

Document Version

Final published version

Citation (APA)

Arkesteijn, M. H., Pelosi, C., den Heijer, A. C., & Schlosser, D. H. (2024). Office space utilisation at Dutch university buildings. In A. den Heijer, M. Arkesteijn, C. Pelosi, & J. Bacani (Eds.), *Campus NL - Knowledge sharing and hybrid working: Annual report 2023-2024* (pp. 37-63). Delft University of Technology, Faculteit Bouwkunde.

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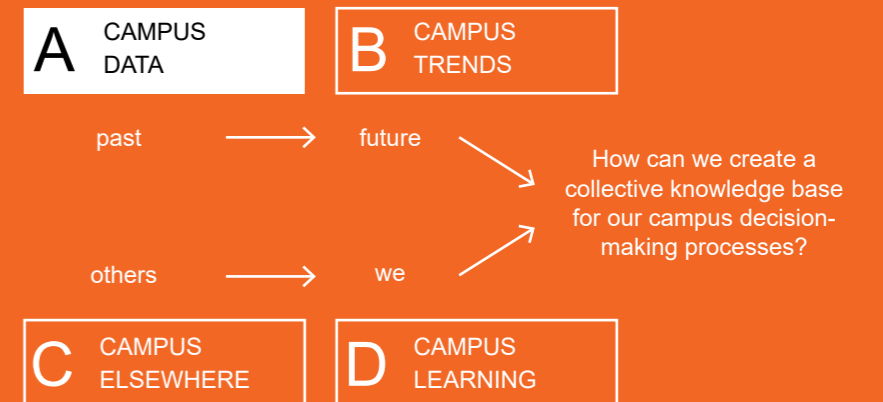
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Part II - Results 2023/2024

A3 Office space utilisation at Dutch university buildings



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A3.1 Introduction

As the landscape of campus management is continuously evolving, we aim to improve our understanding and management of campus resources and facilities.

This four-year Campus NL research explores the strategic approach towards this goal in the following areas:

- The goal is to generate comprehensive campus management information. This is fundamental for providing reference data that supports campus-related decision-making and investments.
- We focus on collecting data on existing campus buildings as well as future projects. This results in a project database, with time series analyses and campus dashboards. These dashboards are designed to offer decision-support information for strategic planning and management.

Throughout the first of the four (academic) years, the 2023/2024 period, the theme of “hybrid working” was chosen, reflecting the workspace use, specifically after the COVID-19 pandemic and lockdowns (2020-2021). This focus supported the collection and analysis of data related to office spaces on university campuses, specifically utilisation, and the evolving usage patterns before and after the pandemic.

In the summer of 2023, the 14 universities of the Netherlands acknowledged the lack of detailed “office utilisation data (as stated by executive board member, campus and facilities directors in their respective SBF, HOI and DFB network meetings).” It was decided that Campus NL should prioritize the collection of those data. While individual universities had data regarding their facilities, a comprehensive dataset was missing. This report represents the first step in building this comprehensive dataset, which the Campus NL team will build with input from practice and theory during the research period (2023-2027).

In the beginning of 2024, the data collection and data analysis regarding utilisation of office spaces in the universities began. This process was discussed and improved through meetings with HOI-DFB (campus and facilities directors respectively) on the 25th of January, the 1st of March, and the 19th of April, where process updates and preliminary results were shared.

To facilitate the collaboration, each participating institution identified a designated campus representative, collectively called campus NL-contacts. They played a crucial role in ensuring the quality of the data collection, enhancing the reliability and comparability of the data.

Through this collaboration, we are not only responding to current needs but are also shaping the way for future innovations in campus management.

How universities work is partly reflected in the utilisation rates of office space: when and where workplaces are used (or not). It is up to the universities whether or not they actively would like to use this information to steer. The information found in this report represents a combination of the physical (workplace) and functional (utilisation) perspective. Other perspectives representing the universities’ way of working: organisational (hybrid policies), physical/functional (m² per user), functional (user demands) and impact on resources (financial and ecological) are discussed in the other parts.

A3.1.1 Space utilisation

The main research question in this report is: **What is the space utilisation in office spaces in university buildings and is there room for improvement?**

In order to answer this question, the following sub questions are answered:

- A3: What is the average seat occupancy of office spaces?
- A4: What is the average seat occupancy without signs of life?
- A5: What is the peak seat occupancy?
- A6: Which weekly seat occupancy patterns can be distinguished?
- A7: What is the room frequency and occupancy per space type?
- A8: What is the relationship between seat occupancy and a provisional workplace norm (workplaces per fte)?

These seven questions are respectively answered in chapter A3.3 to A3.9 and are all related to offices spaces in university buildings.

A3.1.2 Definitions and terminology

Frequency, occupancy and utilisation rates are all terms that inform us about how well the physical spaces are been used. However, they all explain a piece of the puzzle.



Frequency rate (“bezettingsgraad”) measures “the proportion of time that space is used compared to its availability” (Space Management group (SMG). It is the percentage of spaces that are “used”, by at least one person. It indicates if the space is used or not, independent of the number of people. For example, the frequency of 40% indicates that 40% of the office spaces is used, by any number of people¹.



Occupancy rate (“benuttingsgraad”) measures “how full the space is compared to its capacity” (SMG). It is defined as a percentage of total capacity. For example, an occupancy of 50% indicates that half of the workplaces (seats) in an office space is occupied by either a person or personal objects in a specific time frame. (based on various reports amongst others by SMG and Valks, 2021)

Utilisation is a function of the frequency and occupancy rate (SMG): the frequency rate is multiplied by the occupancy rate. The universities in their individual space utilisation studies did not calculate the utilisation, so therefore in this report the utilisation rate is not used. The term “utilisation” is used as overarching for frequency and occupancy, defined more general as “making use of space”.

Bezettingsgraad (“Frequency (rate)”) = een ruimte is “bezet” met minimaal 1 persoon.

Benuttingsgraad (“Occupancy (rate)”) = welk deel van de maximale capaciteit van de ruimte is gebruikt.

It is important to note that, according to Valks et al. (2021, p. 445) “[...] the definition of space utilisation assumes the room as the object of measurement: frequency describes its availability and occupancy describes its use of capacity. However, in office areas and study spaces, the object of measurement is a workplace (also referred to as seat). Here, the frequency and occupancy are essentially the same because the value of the capacity can only be 0 (free) or 1 (occupied).”

Room frequency and room occupancy are depicted in Figure A3.1.

Footnote 1: The availability of space for offices is determined the amount of measurements that are done

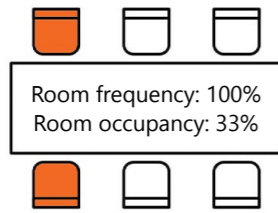


Figure A3.1: Example of room frequency and room occupancy of meeting space (Campus NL, 2024)

In this study we therefore chose to use the following terms of frequency and occupancy as defined above, but specifically call it:

- Room frequency when the object of frequency measurement is a room.
- Room occupancy when the object of occupancy measurement is a room.
- Seat occupancy when the object of measurement is a seat (i.e. workplace). This means that we do not use seat frequency because it is equal.
- Space use: when referring to this phenomenon in general
- Space utilisation studies: when referring to the studies in general that report on either frequency, occupancy or both.

For the utilisation of office, the seat occupancy of workplaces is the most important as discussed in A3.2, while for meeting spaces both the room frequency and the room occupancy is important (see A3.6).

A3.2 Data collection and methods

This study was conducted to assess the frequency and occupancy rates (respectively “bezettingsgraad” and “benuttingsgraad” in Dutch) for workplaces and meeting spaces across all 14 universities in the Netherlands. Our campus-contacts provided detailed insights about their respective university and campus. We requested relevant space utilisation studies. Data collection began in January 2024 and finished end of April, 2024. We obtained ethical approval to collect data from human subjects.

- 31 Space utilisation studies
- 10 Universities
- 96 Buildings
- > 32.700 Workplaces
- Data from 2012 to 2024

Each campus NL-contact received an email request for information and documents, which they either uploaded to a secure, protected database or sent via email. In cases of non-response, every campus contact was contacted again either by phone or with an email reminder. We successfully collected space utilisation studies of 96 office space - workplaces and meeting spaces from 10 universities, resulting in 31 reports covering almost 100 buildings (Figure A3.2). Of these, 6 buildings - 5 from university U10 and 1 from university U4 were mentioned in multiple reports. Therefore, they are presented separately in our analysis, accounting for data from a total of 96 buildings, which include more than 32,744 working places. Some universities have done one space utilisation study for one building while others have done longitudinal studies over the years for one or all their buildings². One university was not able to provide their space utilisation studies and three universities have not done any studies.

Frequency vs. Occupancy



Measurement amounts



Pre- or Post-Covid 19



Chairs



Work places or Meeting spaces



Closed or Open space



Amount of seats

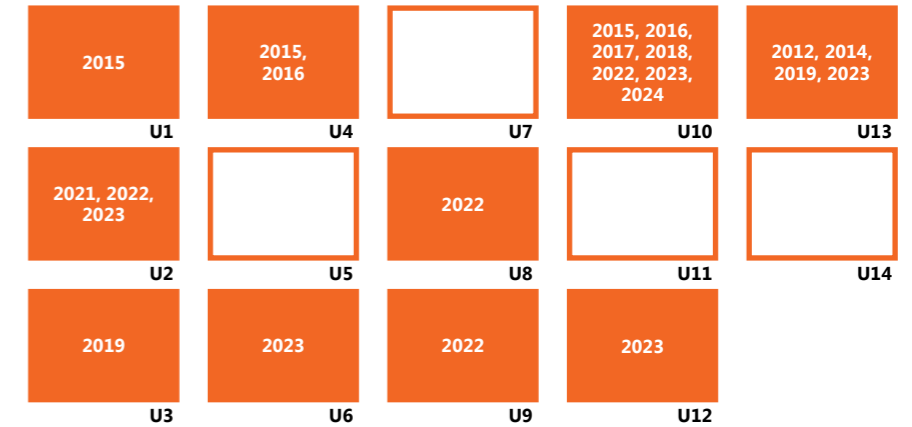
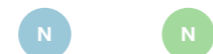


Figure A3.2: Study years per university (Campus NL, 2024)

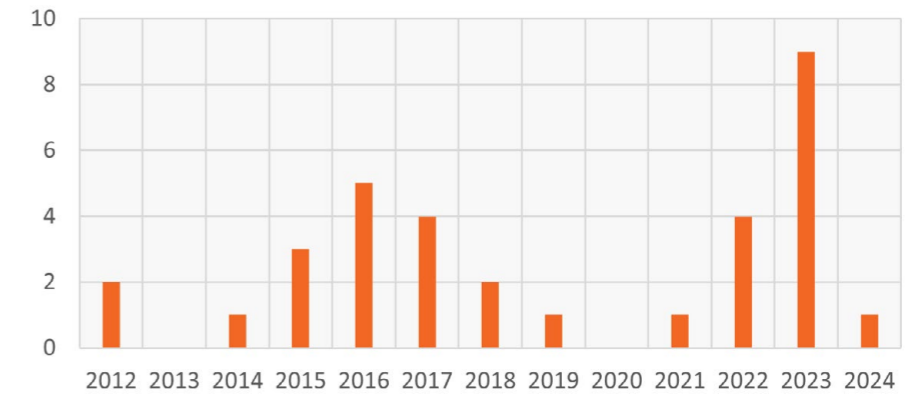


Figure A3.3: Timeline of space utilisation studies indicating the number of studies per year² (Campus NL, 2024)

The collected space utilisation studies have been conducted between 2012 to 2024. The distribution of the studies over the years can be seen in Figure A3.2. Most studies have been done in the year 2023. In total, more than half of the studies (18) have been done before COVID and a bit less than half of the studies after COVID (13). In Figure A3.3, the timeline of space utilisation studies, which we collected for Campus NL can be seen.

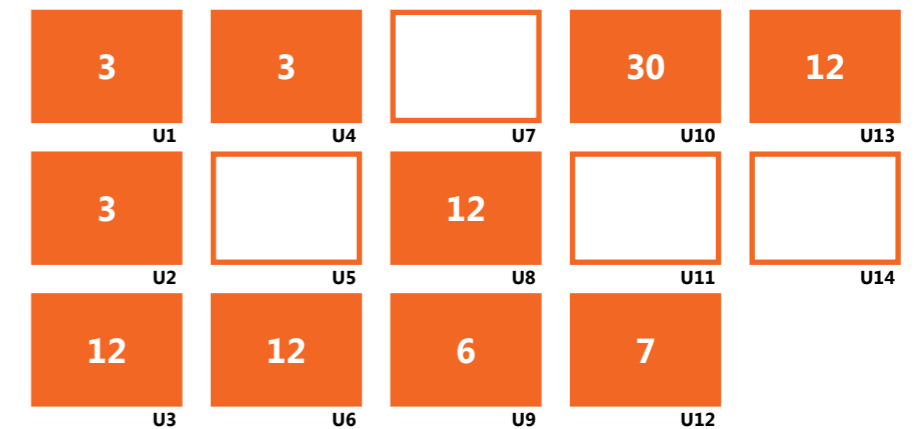


Figure A3.4: Buildings included in the studies per university (Campus NL, 2024)

Footnote 2: U2 has one space utilisation study over multiple years, therefore they have been presented in this graph in all three years (2021, 2022, 2023) separately

A3.2.1 Dataset

All the received space utilisation studies from the various universities have been anonymised using alphanumeric codes, making the universities and reports anonymous, but the data still traceable to the underlying used reports. The structure of this code is as follows: Every university received a unique code (Ux);

- Every report received an alphanumeric code (y);
- Every building received an alpha numerical code (z).

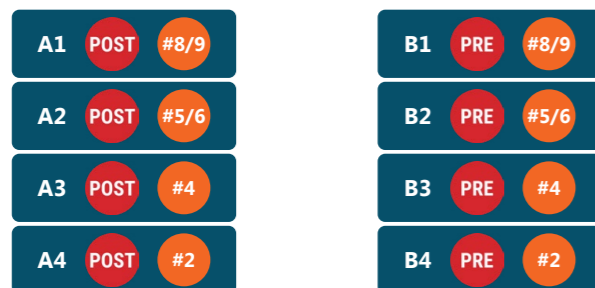
Resulting in a combination of Ux.y.z, for example, U9.1.2.

We firstly collected information per report, including year and days of the research, number of measurements per day and company that perform the measurement. Further we collected other type of information per report, including number of workplaces, meeting facilities and laboratory places to get a general idea of the reports. (see appendix A).

Secondly, we selected all the data regarding number of working-places, meeting spaces and average, lowest and highest frequency, and occupancy. To account for difference in building size we calculated the weighted mean for each cohort, resulting in higher influence of larger buildings on the final mean. When data on working places was lacking, we provided an arithmetic mean instead.

A3.2.2 Comparison

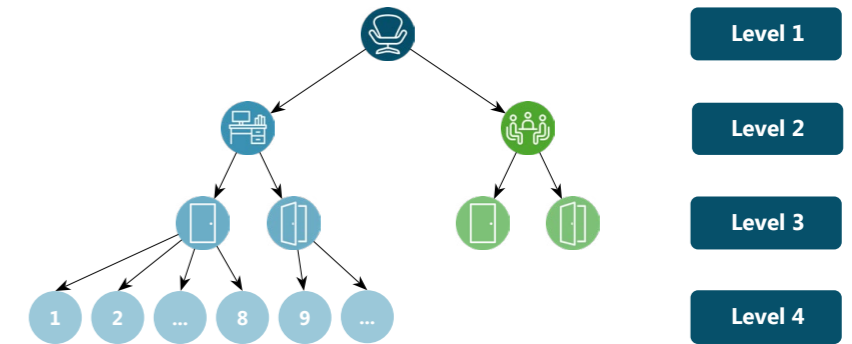
Given the variability in research methods and the timing of the documents, we took measures to minimize bias and enhance comparability. Documents were organized by time and measurement frequency. We categorized all measurements taken after 2020, the beginning of the covid-19 pandemic, as Cohort A. U2 started their continuous measurements in September 2021 and the first time-bound space utilisation study post-lockdown was from U9 from June 2022. Measurements conducted before 2020 were classified as Cohort B, representing the pre-lockdown period. The last space utilisation study pre-lockdown was done in October 2019. Cohorts are classified as follows: 8+ measurements constitute Cohort 1, 5-6 measurements as Cohort 2, 4 measurements as Cohort 3, and 2 measurements as Cohort 1 (see Figure A3.5 and appendix B). If a university measured 8 times during a day the average frequency and occupancy gives an overview of that day, if however, a university measured two times during peak hours, the average frequency in that time period more resembles the peak frequency than the average frequency per day. In order to compare the data, these cohorts were defined.



Further analysis was conducted on the places across four levels (see Figure A3.6):

- Level 1 was defined as all the places (seats) in the buildings without distinction between workplaces and meeting spaces and without distinction between spaces;
- Level 2 was defined as workplaces and meeting spaces (seats) observed separately;
- Level 3 was defined as either closed or open meeting spaces or workplaces;
- Level 4 more specifically looked at the types of spaces.

Figure A3.6: Division in 4 levels for visualization of various places in the universities (Campus NL, 2024)



At level 1 and 2 the analysis is done on seat level. In many reports this is called the frequency rate (bezettingsgraad), however as explained in the introduction (definitions and terminology), if the unit is one seat, the frequency rate and occupancy (benuttingsgraad) rate is the same. In general, in these reports for meetings spaces the difference between frequency and occupancy is made, but not for the offices spaces.

Weighted mean and average

In principal we have use the weighted mean in this analysis. In this way, the conclusions are drawn based on the amount of workplaces under investigation . However, in cohort A4, the average is shown instead of the weighted mean for both working places and meeting spaces due to the lack of information on the number of places per building. In cohort B3 meeting spaces, the average is used instead of the weighted mean because of inconsistencies in the report regarding the number of places per building. Additionally, some reports provided the cumulative number of places per report instead of per building. In that case, each of the buildings has the same frequency or occupancy rate.

Weighted mean: An average computed by giving different weights to individual values. If all the weights are equal, the weighted mean is the same as the average.

Average: The mean value, calculated by dividing the sum of a set of values by the total number of values in the set.

Dataprocessing

Sometimes it was necessary to process the data that was reported in the space utilisation studies. For instance, if the information was given per room type but the average for the spaces was not given, the average or weighted mean had to be calculated by the researchers. Furthermore, sometimes in the report the frequency and occupancy rates were not reported for a building but for instance per measurement (U9 for example). In that case we have calculated the average between the measurements as the rate for the building.

A3.3 Seat occupancy rates

In this section the question is answered **What is the average seat occupancy of office spaces?** In this section we present the seat occupancy per type of space and per cohort, starting with all spaces (level 1), followed by workplaces and meeting spaces (level 2).

A3.3.1 All spaces seat occupancy rate (Level 1) - post-lockdown

In this paragraph, we present the seat occupancy rate of 3 buildings in one university because this is the only university where no distinction can be made between workplaces and meeting spaces. For this study the average building size was 857 and the average seat occupancy was very similar, the lowest in building U2.1.1 (15%) and the highest U2.1.3 (18%) (see Figure A3.7). The interesting aspect from this study is that the measurements are continuous, meaning this set is the only one that presents an image over multiple years. For the other universities we present the seat occupancy for workplaces and meeting places separately.

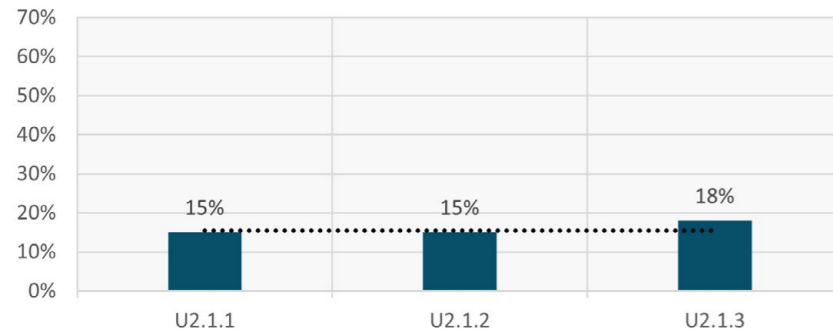


Figure A3.7: Mean of frequency rate per cohort A (after COVID-19), 1 (continuous measurements per day). (Campus NL, 2024)

A3.3.2 Workplaces and meeting spaces (Level 2)

For universities, the seat occupancy of the workplaces is the most important, because their aim is to provide their employees with a sufficient capacity of workplaces. However, from a capacity point of view it does not matter how many workplaces (i.e. seats) a room has. The workplaces can always be used if they are “free”. This contrary to meeting spaces, if one seat in a meeting space is used, the room is “used” and the other seats cannot be used anymore. There both the room frequency and room occupancy are interesting.

A3.3.2.1 Workplaces pre-lockdown

Cohort B encompasses measurements taken before the COVID-19 pandemic (2012-2019). We further subdivided this cohort based on the number of measurement moments per day. Consequently, four B cohorts were defined, although no measurements were categorized as B4.

The seat occupancy rates of Cohort B are shown in Figure A3.8. It presents data from 17 buildings across three universities, with an average seat occupancy rate of 42%. The average building size was 514 workplaces, ranging from 15 to 1765 workplaces. The highest seat occupancy rates, both 57%, were recorded in buildings U1.2.2 and U3.1.1, with the first also being the smallest building in this cohort. Lowest seat occupancy rate was shown for building U3.1.9 (34%).

Figure A3.10 illustrates the seat occupancy rates for Cohort B2, where the mean building size is 82 workplaces. The size range in this cohort extends from a minimum of just 1 workplace to a maximum of 734 workplaces. Only three buildings in this cohort contain more than 100 workplaces. The mean seat occupancy rate is 32%, with the lowest rate of 17% observed in building U13.3.8, which is also the smallest in terms of workplace count, and the highest rate of 37% noted in building U13.3.6.

Figure A3.12 shows the seat occupancy rates for Cohort B3, which includes 27 buildings from 2 universities. The average size of these buildings is 265 workplaces, with the

smallest having 16 and the largest having 1213. The mean seat occupancy rate is 43%. The lowest seat occupancy rates were recorded in buildings U10.9.18 and U10.13.35 (31%), while the highest seat occupancy was observed in building U10.7.12 (57%).

A3.3.2.2 Workplaces post-lockdown

Cohort A includes measurements taken after the COVID-19 pandemic (2020-2024). This cohort is further subdivided based on the number of daily measurement moments. The seat occupancy rates of cohort A1 are depicted in Figure A3.9. It presents data from 7 buildings from the same university, with an average seat occupancy of 27% and an average building size of 630 (ranging from 227 to 1568 workplaces). The lowest mean seat occupancy, 21%, is observed in building U12.1.1, while the highest, 40%, is in building U12.1.7.

The seat occupancy rates for Cohort A2 are shown in Figure A3.11, featuring 31 of the 50 buildings in cohort A, including buildings from four universities. The average seat occupancy here is 23%, slightly lower than the previous cohort, with building sizes averaging 254 workplaces, ranging from a minimum of 2 to a maximum of 1264 workplaces. The highest seat occupancy rate, 42%, is recorded in building U8.1.10, and the lowest, 14%, in building U10.1.1. Both buildings are relatively small in terms of workplace count. Notably, buildings in U8 generally show higher seat occupancy rates than those in U10 and U6.

Cohort A3 is presented in Figure A3.13, the mean seat occupancy rate is 30% across buildings averaging 283 workplaces (from 156 to 515 workplaces). This figure includes 3 buildings from the same university, with the highest seat occupancy rate, 35%, noted in the largest building (U10.4.8). The other two buildings, with 156 and 177 workplaces respectively, show similar seat occupancy rates of 21% and 23%.

Lastly, Figure A3.14 presents data from Cohort A4, which consists of 5 buildings from a single university. The building sizes are unspecified, but the overall mean seat occupancy rate is 35%. The highest rate, 47%, is observed in building U9.1.2, and the lowest, 25%, in building U9.1.6.

A3.3.2.3 Conclusions seat occupancy rates workplaces

Before COVID-19 (cohort B), the seat occupancy rates for the 4 cohorts, were higher than after COVID-19 (cohort A). For example, after the pandemic, seat occupancy rates were recorded at 27%, 23%, 30%, and 35% for cohorts 1 to 4, respectively. After COVID-19, these rates were to 42%, 32%, 45%, for cohort B1 to B3, respectively (no building was classified as B4), corresponding to about 2/3 of their values (see Table A3.1). In each cohort a drop of 10 to 15 percentage points can be seen. Therefore, the impact of hybrid working due to COVID-19 on workplace seat occupancy rates is evident when comparing data from before and after its onset.

Logically, cohorts 3 and 4 exhibit higher seat occupancy rates compared to cohorts 1 and 2, with relatively minor differences between the first two as they exhibit fewer measurements on the relative peak hours.

Across Cohort A there are important differences in seat occupancy rates with A1 showing an seat occupancy of 27% and A4 of 35%, which account to 8 percentage point difference. Despite broader trends, some buildings, like U8.1.10 in Cohort A2 at 42% and U1.2.2 B1 at 57%, maintain higher utilisation rates. This means that the seat occupancy of workplaces can be improved. In order to do so, it is not possible to keep (all) dedicated workplaces and universities need to decide whether they want to change their way of working and introduce flexible working on a larger scale.

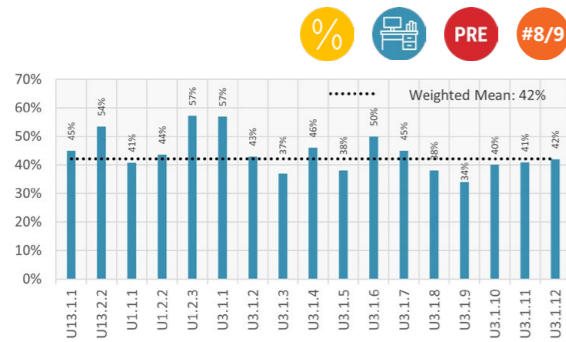


Figure A3.8: Workplaces cohort B1 - year 2012-2019 - 8/9 measurements/day (Campus NL, 2024)

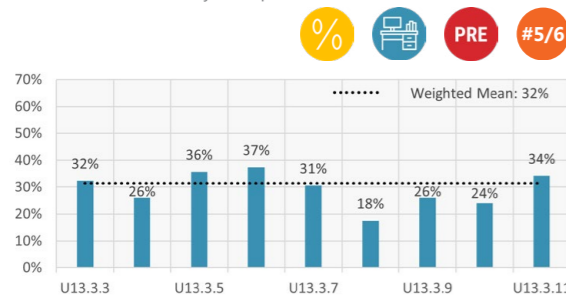


Figure A3.10: Workplaces cohort B2 - year 2012-2019 - 5/6 measurements/day (Campus NL, 2024)

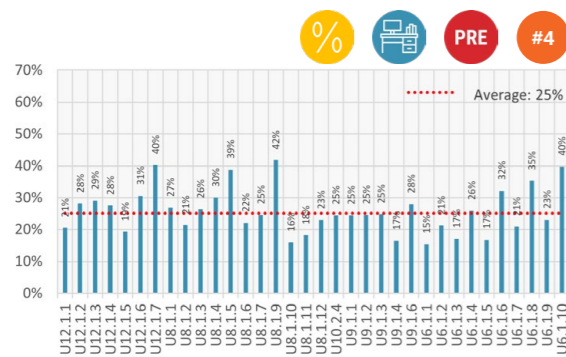


Figure A3.12: Workplaces cohort B3 - year 2012-2019 - 4 measurements/day (Campus NL, 2024)

	Pre lockdown	Post lockdown	Difference and Factor
#8/9	42%	27%	27/42 = 0,64 Minus 15 percentage points
#5/6	32%	23%	23/32 = 0,72 Minus 9 percentage points
#4	43%	30%	30/43 = 0,70 Minus 13 percentage points

Table A3.1: Changes in seat occupancy rate of workplaces (weighted mean) pre- and post-lockdown in the same measurements cohorts (Campus NL, 2024)

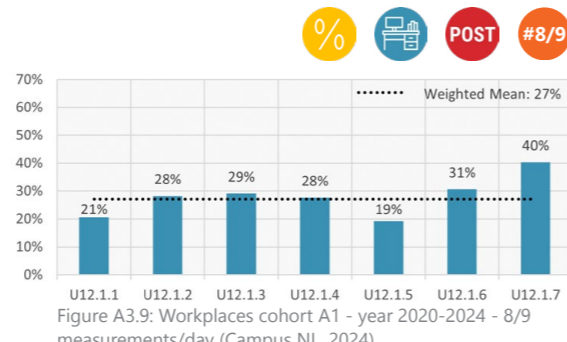


Figure A3.9: Workplaces cohort A1 - year 2020-2024 - 8/9 measurements/day (Campus NL, 2024)

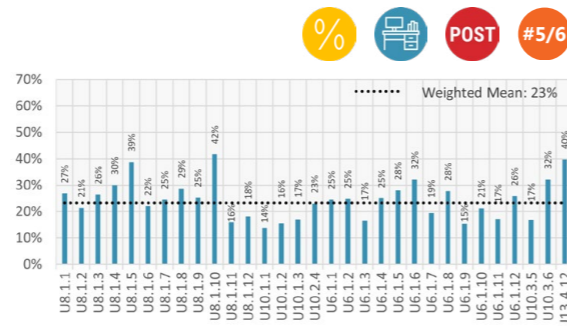


Figure A3.11: Workplaces cohort A2 - year 2020-2024 - 5/6 measurements/day (Campus NL, 2024)

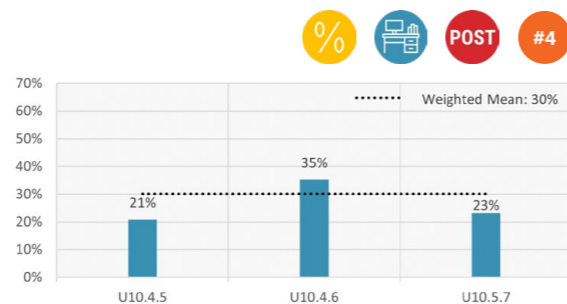


Figure A3.13: Workplaces cohort A3 year 2020-2024 - 4 measurements/day (Campus NL, 2024)

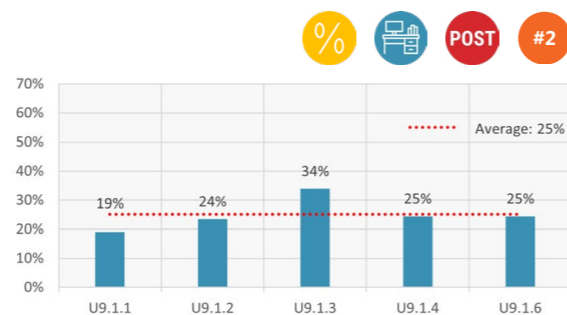


Figure A3.14: Workplaces cohort A4 - year 2020-2024 - 2 measurements/day (on peak hours) (Campus NL, 2024)

A3.3.3 Meeting spaces

We assessed the mean frequency rates of meeting spaces per building for each cohort. In total, data was collected on 63 buildings: 34 in Cohort A and 29 in Cohort B.

A3.3.3.2 Meeting spaces pre-lockdown

Cohort B covers pre-lockdown measurements (2012-2019), with the same subdivision criteria as used for working spaces. Figure A3.15 displays the frequency rates for meeting spaces in 17 buildings across three universities. The mean frequency rate is 17%, ranging from 2% (building U1.2.3) to 49% (building U3.1.1).

Figure A3.17 presents frequency data for meeting spaces in 8 buildings within the same university. The mean frequency rate is 10%, with the lowest at 5% (building U13.3.9) and the highest at 17% (building U13.3.11), characterizing this cohort by a generally low utilisation of meeting spaces.

Figure A3.19 presents the frequency rate data for meeting spaces in 21 buildings across 2 universities. The mean frequency rate was 19%, with the lowest mean frequency rate in building U10.13.36 (3%) and the highest in building U10.7.13 (41%). As not all universities provided data regarding the specific number of meeting spaces per building, this cohort is characterized by high variability.

A3.3.3.1 Meeting spaces post-lockdown

Cohort A includes post-lockdown lockdown measurements (2020-2024), using the same categorization criteria as the working spaces analysis. Figure A3.16 presents the frequency rates for meeting spaces in 7 buildings at the same university. The mean frequency rate is 28%. The lowest rate is 24% (building U12.1.4), and the highest is 33% (building U12.1.1). Buildings in this cohort typically have 25 meeting spaces, with a range from 3 to 52.

Figure A3.18 shows the frequency rates for meeting spaces in 26 buildings across three universities. The mean frequency rate is 11%. The rates range from 4% (building U8.1.2) to 30% (building U10.1.4). Information on the number of meeting rooms was inconsistently provided, with some universities detailing the number of seats instead.

Figure A3.20 displays frequency rates for meeting spaces in 3 buildings at the same university, showing a high variability between buildings. The mean frequency rate is 26%, with the lowest at 7% (building U10.5.9) and the highest at 36% (building U10.4.8). The average number of meeting spaces is 33, ranging from 23 to 38.

Lastly, Figure A3.21 illustrates frequency rates for meeting spaces in 5 buildings at the same university. No data on the number of meeting spaces was provided. The mean frequency is 40%, with the lowest at 24% (building U9.1.3) and the highest at 53% (building U9.1.6).

A3.3.3.3 Conclusions meeting spaces

In general, the frequency rate in meeting spaces increased after the COVID-19 pandemic, with variations across different cohorts. Cohort 1 saw an increase in frequency from 17% to 28%, a factor of 1.6 times. Cohort 2 had a more modest increase from 10% to 11%. Cohort 3 increased from 19% to 26% (Table A3.2). Finally, Cohort 4, which has no pre-pandemic data available, reported a frequency rate of 40% post-pandemic. This overall rise in frequency may be attributed to an increased demand for meeting spaces for hybrid groups post-pandemic. Specifically, Cohort 2 showed the lowest frequency rates

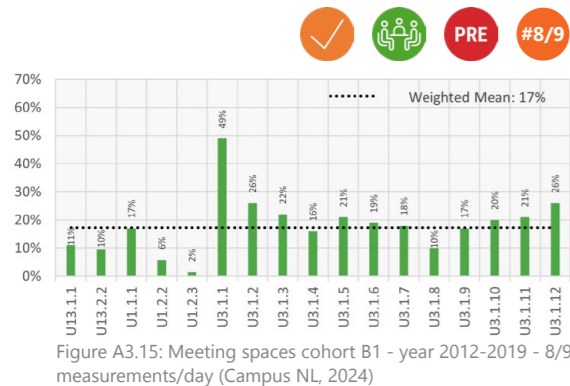


Figure A3.15: Meeting spaces cohort B1 - year 2012-2019 - 8/9 measurements/day (Campus NL, 2024)

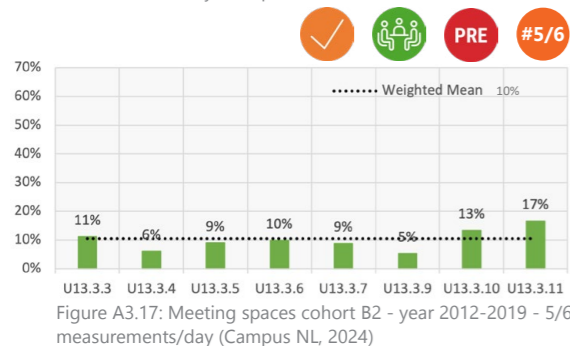


Figure A3.17: Meeting spaces cohort B2 - year 2012-2019 - 5/6 measurements/day (Campus NL, 2024)

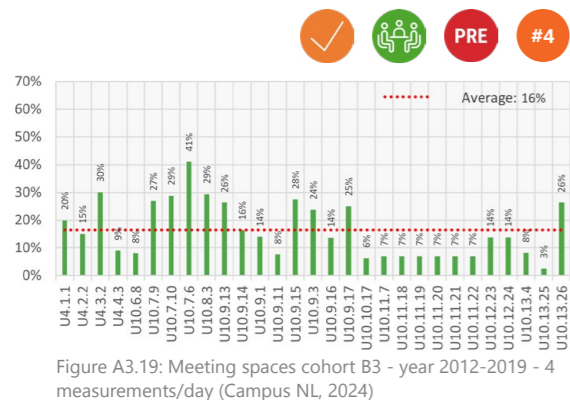


Figure A3.19: Meeting spaces cohort B3 - year 2012-2019 - 4 measurements/day (Campus NL, 2024)

	Pre lockdown	Post lockdown	Difference and Factor
#8/9	17%	27%	27/17 = 1,60 Plus 10 percentage points
#5/6	10%	11%	11/10 = 1,10 Plus 1 percentage point
#4	N/A	26%	N/A

Table A3.2: Changes in (weighted mean) occupancy rate of meeting spaces pre-post lockdown in the same measurements cohorts (Campus NL, 2024)

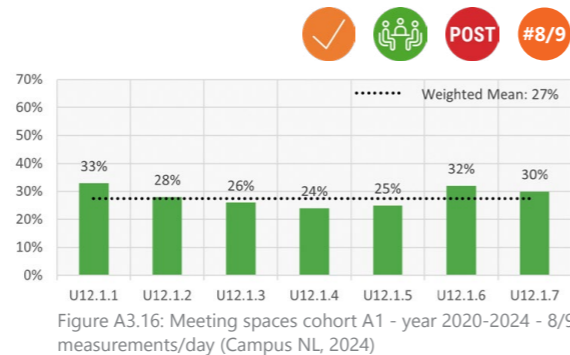


Figure A3.16: Meeting spaces cohort A1 - year 2020-2024 - 8/9 measurements/day (Campus NL, 2024)

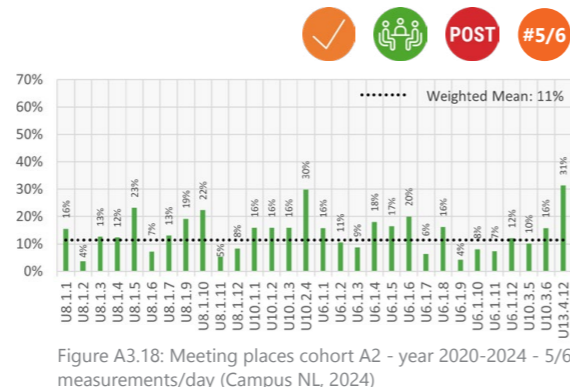


Figure A3.18: Meeting places cohort A2 - year 2020-2024 - 5/6 measurements/day (Campus NL, 2024)

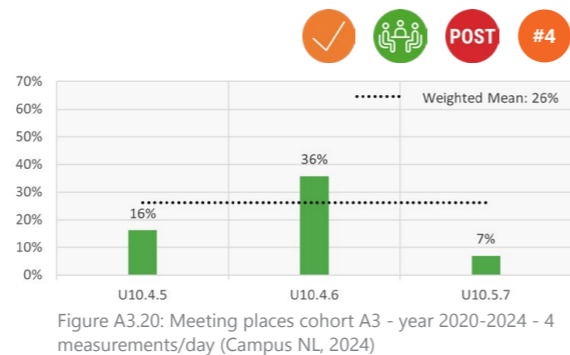


Figure A3.20: Meeting places cohort A3 - year 2020-2024 - 4 measurements/day (Campus NL, 2024)

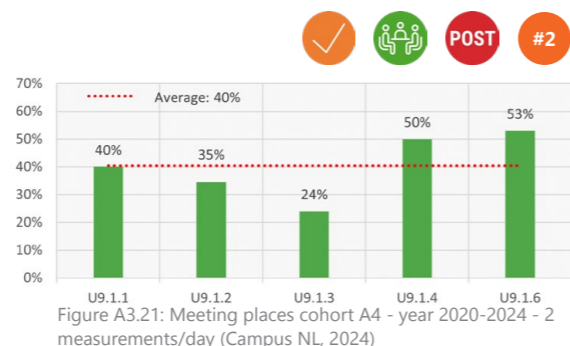


Figure A3.21: Meeting places cohort A4 - year 2020-2024 - 2 measurements/day (Campus NL, 2024)

both before and after COVID-19, while Cohorts 3 and 4 had higher frequency rates than Cohorts 1 and 2.

This means that the frequency of meeting spaces can be improved. In order to do so, it is not possible to keep (all) dedicated workplaces and universities need to decide whether they want to introduce flexible working on a larger scale.

A3.4 Signs of life in seat occupancy rates

In this paragraph the following question will be answered: **What is the average seat occupancy rates without signs of life?**

When measuring the seat occupancy in most reports signs of life are included. It is understandable to include them in the because if a workplace or meeting space is occupied by 'stuff' another person is not able to use the place. However, the place or space is not actually used by a person, so in theory it could be available. At the swimming pool, this phenomenon is referred to as "handdoekje leggen".

The percentages signs of life are given (see Table A3.3) either for the workplaces specifically, but also sometimes for meeting spaces and sometimes as average for all spaces.

University	% signs of life		
Level	Meeting spaces	Workplaces	All spaces
U2	not indicated	not indicated	not indicated
U6	0,5%	4,7%	3,6%
U8	not indicated	not indicated	4,4%
U9	unknown	unknown	unknown
U10	under investigation	4,7%	unknown
U12	not indicated	7,1% ³	not indicated
U13	not indicated	12% ⁴	not indicated

Five universities specify this percentage. The signs of life differ per type of space, whereas at U6 this is rather low for group spaces with a range from 0,4 to 1,4 (which is only % of the average seat occupancy). For individual workstations this ranges from 2,6 to 9,5%, where the latter is almost 1/3 of the occupancy rate. At U8, the signs of life range from 2,7 to 11,1% with an average of 4,4%. When looking at the signs of life as percentage of the average seat occupancy in the buildings this ranges from 16 to 31% with an average of 21%. That means that 1 in 5 places that is occupied by signs of life. In U10, we see that the average sign of life is 4,7% and a smaller range from 2 to 6%. However, this corresponds with 19% on average as percentage of the average frequency for the workplaces in the buildings this ranges from 11 to 32%. U12 has a range of signs of life from 3,1% to 11,3%, corresponding with a weighted mean of 25% for the signs of life / average occupancy, but the underlying range is wide and ranges from 16% to 35%. For U13, a visual inspection gave an average of 12% of spaces with a sign of life which corresponds with 33% of the average frequency. U13 encompasses one building with 4% of the workplaces, while U6 has 71% and U10 26% of the workplaces. As can be seen in Table A3.4, this gives an average of 23% of the workplaces that are temporary unoccupied.

Table A3.3: Signs of life workplaces space utilisation studies post-lockdown (Campus NL, 2024)

Footnote 3: Percentages of signs of life were not given, but a graph was included that showed these percentages. A visual indication gave a range of 11 to 14%. Similarly, the average occupancy was between 38 and 42%.

Footnote 4: Indicated as percentage of average occupancy per building, based on discussion between researchers and U12 weighted mean calculated.

University	% signs of life (workplaces)	% signs of life (workplaces) / average seat occupancy	Amount of workplaces per university
U6	4,7%	21%	6.864
U10	4,7%	19%	2.473
U12 ⁵	7,1%	25%	5.287
U13	12,0%	33%	348
Weighted Mean	5,0%	23%	14.972



Table A3.4: Signs of Life workplaces in relation to the average seat occupancy (Campus NL, 2024)

We can conclude that, the “signs of life” for individual workstations at universities is 5,7% (weighted mean) with range from 4,7% on average to 12%. This corresponds on average with 23% unoccupied workplaces of the average seat occupancy in buildings. As a rule of thumb for workplaces the average frequency without signs of life is 0,8 * average seat occupancy. We concluded that there is room for improvement in seat occupancy of buildings and this is even more so when the signs of life are considered. To do this, besides introducing flexible working universities can introduce a teachers-room (docentenkamer) for instance and/or using a clean desk policy.

In libraries for instance there are policies in place that when a workplace is occupied by stuff for too long and the person does not return in time, the stuff is removed from the workplace and can be collected later.

A3.5 Peak seat occupancy

In the former section, we have concluded that the average frequency in buildings give possibilities to use the space more efficiently. For capacity planning campus managers aim to have sufficient workplaces available. The target value for government offices (FWR) assumes a seat occupancy rate of 75%⁶. To see which percentage would be possible for universities the peak seat occupancy is studied and the following question is answered **What is the peak seat occupancy?**

One needs to bear in mind that this section only discusses the efficiency possibilities from the physical-functional point of view. Whether or not a university will choose to accommodate themselves more efficiently, can only be decided after taking more information from the perspectives: strategic, functional and financial into account (see management summary).

In Figure A3.22 the peak seat occupancy⁷ has been shown for all buildings in cohort A. The average of the peaks is 45%, whereas 45% of the buildings have a lower peak and 55% a higher or equal peak. One out of forty-four buildings have a frequency of 100%.

For capacity planning campus managers aim to have sufficient workplaces available and set a target value. A 70% target value is possible since 93% of the buildings in this analysis are below this line. This conclusion is on the ‘safe side’ for two reasons: (1) the peak seat occupancy includes the signs of life and (2) for capacity planning organisations will not only study the highest peak seat occupancy.

When looking at the three building above 70%, U8.1.10 (17 workplaces and 77% peak) and U6.1.6 (62 workplaces: 73% peak) falls under the 70% target if the signs of life are

Footnote 5: These numbers are based on the larger dataset as indicated by U12

Footnote 6: source: Factsheet Government Working Environment, January 1, 2015

Footnote 7: The highest peak refers to the highest recorded seat occupancy (both physical and temporarily unoccupied) during one of all the measurement moments

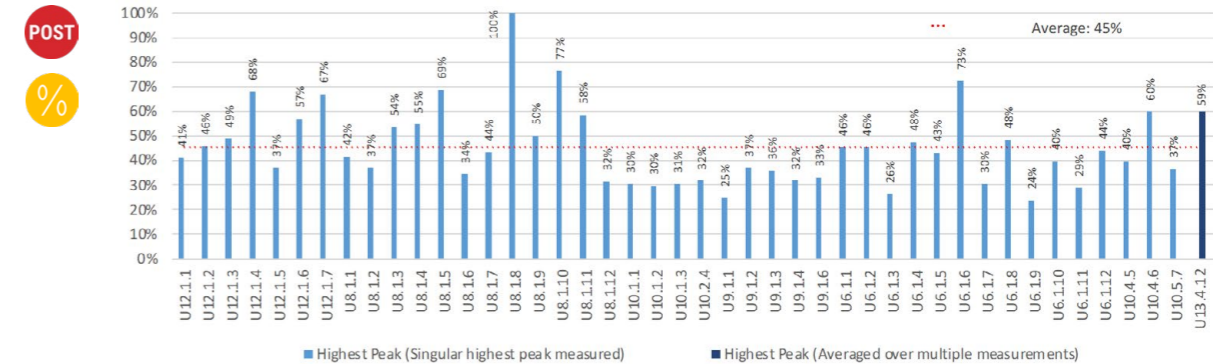


Figure A3.22: Peak seat occupancy per building in cohort A (Campus NL, 2024)

taken into account. U8.1.8 (2 workplaces: 100% peak) has a 100% peak but is so small and therefore not representative. It is possible that some employees can be present most of the time and campus managers take this into account in their analysis when studying possibilities for sharing.

Although U2 has not reported the highest peak for workplaces, it is worthwhile to look at their data as well, because they have a continuous measurement over multiple years for all types of spaces. For three buildings the highest peak measured in one year is respectively 65%, 56% and 52%: all below the 70% and still inclusive the signs of life. Whereas U13.4.1.2 did not reported a highest peak, but an average over multiple measurements, this was still lower than 70%, namely 59%.

Based on these numbers, we can conclude that the average peak seat occupancy is 45% and using a target value of 70% for capacity planning is realistic. This means that there is room for a (at least) 30% efficiency improvement. In the next steps of this research, we will discuss with the campus managers how to determine the target value based on additional analysis.

A3.6 Weekly seat occupancy patterns

Occupancy patterns are recently due to hybrid working addressed to as the camel, where the Tuesday and the Thursdays are busiest. (Even Dutch comedian Arjan Lubach has dedicated a show to this phenomenon). This section is based on 36 buildings in cohort A (post-lockdown) that report about the weekly occupancy patterns⁸ and answers the question: **Which weekly seat occupancy patterns can be distinguished?** First, we explain how the seat occupancy patterns are determined, after that the seat occupancy patterns at the universities are described, followed by the conclusion. Next to that, we study the core and peak hours at universities.

A3.6.1 Determination of occupancy patterns

For the patterns we look at the days that have a higher occupancy than the others. However, we also consider the differences between the occupancy rates per day. The occupancy can have larger difference or smaller differences. Take the graph in Figure A3.23. Although at first glance you would classify it as a camel, the occupancy rates of the Monday and the Thursday are very similar, with respectively 21 and 22%. It makes

Footnote 8: For some universities the weekly patterns are given including the underlying percentages (U6 & U13) and partially this was the case for U10. For some the patterns were visually analysed (U8 & U12) and for one (U2) the patterns have been concluded by the university themselves

no sense – if an organisation would apply peak shaving – to shift occupancy from the Thursday to the Monday. Therefore, we decided to call this pattern the Mon – Tues - Thurs pattern. Meaning that the pattern is based on both peaks and differences between days. In the following analysis, we have looked at a difference of maximum 5% between the days to include them in the weekly pattern. We realise that 5% is a larger or smaller part of the seat occupancy depending on the highest seat occupancy on a specific weekday as can be seen in Table A3.5. Therefore, the percentage that determines the pattern will be discussed with the universities in the follow-up study. Next to that, an analysis is made based on a difference of 7,5% between the days to include them in the weekly pattern which is displayed in Figure A3.23. In Figure A3.25 all patterns are displayed (see next spread).

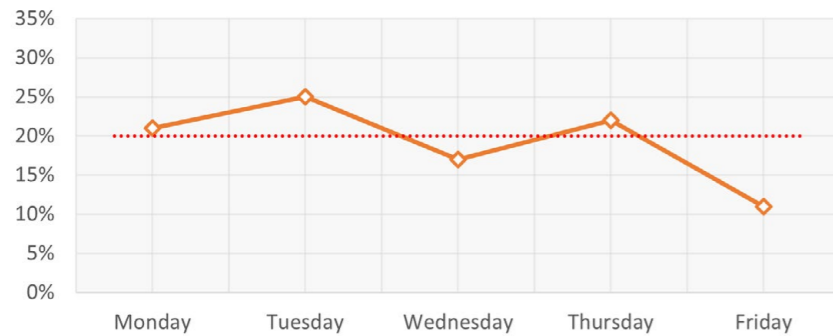


Figure A3.23: Illustrative occupancy pattern example (Campus NL, 2024)

A3.6.2 Weekly occupancy patterns at universities

At universities there are more diverse weekly patterns than the commonly referred to “camel” as is shown in Figure A3.24. We distinguish four patterns, 1 day, 2 days, 3 days and 4 days patterns: all patterns representing about 25% of the buildings.



Figure A3.24: Occurrence of the weekly day patterns (Campus NL, 2024)

There are four particular patterns that are most common as can be seen in Table A3.5. The two most popular patterns are Mon-, Tues-, Wednes- and Thursday (4 day pattern) and on Mon-, Tues- and Thursday (3 day pattern) with both 23%. Followed by the ‘camel’ which is present in 21% of the buildings and the 1 day pattern on the Monday with 18%.

Pattern					# Observed	% of Total
Monday	Tuesday	Wednesday	Thursday	Friday	9	23%
Monday	Tuesday	Wednesday	Thursday	Friday	9	23%
Monday	Tuesday	Wednesday	Thursday	Friday	2	5%
Monday	Tuesday	Wednesday	Thursday	Friday	8	21%
Monday	Tuesday	Wednesday	Thursday	Friday	1	3%
Monday	Tuesday	Wednesday	Thursday	Friday	7	18%
Monday	Tuesday	Wednesday	Thursday	Friday	2	5%
Monday	Tuesday	Wednesday	Thursday	Friday	1	3%
Total					39	100%

Table A3.5: Occurrence of the weekly patterns (Campus NL, 2024)

In general we can conclude that the higher the occupancy on a certain day, the bigger the differences between the days. The largest group (10 buildings) has a highest occupancy on a certain day between 21 and 30% and a differences of 10-20% with the day that has the lowest occupancy. The second largest group has a highest occupancy on a certain day between 31 and 40% and a differences of 20-30% with the day that has the lowest occupancy.

If we look at the specific universities, U2 has a very low occupancy on the Fridays, while the occupancy on the other days is similar.

University U6 has provided weekly patterns for each of their buildings and the 3 day pattern on Mon-, Tues, Thursday is the most prevalent followed by a flatter 4 day pattern where only the Friday has a lower occupancy and only 2 buildings have a camel pattern (Tues-Thursday). Half of their buildings have a highest occupancy between 21 and 30% with differences of 10-20%. Some buildings have a highest occupancy between 31 and 40% and differences of 20% per weekdays,.. For U6, mostly the Friday is the day with the lowest occupancy except for two buildings where the Monday or Wednesday is the lowest.

U8 has provided weekly patterns for each of their buildings and the 2 day pattern on Mon and Tuesday is the most prevalent. In general they have a lower occupancy on both Wednesday and Friday.

Looking at the averages of two weeks, the most prevalent patterns for U10 is the 3 day pattern on Mon- Tues and Thursday. Because not all average percentages per day of the week are displayed in the graph, we cannot exactly give the differences between the days, but a visual inspection gives the impression the differences at U10 are not so big and are less than 5%. In one building the Wednesday is the least occupied day and for the other building the Wednesday and Friday are similarly lower.

University U12 also presented the patterns per building like U6 and concluded that they mostly have the “camel-like” pattern. In our analysis some have the camel-like pattern, but when looking at the 5% difference per day, most of them are classified as a 1 day pattern on the Tuesday if a difference of 7,5% or 10% per day would be taken more buildings would have the camel or the 3 day pattern of Mon-Tues- and Thursday. Making it interesting to study which percentage should determine the pattern.

For U13, the pattern is the camel.

At the universities, more diverse occupancy patterns are observed with the most prevalent patterns: the 4 day Monday to Thursday pattern and the 3 day Mon - Tues – Thurs pattern. The camel is observed in more than 1/5th of the buildings and the 1 day pattern on Tuesday is seen in a bit less than 1/5th –of the buildings. Universities that reported all their buildings separately also show diverse patterns. These more diverse patterns can be caused by the different tasks that are performed at universities: education, research and valorisation.

Results have shown that there are possibilities to raise the average occupancy rate per day. When, looking at weekly patterns, giving the diversity per building, the use of the specific building should be the starting point. This process is often referred to as peak shaving and aims to distribute the use of the university buildings more evenly to all days of the week. Peak shaving can be used, next to raising the occupancy for all days. Peak shaving is only interesting if the peak occupancy will be higher and close to the target value. Universities need to change their way of working and scheduling if they want to achieve peak shaving.

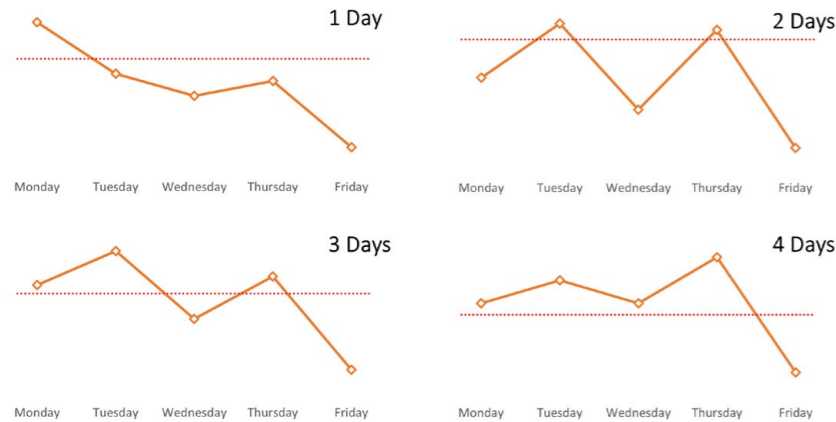


Figure A3.25: Illustrative examples of the four distinct weekly patterns, vertical axes have been scaled differently and do not start at zero. (Campus NL, 2024)

Looking at the weekly patterns it could be interesting to study the buildings that have a 4-day occupancy. Is that the case for specific faculties, specific ways of working or have specific measures been taken to create these patterns.

A3.6.3 Core and peak hours

Five of the universities (U2, U6, U8, U10 and U12) analysed the core and peak hours per hour for each building (n=36). Two reports were excluded as they provided average of the core and peak hours data across multiple buildings rather than providing specific ones per building. Another report was excluded because it only provided occupancy data per floor. Core hours are defined as hours that the frequency is above 20% and peak hours indicates the hour that is busiest during the day.

The core hours shown in the Table A3.6 refer to the post-lockdown pandemic (after 2020). It shows that the for the majority of the buildings, core hours are from 8.30-9.30 (depends on the time the measurement started) until 16.30-17.30 (the last measurement time). Mondays, Tuesdays, and Thursdays showed more often this patter, whereas for Wednesdays and Fridays the core hours concentrate in shorter intervals during the day.

Peak hours were mostly registered during lunch time and in the early afternoon. The highest frequency was from 11.00 to 12.00 and from 14.00 to 15.00. In some cases, from 13.00 to 14.00⁹ or 13.30 to 14.30 or from 14.30 to 15.30. Rarely, peak hours were registered after 16.00 or before 10.00.

These occupancy measurements are based on all types of rooms (which we refer to as level 1) in combination with a weighting so that office rooms for instance have a greater weight that phone booths for instance and include signs of life.

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Total
08:30-09:30 to 16:30-17:30	18	17	9	17	6	67
11:00 to 17:00	3	2	2	3		10
10:00 to 16:30	3	2	2	2		9
10:00 to 17:00		4	1	3		8
10:00 to 15:30	1	1	2	2	1	7

Possibilities:
 These frequency rates (around 25%) give opportunities for improvement of the efficiency. When a university would like to take more precise measures core and peak hours can help them to either better schedule events. For instance, events could be strategically planned in the morning to spread out attendance or scheduled during peak hours to maximize higher occupancy rate.

Table A3.6: Most frequent core hours in weekdays (Appendix C shows core times that occur less than 5 times) (Campus NL, 2024)



Table A3.7: Available data per university level 3 and 4 (Campus NL, 2024)

University	Workplaces	Meeting places
U2	No specification - level 1	No specification - level 1
U6	No specification - level 1	No specification - level 1
U8	No specification	No specification
U9	Office rooms (assumed closed) and open workplaces (assumed open) and closed	Phone booth and meeting spaces and use per meeting space by 1 person
U10	Diversity of workplaces	Diversity of meeting spaces
U12	Single-, multiple workplaces, phone booth and 'touchdown' space ¹⁰	No specification
U13	Open and closed & number of persons per room	Open and closed

A3.7.1 Open and closed workplaces

When looking at the difference between open and closed workplaces at U9, Figure A3.26 and Figure A3.27 show that the room frequency in open spaces (average 67%) is higher than in closed spaces (average 43%). While for the room occupancy it is the opposite because the room occupancy is 19% for the open spaces and 27% for the closed spaces. For U13, for room frequency the same conclusion can be drawn with an average room frequency of 45% for open workplaces¹¹ and 39% for closed workplaces as can be seen in figure A3.33. The room occupancy in both type of rooms is slightly higher in open spaces than closed spaces with respectively 30% and 27%. The descriptions of closed and open spaces by U9 and U13 can have different a slightly different meaning (see footnotes). The differences between buildings are large though. Note that U9 measured at the peak moments with two measurements, while U13 performed six measurements per day.

Footnote 9: For U2 this is the case in 80% of the days in the three buildings that have been measured

Footnote 10: aanlandplek in Dutch

Footnote 11: U9 refers to closed and open spaces in their space utilisation study, while U13 (slide 6) shows that closed rooms have 1 to 8 persons per room and open spaces 2 to more than 8 persons in the space

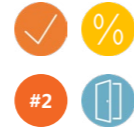
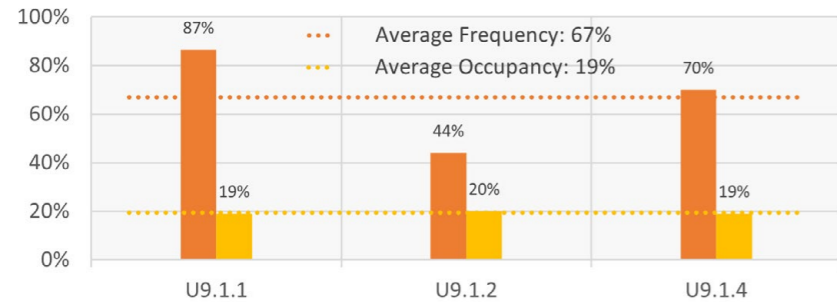


Figure A3.26: Room frequency and room occupancy open spaces [U9]¹² (Campus NL, 2024)

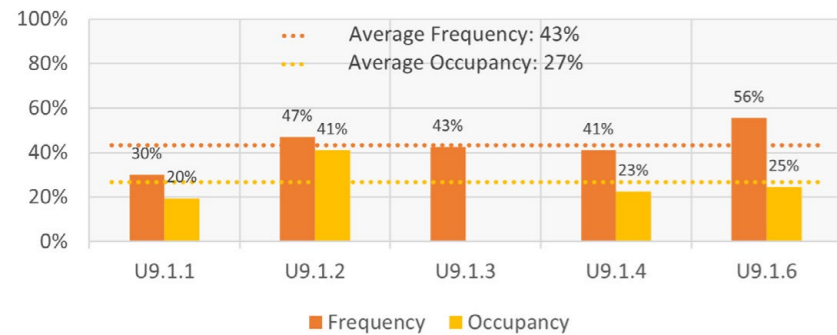


Figure A3.27: Room frequency and room occupancy closed spaces [U9]¹³ (Campus NL, 2024)

When looking at the peak room frequency for U9 in open and closed spaces, it is on average respectively 83% and 56%, while the peak room occupancy is very similar with 34% for the open spaces and 36% for the closed spaces. Two buildings even have a room frequency of (almost) 100% which shows that people first fill the different spaces before filling up a space, because in one of the buildings the room occupancy is as low as 25% while the other is 50% (be aware for U9 this is not a daily average but based on the two measurements in peak hours).

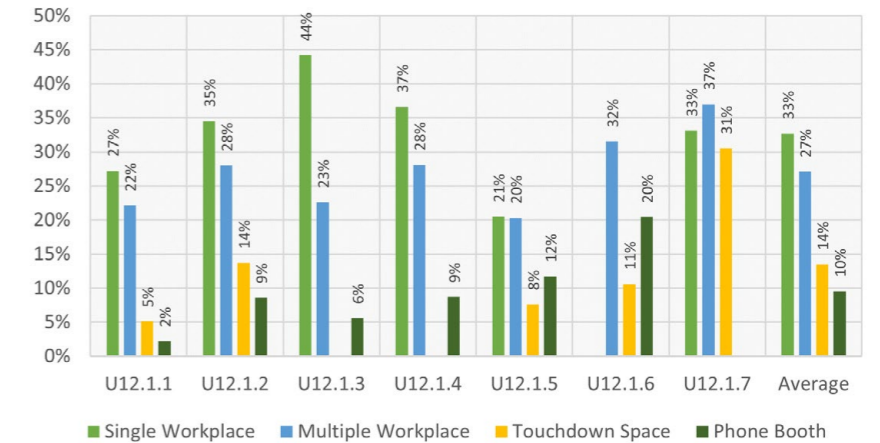
The room frequency is higher in open spaces than in closed spaces, but for the room occupancy closed spaces are higher than open spaces in U9 but not in U13 where open spaces have a slightly higher room occupancy than closed spaces.

University U12 made an analysis per type of workspace in which they distinguished four types of spaces (Figure A3.28). Single workplaces have the highest average room frequency (33%), followed by the multiple workplaces (27%), whereas the “touchdown spaces” and the phone booths are lower with 14% and 10% on average. There are differences per building, but the order is almost the same for each building except for U12.1.7. Based on the numbers provided by U13, we also concluded, for the closed workplaces, that the single workplaces (49%) have higher room frequency than the multi workplaces (36%). Since most of these workplaces (probably) are ‘designated’, i.e. fixed, it is more relevant to look at the room occupancy which upholds the conclusion with 32% and 25% respectively but the difference in room occupancy is smaller than for the room frequency. U13 did not have any single workplaces, so for those spaces this comparison cannot be made.

University U13 not only made a distinction between single and multi-workplaces, but also made an analysis per room size, as can be seen in the Figure A3.29. For the closed rooms: “the fewer persons per room, the higher the room frequency” and the 1-person room has the highest room frequency with 49%. For the open spaces this is the opposite, the more persons per room the higher the room frequency, although this correlation is less strong and only valid for the room frequency and not for the room occupancy.



Figure A3.28: Room frequency different workplaces [U12]¹⁴

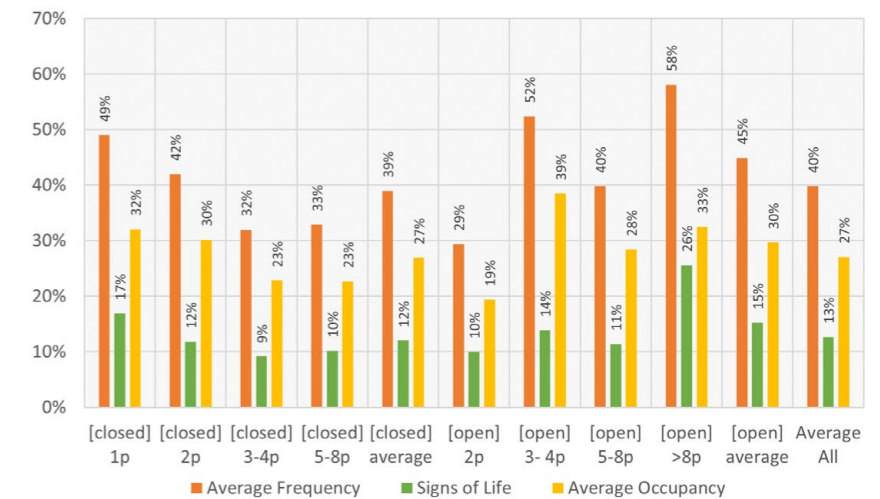


In closed rooms: the fewer persons per room, the higher the room frequency.

University U10 made a different distinction in workplaces as can be seen in Figure A3.30 and determined the room frequency and room occupancy for in total almost 2000 workplaces. The weighted mean room frequency is 24% and the weighted mean room occupancy 19%, which is lower than registered at U10. The difference between the spaces is not that big, but three spaces are the most common: fixed desk (1085), office desk (625) and standard workplace (191)¹⁵.



Figure A3.29: Average frequency, signs of life and room occupancy per room type for U13 (Campus NL, 2024)



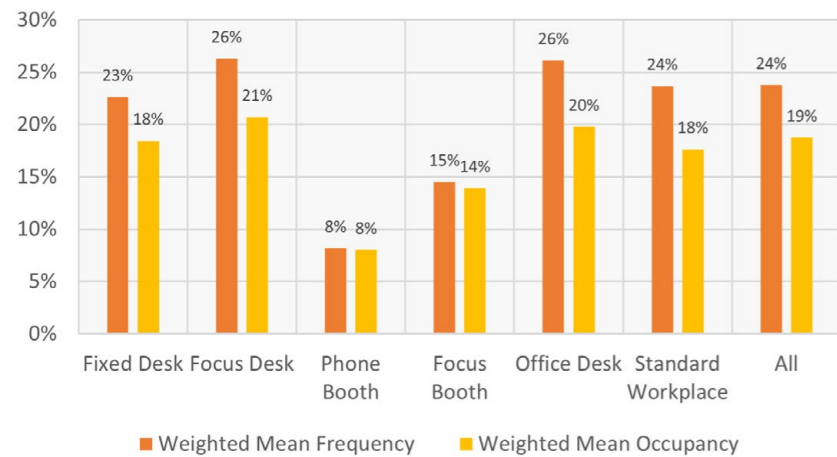


Figure A3.30: Weighted mean room frequency and room occupancy for different (types of) workplaces [U10.1 to U10.5] (Campus NL, 2024)

A3.7.2 Meeting spaces

For meeting places it is important to study the room frequency but also to look at the capacity of the room. For meeting spaces if the room is used, regardless of the amount of persons that use the room, nobody else can use the room. For workplaces this is not the case as explained in A3.

In the table underneath, we can see as expected that in meeting spaces at U10: "the higher the capacity of the room, the more persons present". However, we can also see that the number of persons in relation to the capacity is negatively correlated with the room size. This means that "the bigger the room, the more the room is not used to its full capacity". On average 3,5 persons are in a meeting space, based on the observed data (see Figure A3.31). Larger rooms are meant for larger groups, however if meetings with more than 9 people are not that frequent it is good they are used by smaller groups.

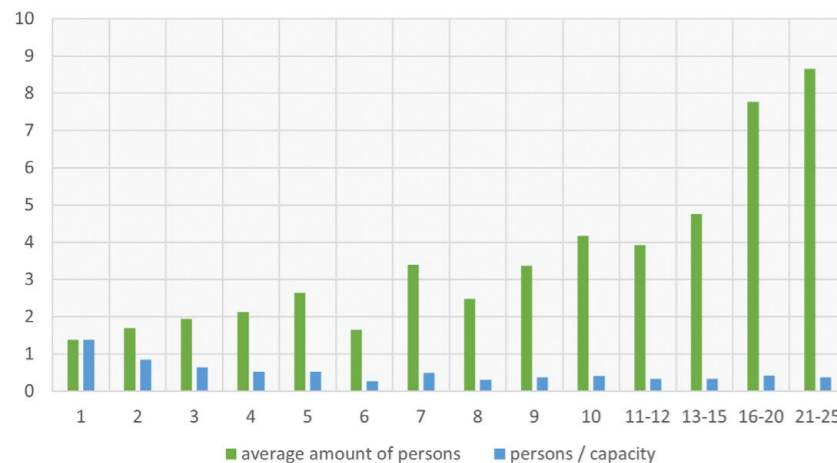


Figure A3.31: Room occupancy (number in persons in a room – (Y axis divided by the capacity of the room (X axis, number of persons) (U10) (Campus NL, 2024)

Footnote 15: It could well be that these workplaces are similar but have been given a different names in the reports based on how they are called in a particular building

In principal it is not a problem if a room with a larger capacity is used by a smaller group. If the room is available and the room is needed because smaller meeting spaces are fully occupied. In that case, it is better that it is used than not. However, it could be a problem but that is dependent on the booking behaviour in a university. If larger rooms are booked by smaller groups, while smaller meeting spaces are available. It could happen that larger groups have no meeting spaces available, although they could have been one available.

Next to that, for the capacity planning universities want to know whether they have the right mix of meetings spaces. This data, especially when collected year over year (or based on an planned meetings spaces), can inform universities if they have the 'right' amount and type of meeting spaces.

A3.7.3 Conclusion

The room frequency rate varies in different types of spaces. At U9 and U13, the room frequency is higher in open workplaces than in closed workplaces. The room occupancy however is inconclusive, in one university it is higher in closed spaces and in one it is higher in open spaces. For the open spaces U13 showed that the spaces with more than 8 seats had the highest room frequency. For the closed spaces U12 showed that the single workplace is most used, followed by the multiple workplaces, touchdown-spaces and the phone booth, however in this set we do not know whether the multi workplaces are open or closed. When only looking at closed rooms, the single workplace is also the most used (of the closed rooms but not of closed and open rooms jointly) at U13, but they also observed that "the less persons per room, the higher the room frequency".

A3.8 Seat occupancy and workplace norm

In this section the following question will be answered **What is the relationship between seat occupancy and a provisional workplace norm?**

University U8 made an analyses per organisational unit of the average seat occupancy¹⁶ versus a provisional "workplace norm". The workplace norm (a space standard used to plan or allocate offices) they have used in their analysis is a provisional bandwidth of 0,7 to 0,9 workplace per fulltime equivalent (fte) university staff. Four units fall within this range, one unit is below the norms while the other 10 of in total 15 units are accommodated above this norm (see Figure A3.32). Although this is an provisional norm, it shows that there is a negative correlation of (-0,65) between the average occupancy and the amount of workplaces per fte. Meaning that less workplaces per fte, lead to a higher occupancy.

We can conclude that according to expectations, if organisational units are accommodated "within the workplace norm", the occupancy of workplaces is higher.

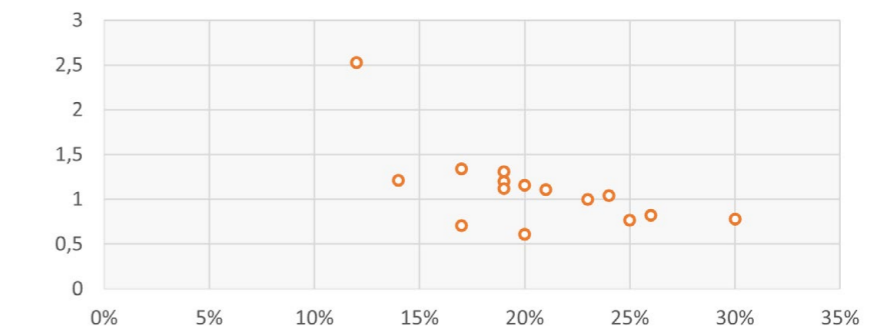


Figure A3.32: Relationship between average occupancy and workplaces per fte (bandwidth norm from 0,7 to 0,9 workplace per fte is included in the graph) (Campus NL, 2024)

Footnote 16: U8 has processed the information from report U8.1 in this particular analysis, to use the average occupancy per organisation unit

A3.9 Summary, conclusions and discussion

In September 2023, it was decided (by SBF, HOI, and DFB) that figures on space utilisation were important, especially actual occupancy and utilisation. In the first months of 2024, campus contacts were asked to provide their occupancy and utilisation measurements from recent years. Ultimately, the research team received a large number of studies, dating from 2012 to 2024.

The Campus NL team is proud of the collectively gathered data: over 100 buildings encompassing nearly 33,000 workspaces. This has allowed Dutch universities to collectively build a database that can be expanded in the (near) future. The comparison in this study is based on the data from the reports. For the expansion of the database, we see two possibilities: on the one hand, we aim to aggregate the underlying source data in a joint data warehouse, this will make more data available at measurement level for additional analyses (the quantity of data increases). On the other hand, we want to include more (explanatory) data in the database: what characteristics of accommodation solutions lead to low or high occupancy and what can we collectively learn from them? The universities are also considering giving new studies the same format to increase comparability - which was not optimal now.

Naturally, many conclusions can already be drawn from the current database, which are summarized below.

The current working practices of universities are reflected in the occupancy rates of buildings. These practices include individual choices about why and when people come to the office, as well as how scheduled meetings and educational activities are planned.

- **The average occupancy rate of office spaces is clearly lower post-COVID than pre-COVID, ranging from 23% to 30% (post-COVID) compared to 32% to 43% (pre-COVID) (see table).** This is a decrease of 9 to 15 percentage points, meaning the post-COVID occupancy is 2/3 of the pre-COVID occupancy. Looking at the post-lockdown studies that took many measurements per day (8 to 9 measurements), the average occupancy per day is 27% compared to 42% pre-lockdown. This is post-lockdown slightly lower than in the study with 4 measurements per day where occupancy was 30%. We study the seat occupancy of the workplaces, because universities aim to provide their employees with a sufficient capacity of workplaces. Therefore, from a capacity point of view it does not matter how many workplaces (i.e. seats) a room has; the workplaces can always be used if they are "free".

	Pre lockdown	Post lockdown	Difference and Factor
#8/9	42%	27%	27/42 = 0,64 Minus 15 percentage points
#5/6	32%	23%	23/32 = 0,72 Minus 9 percentage points
#4	43%	30%	30/43 = 0,70 Minus 13 percentage points

Table A3.8: Changes in seat occupancy rate of workplaces (weighted mean) pre- and post-lockdown in the same measurements cohorts (Campus NL, 2024)

- In order to have sufficient workplaces available, campus managers also study peak occupancy because not all days are equally busy. **When looking at the highest measured values, the "average" peak load is 45% (post-COVID) across 44 buildings. The busiest times are between 11:00 and 12:00 and between 14:00 and 15:00.** At the same time, many occupancy measurements count a workspace as "occupied" if there is a coat, bag, or laptop present as a "sign of life." Studies that noted this separately show that this can lower the occupancy by a factor of 0.2 to 0,25.

- **Unlike workspaces, meeting spaces were better utilized post-COVID. Here, there is a wide range from 11% to 40%. note that this measures if the meeting room is "used": this is also the case when only one person uses a meeting room with a small, medium or large capacity).**
- The so-called "camel" (Tuesday-Thursday peak in space usage) is also observed in the academic office, but only in 1/5th of the buildings. Together with another two-day pattern (Monday-Thursday) 1/4 of the buildings have a two-day peak. At universities, we observed four patterns: besides the two-day pattern, there were also patterns with a peak on 3 or 4 days or only on 1 day of the week. All patterns have around ¼ of the buildings: 1/4 of the buildings had a four-day pattern (Monday-Tuesday-Wednesday-Thursday), and 1/4 had the three-day or one-day pattern (1/4). The days when it is busy differ. Monday is also relatively busy at the university. Based on the information available in the space utilisation studies, we cannot conclude what causes these differences, but teaching alongside doing research certainly contributes to it. Universities that reported all their buildings separately also show diverse patterns. These more diverse patterns can be caused by the different tasks that are performed at universities: education, research and valorisation.
- **Four universities examined post-lockdown the occupancy and utilisation of specific spaces, but because the number of measurements varies from university to university, not all data can be compared one-to-one. Most universities also do not know whether the workplaces are shared or not, how the spaces are furnished and whether they have been recently upgraded or not. Nevertheless, we provide some insights from these studies to get a picture of how spaces are used. This information can be used -by a university- to determine whether they have the right mix of workplaces.**
 - Room frequency is higher at U13 in open spaces (45%) than in closed spaces (39%), this is the same at U9. Looking at room occupancy does not give an unambiguous picture, at U13 the difference is very small (open workspaces 30% and the closed workspaces 27%. and U9 has just the opposite picture (open workspaces 19% and closed workspaces 27%).
 - At U13, for the closed spaces it was found that 'the less capacity in a space, the higher the occupancy': the individual workstation has the highest room frequency at 49%. This is higher than the average of the open spaces (45%), but lower than the room frequency of the >8 person spaces (58%) and the 3-4 person spaces of the open spaces (52%).
 - U13 has an room occupancy rate of 30% in open work places compared to the average room frequency rate of 45%, with only room frequency in 3-4 person spaces being higher than the average (38%). At another University (U10), the difference between room frequency and room occupancy is less pronounced, and the average room frequency rate (19%) is lower.
 - At U12, individual workstations are on average the most occupied (33%), followed by multi-person work places (27%). 'Landing' work places and the 'phone booths' are the least occupied here. This is not entirely comparable with U13 and U9 because in this study the distinction between open or closed places is not made; the multi-person places can therefore be either open or closed.
- **Occupancy is higher in organizational units that are accommodated according to a provisional space norm, as shown in a study by U8. In the future they aim to determine a space norm.**

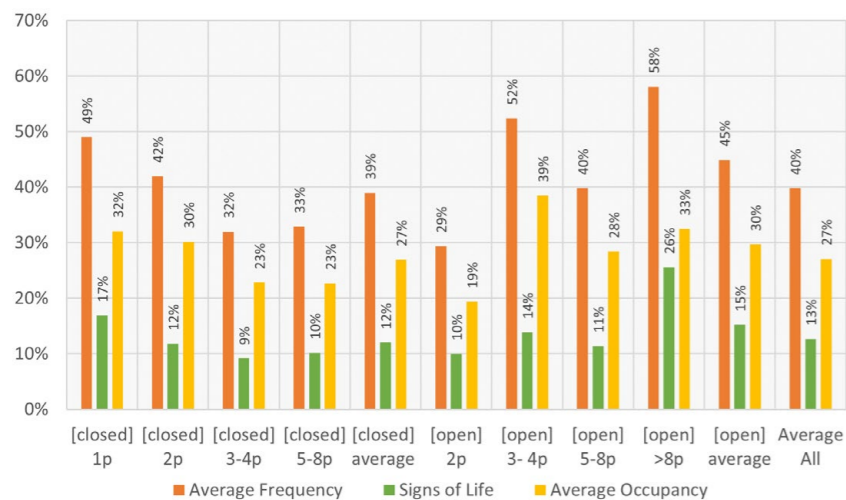


Figure A3.33: Average frequency, signs of life and room occupancy per room type for U13 (Campus NL, 2024)

A3.9.1 Discussion: Making (at least) a 30% Reduction Theoretically Possible

The current way of working and planning at universities leads to occupancy rates between 23% and 30% including signs of life. The average seat occupancy shows that the space can be used more efficiently, next to the average campus managers also study peak-occupancy in order to provide sufficient work places also on the more busy days and hours. For government offices a target value of 75% is used. With an average peak occupancy of 45% post-lockdown, with the lowest peak seat occupancy of 24% and an exceptional highest average occupancy of 100% which is caused because in this building only 2 workplaces were studied. It can be cautiously concluded that universities can aim for 70% as a target value for capacity planning. More than 90% of buildings have a lower peak occupancy than this. This conclusion is on the 'safe side' for two reasons: (1) the peak seat occupancy includes the signs of life and (2) for capacity planning organisations will not only study the highest peak seat occupancy. It is most effective to first improve occupancy for all days by further exploring the possibilities for flexible working if universities choose – taking everything into consideration (see other sections of the book– to change the space use).

A3.9.2 Discussion: “Space Use and Utilisation Also Allows for Peak Shaving”

Additionally, universities can use peak shaving. Although, this is not the most effective measure they can take, it can still be interesting from a mobility point of view to avoid the hyper rush hours. Peak shaving is possible by intensifying the use in the (early) mornings or spread the usage over more days, as the weekly patterns show. This needs to be based on specific measurements for a building as the patterns differ greatly. This requires a different way of space planning and scheduling (of meeting rooms).

There is certainly room—literally and figuratively—to increase occupancy on all days of the week. The demand can also be better spread over the hours of the days and the days of the week.

A3.9.3 Summary

The occupancy/utilisation figures indicate that a “repurposing” of up to 30% of office space is feasible. This “repurposing” could mean not constructing additional buildings despite growth, facilitating more educational activities in office spaces, or even selling, (circular) demolition, or transforming spaces into housing. See Part III of this report for (extreme) strategies and other solutions.

Universities can use this management information to make informed decisions. This will always be done in combination with the results from other parts of this study, such as trends impacting the size of universities, sustainability goals, and available resources.

A3.9.3 Next steps

This first comparative analysis has provided valuable results and discussion points for universities which they can use in combination with the results of the other perspectives (organisational, functional, financial). For the space utilisation study, the next step is to determine in a workshop with the campus managers and/or campus contacts, if this information is sufficient for decision making. This will provide input for the next steps in this study and will guide the expansion of the database.

References and further reading

This chapter is based on a list of utilisation studies, which can be found in appendices A-D.

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