audio transcription

– Give information about the NIILS Project (informal inclusive learning environments) and the focus group
– Participants are lecturers from different status groups (professor, lecturer, research associate)
– Conditions are: Voluntariness, anonymity, confidentiality of all statements |

	– Short self-presentation of participants (warm-up): name, faculty/study program, professional background, which campus working/teaching

c) **used informal or non-conventional learning spaces** on students' knowledge acquisition: **Satisfaction** with the support and the learning environment
 	
Campus Map on Mural or on moderation wall (if lecturers do not know any spaces, you might use pictures)
	Informal learning environments (15 min)
	
	– Which spaces for informal learning environments do you know? (Mark the spaces with dots on a Campus Map on MURAL or on a moderation wall)
	– How do the students use these spaces? Which spaces are used for focused learning activities? Which spaces are used for collaborative (community/group) learning activities?
	– What places do <u>you</u> use for meetings/interaction with students outside of courses and formal teaching situations?
	– Are you satisfied with the existing informal learning places for students?
	    • If yes, why? Which characteristics are satisfactory?
	    • If no, why not? What are the reasons?

d) Existing **inequalities and barriers** related to informal or non-conventional learning spaces, including access to technical equipment and internet as well as to physical-spatial environments conducive to learning and well-being
 	
PPT: List of categories for fewer opportunities
	In depth inequalities and barriers (15 min)
	
	➢ How do you evaluate the **access** to existing informal learning places on campus and in the surrounding?
	➢ Are you aware about any barriers that students face in accessing the informal learning spaces you mentioned?
	    ○ Examples: opening hours, registration /controlled access, physical barriers
	➢ How do you evaluate the **availability** of existing informal learning places?
	➢ Are there any obstacles regarding the availability of informal learning places?
	    ○ Examples: not enough places, too crowded, environmental factors (light, temperature, acoustic, air), atmosphere/well-being, technological infrastructure (plugs, Wi-Fi)
	
	– Now we want you to consider the **students with fewer opportunities** which can be identified as: ... (Read out/present categories out of the survey for students with "fewer opportunities")
	    ○ Physical impairment (e.g. mobility, visual, auditive); Chronic somatic disease (e.g. multiple sclerosis, cancer, diabetes); Mental disease (e.g. Burnout); Learning disabilities (e.g. Dyslexia, Dyscalculia, ADHD); Cultural differences (e.g. different cultural background to my university); Language (I do not study in my mother tongue.); Economic obstacles (e.g. financial barriers); Need to work for living while studying; Family related obstacles (e.g. responsible for children or nursing

	cases); Geographic obstacles (e.g. remote residence); Age: – Are you aware if any of these groups of students face challenges in accessing and using the informal learning places? Have you observed any difficulties and barriers for these groups of students? If yes, what type of challenges?
e) Lecturers' **awareness and enabling strategies** to deal with existing inequalities and barriers	**Awareness and existing strategies to decrease inequalities (15 min)** – What do you think: Are these barriers known by your students and the university administration? – Are you aware or do you know if anything is being done to break down these barriers? – What could be done in the future to reduce these barriers? – Which strategies would decrease existing inequalities and barriers in accessing and using the informal learning spaces?
Hybrid and virtual learning activities PPT: List of in-depth-questions	**Definition Hybrid Activities:** combining activities with regard to space (physical <u>and</u> virtual spaces) and time (synchronous <u>and</u> asynchronous activities; see Reinmann, 2021, S. 4) *Examples:* students meet partly physical and remote discussing a presentation (e.g. Zoom), students work together on a document (e.g. file sharing). Students get course material after class via the university provided learning platform (e.g. Moodle) **Hybrid and virtual learning activities (15 min)** Hand out the following questions as a questionnaire or prepare them in the MURAL Board, on the moderation wall or in a power point presentation. In-depth questions: 4. Can the integration of services in the virtual space (apps, etc.) help students to overcome barriers they are facing when using the campus? 5. How could an online platform make interacting within a physical space easier? 6. If students are in a physical environment, how could an online platform make it easier for them to interact with other students who are over distance?
Summary, open questions by the participants, acknowledgement and farewell	**15 min**

Coding list

The table below lists the deductive codes/subcodes (additional codes/subcodes arose inductively).

Codes	Subcodes
Informal Learning Spaces on Campus	Focused Informal Learning Spaces
	Collaborative Informal Learning Spaces
	Informal Learning Spaces Used for Meetings
	Satisfaction
Barriers to Access	Opening Hours
	Registration/Controlled Access
	Physical Barriers
Barriers to Availability	Limited Availability/Crowded
	Atmosphere/Well-being
	Technological Infrastructure
Awareness of Barriers	Barriers to SWFO
Strategies to Mitigate Barriers	
Support through Virtual Spaces	Hybrid Groupwork

Appendix C – Photos of preferred learning spaces on UWK campus

ILS identified in focus groups with students

Unless otherwise indicated, photos were taken as part of the NIILS project.

Labels	Photos of ILS
Outdoor area at the IMC	
Mensa Café Virginier	
Mensa Restaurant (canteen)	
Cafés and restaurants on campus and near the campus (e.g. Filmbar)	

Outdoor space next to the Mensa Restaurant (canteen)	
Outdoor space next to the "Kesselhaus"	
Seating group in the foyer of the library	
ÖH Lounge	

Acoustic booths campus West	
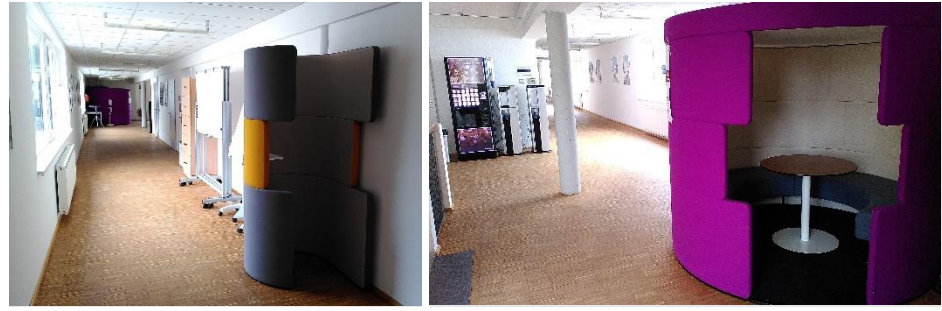
ILS identified in focus groups with lecturers

Unless otherwise indicated, photos were taken as part of the NIILS project.

Labels	Photos of ILS
Mensa Café Virginier	
Mensa Restaurant (canteen)	
ÖH Lounge	
Cafés and restaurants on or near campus (e.g. Filmbar)	

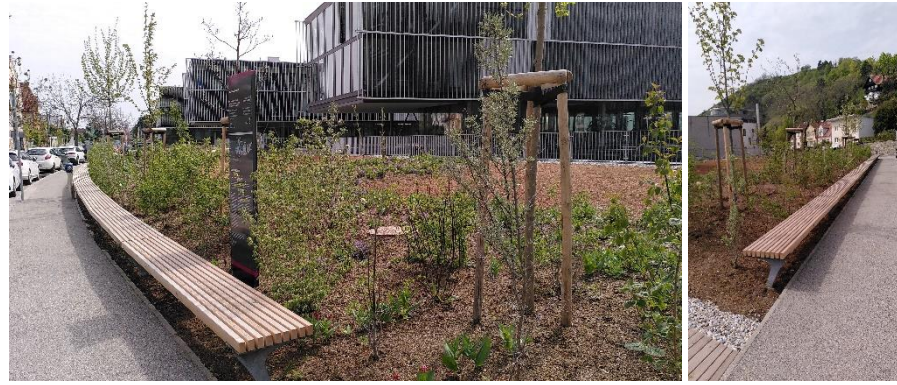| Mosaic tile carpets | |
Seating group on the 2nd floor	
First floor reading room in the library	
Seating group in the foyer of the library	
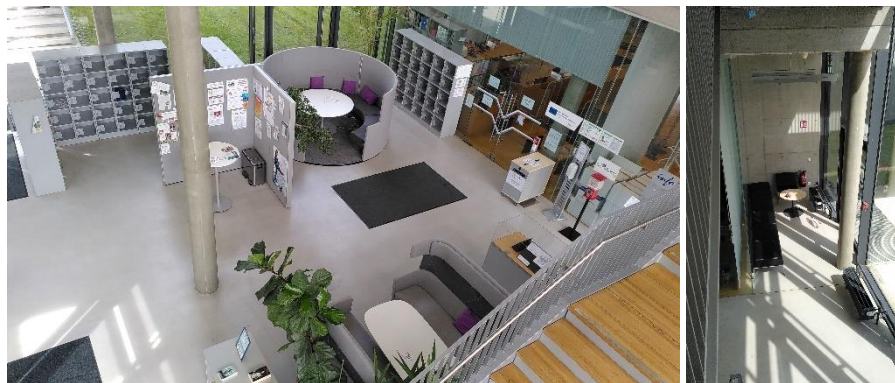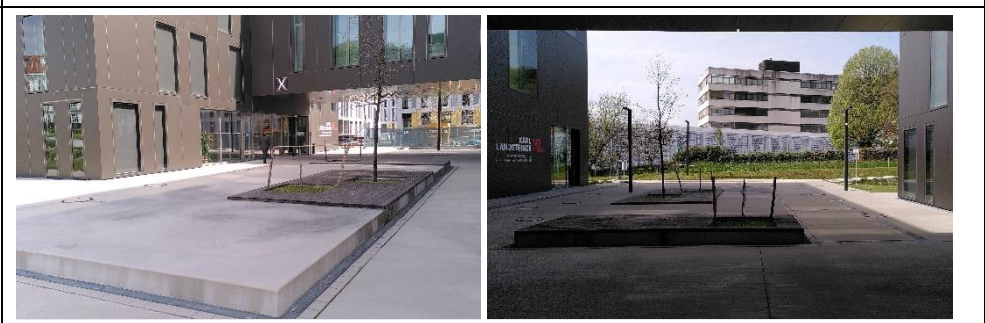
Outdoor area in front of the campus	
The pool	
Tree and benches in front of Karl Landsteiner	
Slope next to "Kesselhaus"	

At the pond	
Stairs in front of the main entrance	
Smoking areas	
Golden benches behind the Mensa	

Benches at "Alauntalstraße"	
Standing desks on the bridge 2nd floor	