Students’ Usage and Perception of the Collaboration Commons

“I would like more spaces like this...In an ideal world, I would want the whole library to look like this.”
– junior, biology
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Executive Summary

The Collaboration Commons in Pattee Library opened in fall 2019, a 10,000-ft² space designed to facilitate group work and serve as a second “bring your own device” location in Pattee and Paterno Libraries. At the request of Libraries Administration, the Assessment Department conducted a mixed methods study of student use of the Collaboration Commons during the fall semester. The goals of the study were to investigate a) how students were using the new space, b) whether students need more spaces like this and c) what impact the space had on students’ academic work. The research team conducted in-situ interviews with students who were asked about their use and perceptions of the Collaboration Commons and conducted a focus group with members of the Libraries Student Advisory Board. The team also conducted a parallel observation study of seating type usage and decibel levels in different zones of the Collaboration Commons. Decibel levels were also measured at selected locations in Pattee and Paterno Libraries to use as comparison. Through the process of triangulation, several threads emerged, resulting in the key findings that follow. These key findings can be used to inform future renovations and space planning in the University Libraries.

Key Findings

- Students described feeling “motivated” in the open space, surrounded by others who were also working. They said that the color, light, windows, and brightness of the space helped them focus, and that the design aesthetic created a relaxed and calm environment. The importance of lighting became an emerging theme in the qualitative analysis, due to the ubiquity of participants’ comments referring to the brightness of the Collaboration Commons, often in contrast to other library locations.

- The equipment and furnishings in the Collaboration Commons facilitated productivity—the mobile whiteboards, availability of outlets, powered furniture, and large tables were features that interviewees said enabled them to “get work done.” Of note was the versatility of the furniture — students felt comfortable moving seats and tables around depending on their needs. They were observed using almost all available seating types, with armless chairs and booth seating being especially popular. Few students were observed using ottomans or stools.

- The 16 new group study rooms in the Collaboration Commons are highly utilized and were preferred by students over the open area when it came to more vigorous group work. In the first two months of the fall term, total group study room reservations in Pattee and Paterno Libraries increased 40% over the previous year, suggesting that the renovation increased the Libraries’ ability to accommodate previously unmet demand for collaborative group study. Students used the group study rooms to work on projects, practice presentations, or hold brainstorming sessions. Regular users said they reserved rooms just to have a more secluded environment to work with friends.

- The open space was generally preferred for light collaboration. Approximately half of those interviewed were working in groups but were not collaborating on projects. Instead they were working on assignments, “parallel studying,” or spending time with their friends between classes.

- The observation data showed that the busiest period in the Collaboration Commons was during the afternoon. In general, most of the students said they typically visited the area before or between classes. Many students talked about how it was hard to find a seat after midday—this
Despite the mean occupancy rates in the five largest zones never reaching 50% at any time of day.

- Many students working on their own were observed in spaces intended for group work (for example at a booth or round table). This, coupled with a general reluctance to sit next to another student occupying a table intended for a group, may explain the lower than perceived seat occupancy rate.

- Despite its open layout, the Collaboration Commons is a quiet environment. Mean decibel levels recorded in different zones within the Collaboration Commons were comparable to the Paterno Family Reading Room, a space dedicated to quiet study. Students were comfortable speaking in the Collaboration Commons and acknowledged that they self-regulated their voices out of respect for others.

- Students said that while there were other similar modern study spaces on campus, what set the Collaboration Commons apart was the availability of resources and the perception that the library historically communicated the idea of being a place to focus and work.

- While students enjoyed working in the Collaboration Commons, they wanted the Libraries to maintain a mix of different types of spaces. Some noted that for intense study, an environment that was more secluded and private was preferred, such as the stacks or the carrels on the third floor of Pattee Library. Overall, students appreciated the availability of different types of spaces in the Libraries.

**Implications for future spaces**

- The design aesthetic, equipment, and resource availability of the Collaboration Commons create a motivating environment—future renovations should capitalize on these aspects, drawing from and evolving beyond the affordances of the Collaboration Commons.

- The data show that despite its openness, the Collaboration Commons is relatively quiet. Future renovations will benefit from integrating similar design and architectural elements that minimize noise.

- Student prefer to use functional seating, i.e. seating that provides adequate support when using a laptop or writing, over seats with no back support—a consideration that should factor into furniture planning as minimal use of seats without back support was observed.

- The Libraries should continue to maintain a balance of different types of spaces where students can go depending on their needs. Future planning should ensure that the combination of open and private study spaces that currently exists is maintained.
• Spaces designed to support collaborative work are unlikely to reach high occupancy rates, as demonstrated by the observation data. To provide a balance of spaces, the Libraries would benefit from an investigation quantifying the amount of space designed to accommodate individual and quiet study to ensure that a balance is maintained.

• As observed and reported activity suggest, more individual and parallel studying than active collaboration is taking place. With this in mind, future renovations of study areas should accommodate high density seating to increase capacity for and facilitate individual study needs, while acknowledging the cultural reluctance observed of sitting next to a stranger at tables intended for collaboration.

• As additional spaces receive updates, acknowledge the impact of lighting on the experiences described by interviewees. Where possible, consider updating lighting to integrate white over yellow light. Per technological advances updates of this variety will have additional benefits to energy and cost savings.

View visualization of Collaboration Commons occupancy by time of day on Tableau:

[Collaboration Commons Use Assessment]
“This space is a lot more calming than other spaces. I can’t really put my finger on it, I think it may be the color scheme.”  
– junior, elementary education

Light: Students said the abundant natural light and bright white overhead lighting helped them stay focused.

Open line of sight: Seeing others engaged in work was a “motivating” factor.

Versatile: Students liked the ability to reconfigure the furniture according to their needs.

“I’m a lot more productive than if I go other places that are a little noisier because it’s kind of nice and quiet down here but not too quiet that you can’t talk with people that you are working with.”  
– junior, biobehavioral health

Functional and spacious: The powered tables, which can accommodate multiple people and their belongings, enabled students to “get work done.”
Background

The Libraries Assessment Department conducted its first space study, *Investigating Students Workplace Needs*, in fall 2016, which examined usage of the Knowledge Commons in Pattee Library. Through observations, interviews, and a focus group, the study found that students wanted larger tables and more outlets than were currently available. The second study, *News Library Renovation*, focused on the BYOD aspects of Dr. Keiko Miwa Ross Global News Center. Findings showed that the space was heavily occupied though generally used for social activities and light productivity. Building on these findings, the Assessment Department sought to investigate use of the Collaboration Commons.

This report explores usage of the Collaboration Commons in Pattee Library, which opened in fall 2019. Through its open layout and flexible furniture configuration, this 10,000-ft² space is designed to encourage collaborative work and serve as a second “bring your own device” (BYOD) location in Pattee and Paterno Libraries. This assessment investigates the following: How are students using the Collaboration Commons? What impact does the space have on their academic work? Do students need more spaces like this?

Research goals

- Identify how students are using the Collaboration Commons
- Investigate students’ perceptions of how the space supports their academic work

Secondary goal

- Explore sound measurement in the Collaboration Commons by “zone”
- Compare the noise level to other similar open study areas in the Libraries

Research team members and roles

1. Lana Munip, Analysis and Planning Consultant – Principal Investigator, protocol development, logistics, interview facilitation, data analysis and management, reporting
2. Steve Borrelli, Head of Library Assessment – Protocol development, interview and focus group facilitation, data analysis, reporting
3. Laura Spess, Information Resources and Services Specialist – Protocol development, logistics, interviews and focus group facilitation, data visualization

Institutional Review Board

The team submitted study materials to the Office of Research Protections for review. However, the submission did not meet the federal definition of research per not meeting the criteria for “generalizability.” As such an Institutional Review Board review was not required. A study ID of STUDY00013297 was secured, and standard practices for human subject research were followed.

Methods

This report draws heavily on data from semi-structured interviews and one focus group session. The goal of the interviews was to collect multiple accounts of students’ experiences in the Collaboration
Commons, from which across case themes related to use and perception of the space, would emerge. By augmenting interviews with a focus group session, the researchers aimed to bring greater depth to data collection. In addition to the study's qualitative component, an observation study of occupancy by seat type and decibel level by location and time of day was conducted.

Interviews

Semi-structured in situ interviews were conducted with 34 students (30 undergraduate and four graduate students) over the course of the research project, between September 23 and October 11, 2019. A 10-question interview protocol was administered (see Appendix I). Recordings were transcribed and QSR Internationals’ NVIVO 12 software was used for coding and analysis. The research team developed a multi-step approach where each researcher coded the same four interview transcripts. Initial codes were compared and discussed to develop a baseline coding schema, from which an additional transcript was coded against. A coding comparison query was conducted in NVIVO, enabling the team to measure inter-rater coding reliability through the calculation of the percentage agreement and the Kappa coefficient, a statistical measure which considers the amount of agreement that could be expected to occur through chance. Once this calibration exercise process was complete and adequate agreement attained, the codebook was updated. All transcripts were divided amongst the research team and coded against the reconciled codebook. Once all transcripts had been coded, one researcher merged the coded transcripts and conducted the combined analysis.

Focus group

One focus group was held with members of the Student Advisory Board on October 15, 2019, during the group’s regular monthly meeting, in which 14 students participated including eight undergraduate and six graduate students. The focus group question protocol mirrored the interview questions where appropriate, with relevant probing questions added (see Appendix II). Analysis of the focus group transcript was conducted in NVIVO using the same coding schema as the interviews, and findings triangulated with the interview analysis.

Observation

Forty-one observation studies were conducted between September 23 and October 11, 2019. Data gathering was conducted three times a day—morning (between 8 and 11 a.m.), afternoon (between noon and 3 p.m.), and evening (after 5 p.m.). The research team divided the Collaboration Commons into 16 “zones” (see Appendix III) and an intake form was developed in Qualtrics that was designed to count occupancy per seating type per zone, as well as the minimum and maximum decibel level per zone. The research team did not attempt to identify whether students were working in groups, per the challenges experienced in attempting to do so in previous studies. The research team conducted several pre-study observations in order to determine appropriate data collection points within each zone. Sound was measured using a handheld BAFX3370 digital sound level meter and the average measurement was calculated from the minimum and maximum for each zone. To ground sound level readings with other areas of the library, decibel measures were also conducted in the following locations: Knowledge Commons, Leisure Reading Room, Paterno Reading Room, Central Atrium, and the News Library.
Results

Interviews and focus group

Summary of findings

- Students found it motivating to work in the open environment where they could see others working around them. In addition, the design aesthetic—the colors, lighting, and greenery—created a calm environment that enabled them to focus.
- Students said that the equipment (whiteboards, charging outlets), powered furniture, and overall layout of the Collaboration Commons enabled productivity.
- The open space was generally used for light collaboration, while group study rooms were preferred for more vigorous group work.
- Students were comfortable speaking in the Collaboration Commons, although most described the space as quiet. They acknowledged self-regulating their voices out of respect to others.
- The versatility of the furniture was valued, and students felt comfortable moving seats and tables around depending on their needs.
- Due to the popularity of the space, many students perceived the Collaboration Commons as full by the afternoon and did not expect to be able to find seating.
- Students desired a mix of spaces in the Libraries, including areas for private study as well as open spaces such as the Collaboration Commons.

Characteristics of participants

The interview and focus group participants represented a cross-section of library users, from those who visited the library daily to occasional users. They were from 23 different majors and academic levels ranging from freshman to doctoral students. Participants were quite evenly divided between those who were working alone and those who were in a group. Of those who were in a group, approximately half were actively collaborating on classwork, and half described their activities as working with others, but not on group work.

Impact of environment on productivity

Students were asked numerous questions related to their views of the Collaboration Commons—what they liked about the space, how it made them feel, and how it helped them get their work done. Analysis of their comments revealed an overwhelmingly positive perception of the area, with most students describing feeling productive. As one interviewee noted:

“I come to get my stuff done and I do get my stuff done, so it kind of inspires me to do it.” – freshman, aerospace engineering.

Two threads emerged from their responses:

a) Function: The furnishings, equipment, and open layout facilitated a flexible, collaborative environment where students described being motivated to work among others.

b) Aesthetics: The color palette, greenery, windows, and light (natural and overhead lighting) created a relaxing, calm ambience that students said enabled them to focus.
a) Function

The functionality of the Collaboration Commons—the open layout, spaciousness, flexible furnishings, and equipment were frequently referenced in the interviews. A large majority of participants commented positively on the openness of the area, which was described as “airy” and like a “big study room,” rather than a traditional library environment. More than half described the motivating effect of being surrounded by others who were also working.

“It’s like everyone around you is just kind of working, doing their own thing, everyone down here is wanting to get work done. So, you get your own work done.” – junior, film

Some specifically described the absence of barriers:

“Whenever I see other people studying, I guess it subconsciously motivates me to stay studying. So when I’m like, I can see everyone around me, it’s not like everyone is blocked off by a table or a divider, so it’s kind of like a group effort of all the folks studying.” – sophomore, aerospace engineering

The openness also contributed to the comfortable noise level—many participants said they were comfortable talking to others but not engaging in loud conversations. They appreciated having a semi-quiet space where they felt welcomed to having conversations without concern for disrupting others. One commented:

“I’m a lot more productive than if I go other places that are a little noisier because it’s kind of nice and quiet down here but not too quiet that you can’t talk with people that you are working with. So, I like the tempo of it and everything.” — junior, biobehavioral health

Participants also appeared to acknowledge their self-regulating behavior. As one student, a junior in integrated digital studies, noted, “It’s because everyone is really respectful of each other...” One member of the Student Advisory Board even described feeling pressured to “talk in hushed tones” when working with a group inside the open area. While other students felt that it did get loud at certain times of the day, they were comfortable to block out sound with their headphones.

Spaciousness was another theme related to the functionality of the space that emerged from the interviews—students were aware that they had space to move between furniture and to spread out belongings. Participants noted that they did not feel “confined” or “cramped in,” and that they were “not too close to people” when working.

One feature of the Collaboration Commons that sets it apart from other spaces in the Libraries is the variety of seating options. More than three quarters of the students interviewed described how they used different types of chairs in the space. Most frequently mentioned were the “comfy” chairs, swivel chairs, booth seating, and bar stools.

“I like that it’s very open and that like, the furniture and stuff down here is more versatile than upstairs, like, ‘this has to be here.’ Like, I can move a chair, or bring a table together.” – freshman, architectural engineering
This versatility, coupled with the availability of large tables, created an environment that facilitated working with others:

“Usually when we come here there’s like five or six of us so we just try and get the biggest table we can find.” – sophomore, security and risk analysis

While about half of the students interviewed described working in a group, they were generally not there to work on collaborative projects. Rather, they were working on assignments, or on their own homework — “parallel studying,” as one student described it.

“I come here with like a group of friends and we all just like, study, but we’re in different classes so it’s kind of just, motivation, like we’re both there, we’re not talking, we’re not doing the same work but it’s like the accountability, yeah.” – biology, junior

Students also commented on the versatility of the space—about one third of the participants noted the way different zones had been designed within the Collaboration Commons to offer possibilities for different types of work, depending on needs, including for those working alone. Most students who were on their own were studying for exams or working on homework. One graduate student in the Student Advisory Board even described using the space for tutoring sessions, using the bar tables and round tables with whiteboards for larger groups.

The prevalence of outlets and powered furniture was also viewed positively by participants, who welcomed the ability to charge their laptops “basically everywhere.” The 10 freestanding mobile whiteboards were also valued, with students requesting more of them. One participant described using the boards to write out structural diagrams for chemistry homework, while another noted how the whiteboards could be positioned to create a semi-private space in one of the corners of the Collaboration Commons.

b) Aesthetic

The second thread emerging from the discussion of the Collaboration Commons was the aesthetic—most interviewees commented positively on the design, and a recurring theme in the interviews was that the Libraries had designed an environment that enabled students to focus. “Calming,” “relaxed,” and “peaceful” were frequently used to describe the Collaboration Commons:

“This space is a lot more calming, I think than other spaces. I can’t really put my finger on it, I think it may be, like, the color scheme or something.” – junior, elementary education

Interviewees also referenced the plantings and the view from the large windows during daytime, which gave them an indoor/outdoor feel. As one student said:

“[I] just come in here and I get very focused, I don’t feel like I’m here the whole day. Seeing the greenery is relaxing... it’s just a peaceful working environment.” – graduate, plant biology
Many students described the area as “clean” and “bright.” They referenced the natural light streaming in from the windows as well as the overhead lighting, which they contrasted favorably with the “yellow” lighting in other parts of the Libraries.

“I just feel like it’s very light, it’s very clean, it’s just a very open area. It’s nice, it doesn’t feel dingy, dark. I like that it’s always very bright, so it’s just a nice way to focus.”—sophomore, general science

Overall, the analysis found that most comments related to aesthetics stemmed from the students’ perceptions of the lighting—during daytime interviews, comments were dominated by references to natural light in the seating area adjacent to the large windows, while at night, students referenced the overhead lights. The importance of lighting became an emerging theme in the qualitative analysis, due to the ubiquity of participants’ comments referring to the brightness of the Collaboration Commons, often in contrast to other library locations.

Perceived density

While students described the area as spacious and with plentiful seating, some noted that it was hard to find a place to work at certain times of day. Most considered the Collaboration Commons as a space where people would go between classes, consequently, by mid-afternoon, students perceived the space as full. One student noted that there was a lot of seating, but that it “definitely fills up a lot faster,” while another described it as “almost always completely full, especially during the afternoon hours.” One focus group participant described a reluctance to sit next another individual at a space designed for a group.

“I’ve been there several times, but usually, it’s very hard to find a seat. If you go alone sometimes it feels like if you’re going to a table someone is sitting there. It’s kind of intruding their personal space.”—focus group participant

The perception of seating availability was tied to the time of day that students visited the Collaboration Commons—those who spent time in the area in the early morning or in the evening felt it was less busy at those times. As one interviewee who was using the Collaboration Commons in the evening noted:

“…when you come here on a—middle of the afternoon on a Wednesday, it’s not going to look like this. It’s a lot harder to find space.”—senior, energy engineering
Group study rooms

Students commented positively on the new group study rooms, describing them as “modern” and well equipped, with “newer technology” than group study rooms in other Pattee and Paterno locations. Most students had used a group study room in the Collaborations Commons, although responses were split between those who were regular users and those who had only reserved a room to work on a big group project. Overall, students said they preferred to use group study rooms over the open area of the Collaboration Commons for more active collaborative work.

Many said they used the group study rooms to work on assignments, brainstorm, or practice presentations. They considered the rooms as places where they could talk freely without having to moderate their voices in the same way as they would in the open area of the Collaboration Commons.

“I kind of feel like it’s a good space to be able to collaborate with other people without distracting other people working in the library. I really like using the whiteboards in there. I kind of find it really helpful, especially since I’m in chemistry right now so I have to draw all the shapes out and stuff. Yeah, I think it’s like a nice way to also just be able to collaborate with other people.” – sophomore, general science

One student described the group study rooms as a place to “bring focus to a group,” as they were a) secluded and b) fitted with equipment that could be used for collaborating. The large monitors for connecting personal devices, writable glass walls, and large work surfaces were all described as facets that contributed to productivity. Another student described spending up to six hours at a time working in a group study room, noting, “when I’m there in a quiet space, even if it’s with friends, you feel like your mindset is you just have to work.” While some students observed that the rooms were not soundproof, most felt that the noise level was tolerable.
Comparison with other spaces

Locations on Campus

“It’s pretty similar to East Commons, I think, how it looks, but it’s quieter, and there’s more resources.” – sophomore, human development and family studies

Students were asked to compare the Collaboration Commons with different spaces on campus that they felt were similar. The Biobehavioral Health Building, the new Chemical Engineering and Biomedical Engineering building, the HUB, and East Commons were described as some locations with similar spaces. Some noted that what set the Collaboration Commons apart from these other spaces was the availability of resources, noting available personnel, technology and library collections. Beyond resources, however, lay the view that the library historically communicated the idea of being a place to focus and work. Some students described this as the underlying factor that made the Collaboration Commons different from other similarly designed spaces on campus.

“Because it’s attached to a library, so you think, ‘Oh, you have to be quiet.’ People are gonna know that you’re here solely to like get your work done, or collaborate with other people on projects, but at the HUB, it’s multipurpose, there’s like people will be getting food, walking around just passing through, so it’s more chaotic.” – freshman, architectural engineering

Locations in Pattee and Paterno

Students described the work environment in the Collaboration Commons as “relaxed,” facilitated by the furniture configuration and overall design aesthetic. They recognized, too, that the environment differed in other parts of the library which were suited to different types of activities.

“Sometimes I’ll go to the stacks when I’m doing a paper and need it to be just me and my work, but I like it here because other people are doing work too and it’s just more of a relaxed setting.” -- Sophomore, biobehavioral health

“Sometimes a person needs to try and focus as much as he can, and that’s when a table like in the Knowledge Commons or up on the second and third floor would be beneficial, whereas if you want to work on a group project, or if you have something light to work on and you want to hang out with your friends while working at the same time, this [Collaboration Commons] should be the perfect place to do that.” -- Sophomore, aerospace engineering

The analysis revealed, however, that many students preferred the stacks for private, quiet study—such as before an exam. Many described the stacks, with its limited sightlines minimizing distractions, as their location of choice for this type of work.

“If I really need to study or write something and focus, I usually go to the stacks because I just don’t want to see anybody or hear anybody.” — student advisory board member

“Modern” and “updated” were terms frequently used to describe the Collaboration Commons in contrast to other spaces in Pattee and Paterno. Most found the area brighter than many other library
locations. The students perceived light as such a predominant characteristic of the space to the extent that one student, when comparing the Collaboration Commons with the Maps Library, described the latter as being in the basement, despite the two locations being on the same level.

Future spaces

“I would like more spaces like this...In an ideal world, I would want the whole library to look like this.” – junior, biology

About half of the of the students interviewed said that the Libraries should create more spaces like the Collaboration Commons. Some students said the reason for this was that they wanted more areas that looked the same—bright, modern, and spacious:

“... even a little bit of a face lift, you know, like opening up spaces, making it a little more lighter, brightening up the rooms.” – sophomore, general science

Others cited the functionality of having an environment designed for working in groups as the reason they wanted more spaces like the Collaboration Commons:

“...it’s more conducive to work in groups and then discuss things, so it’s not really better to have like, silent cubicles, more open spaces, where we can discuss our work and present.” – doctoral student, plant biology

Many students, however, commented on the importance of maintaining a combination of private study areas and open spaces. One student noted that some higher density locations in the library were more supportive of individual quiet study:

Down here might be a little more open and talkative just because of the layout, and upstairs is very much like a quiet study room, no talking, whispering...If I have a lot of work to get done, I don’t know why but I usually go up a few floors. – sophomore, human development and family studies

**Observation Study**

**Summary of findings**

- The mean occupancy rate for the entire Collaboration Commons area peaked in the afternoon but did not reach 50% at any time of day during the observation period.
- Students were observed using all available seating types. Armless chairs and booth seating were especially popular. The seat occupancy rate for ottomans and stools did not reach 10%.
- The seating area closest to the large windows had the highest occupancy rate in the morning, however, by afternoon, the seats in the middle zones of the Collaboration Commons were more popular.
- Many students working on their own were observed in spaces intended for group work (for example, at a booth or a 48” round table).
- Despite its openness, the Collaboration Commons was mostly quiet, with mean decibel readings comparable to the Paterno Family Reading Room, even during busy times.
Overview

The research team had divided the Collaboration Commons into 16 “zones” (see Appendix III) in order to measure seating type usage and sound. There were some challenges to obtaining accurate occupancy data as the Collaboration Commons is designed as a flexible space in that the layout and furniture can be moved to accommodate preferences. In addition, once a space was re-configured, it was often not set back to the original layout the following day. To work around this, when calculating seat occupancy rates, the team used an architectural rendering of the seating plan as a baseline layout (Appendix IV).

Occupancy

The researchers observed a total of 348 seats of 12 different types throughout the Collaboration Commons. Of these, 34 were seating types with no back support, primarily stools and ottomans, while the remaining 314 functional seats were a combination of rolling chairs, soft seating, booth chairs, and others (see Appendix V for details). As can be seen from Table 2, the mean occupancy rate for the entire Collaboration Commons area peaked during the afternoon but did not reach 50% at any time of day. The occupancy rate of ottomans and stools were low throughout the day.

Table 2: Overall Occupancy Rate by Time of Day

<table>
<thead>
<tr>
<th></th>
<th>Number of seats</th>
<th>Morning occupancy</th>
<th>Afternoon occupancy</th>
<th>Evening occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>348</td>
<td>30.7%</td>
<td>43.9%</td>
<td>39.8%</td>
</tr>
<tr>
<td>Ottomans, stools</td>
<td>34</td>
<td>5.9%</td>
<td>9.5%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Functional seating</td>
<td>314</td>
<td>33.3%</td>
<td>47.6%</td>
<td>43.4%</td>
</tr>
</tbody>
</table>

Few zones were completely unoccupied during any observation rotation. However, zones furnished with ottomans had a lower occupancy rate than other areas. For example, the zone pictured left (see Student Art Zone in Appendix III) very rarely had more than one person observed sitting there.

For a closer look at seating types as a factor influencing occupancy rate, the five largest zones (those with seating for 25 or more) were examined more closely. Table 3 below summarizes the mean seat occupancy rate throughout the day for these five zones. Per Table 3, the window area had the highest occupancy rate in the morning, with occupancy rising in the other zones as the day progressed.

View visualization of occupancy by time of day on Tableau:  
Collaboration Commons Use Assessment

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1 Fewer than specified in the architectural plan because some chair types were grouped into categories due to similarities (e.g. polyshell chair and molded wood chair were considered “chair” for observation study)
Table 3: Mean occupancy rate by time of day in five largest Collaboration Commons zones

<table>
<thead>
<tr>
<th></th>
<th>Total seating</th>
<th># types of seating</th>
<th>Morning occupancy</th>
<th>Afternoon occupancy</th>
<th>Evening occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Atrium</td>
<td>25</td>
<td>3</td>
<td>30.1%</td>
<td>36.3%</td>
<td>39.5%</td>
</tr>
<tr>
<td>Window area</td>
<td>60</td>
<td>5</td>
<td>37.6%</td>
<td>47.0%</td>
<td>42.6%</td>
</tr>
<tr>
<td>Living Room</td>
<td>26</td>
<td>4</td>
<td>28.7%</td>
<td>48.9%</td>
<td>45.2%</td>
</tr>
<tr>
<td>Collaboration Study Zone</td>
<td>52</td>
<td>4</td>
<td>25.8%</td>
<td>43.1%</td>
<td>37.3%</td>
</tr>
<tr>
<td>Multipurpose Room</td>
<td>64</td>
<td>1</td>
<td>27.0%</td>
<td>44.5%</td>
<td>40.6%</td>
</tr>
</tbody>
</table>

- Central Atrium: This area includes a mix of chairs, armchairs, and booth seating for eight. During the morning rotation, the mean occupancy rate of booth seating was 55%. Booth occupancy increased slightly in the afternoon, to 58%, although chair occupancy in this area remained low (23%). The layout of this area is such that most of the chairs share tables with the booth seating, except for one round table in the corner with three chairs. The data suggest that the four booths are typically occupied by a total of four to five people on average, and that little group work is taking place as per the low chair occupancy. Evening occupancy is highest for this zone (maximum people count of 13), with booth occupancy increasing to 65%. However, individual seat occupancy in the evening drops to 21%.

- Window area: This zone has a mix of five types of seating. Additional seating types were observed on 12 rotations. Despite this, occupancy did not reach 50% at any time of day. Mean occupancy of barstools was 38% in the morning, rising to 60% in the afternoon and dropping off to 49% in the evening. The maximum people count in this area was 38, taken in the afternoon. The 10 soft armless chairs were the most popular seating type with an occupancy rate over 50% throughout the day.

- Living Room: The Living Room is a central zone within the Collaboration Commons. It includes four seating types—12 barstools, six armchairs surrounding two round 48” tables, chairs, and stools. The mean morning occupancy of armchairs was 47%, while 24% of the barstools were occupied. Rolling chairs were also observed on three rotations in this zone, despite available capacity of existing seating types. Afternoon occupancy in this zone was close to 50%, with more than half of the barstools (54%) occupied and more than half of armchairs. The highest reading for this area – 17 – also occurred in the afternoon. In the evening, fewer students occupied barstools while armchairs remained popular.

- Collaboration Study Zone: This zone is a larger area encompassing four seating types, primarily 24 rolling chairs and 16 barstools, and a mix of chairs and stools. Occupancy of this zone was lower in the morning, with 28% of barstools occupied. In the afternoon, barstool occupancy increased to 44% and rolling chairs to 53%. The highest people count for this area occurred in the afternoon: 31. In the evening, occupancy dropped for all seating types.

- Multipurpose Room: This zone is characterized by one standard seating type in a high-density environment -- 64 rolling chairs set against eight tables, with no other seating types. The mean occupancy for this area never reached 50% at any time of day. The highest reading, 40 people (63%) was taken during an afternoon rotation.
Sound

The researchers found that the noise level in the Collaboration Commons was relatively quiet, with the mean afternoon decibel measurement ranging from 53 to 58 dB – lower than a typical conversation sound level of 60 dB².

Comparative measures were taken in different locations within the Libraries—Table 4 shows a comparison of the mean decibel readings range by time of day for the five largest Collaboration Commons zones and other locations in Pattee and Paterno Libraries.

![Mean decibel reading in Collaboration Commons compared with other locations and sounds](image)

Table 4: Mean decibel level comparison: Collaboration Commons and other library locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Morning</th>
<th>Afternoon</th>
<th>Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five largest Collaboration Commons zones (range)</td>
<td>53-55 dB</td>
<td>52-54 dB</td>
<td>53-54 dB</td>
</tr>
<tr>
<td>Dr. Keiko Miwa Ross Global News Center</td>
<td>60 dB</td>
<td>59 dB</td>
<td>60 dB</td>
</tr>
<tr>
<td>Knowledge Commons</td>
<td>53 dB</td>
<td>55 dB</td>
<td>55 dB</td>
</tr>
<tr>
<td>Leisure Reading Room</td>
<td>54 dB</td>
<td>54 dB</td>
<td>54 dB</td>
</tr>
<tr>
<td>Paterno Reading Room³</td>
<td>55 dB</td>
<td>55 dB</td>
<td>55 dB</td>
</tr>
<tr>
<td>Franklin Atrium</td>
<td>56 dB</td>
<td>58 dB</td>
<td>59 dB</td>
</tr>
</tbody>
</table>

² From Common Sources of Noise and Decibel Levels: https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html
³ Noise emitted from overhead light fixture contributed to louder than expected minimum decibel reading
Discussion

- **Type of work:** Interviewees were quite evenly divided between those who were working alone and those who were in a group. The Collaboration Commons was described as well suited to a variety of needs, due to the availability of different types of seating configurations in the area. In general, students said they used the open space for light collaboration but preferred to reserve group study rooms for more vigorous group work.

- **Motivating space:** A recurring theme in the qualitative analysis was that the design of the Collaboration Commons enabled students to be productive and focused. Students were attracted to the color scheme, brightness, windows, and openness of the space. Many said they were able to “get work done” and felt motivated by seeing others around them at work.

- **Versatility:** Students valued the versatility of the furnishings, which enabled them to reconfigure the space to meet their needs. This was particularly valuable for working in groups. Both the qualitative findings and observation data show that students used many of the different seating types available in the Collaboration Commons, other than ottomans and similar seating types with no back support, which were always less than 10% occupied.

- **Occupancy—perception vs available seating capacity:** Of note was the incongruity between what students felt was a lack of available seating at certain times of day and what the observation study showed. Many students talked about how it was hard to find a seat after midday—this is despite the mean occupancy rates in the five largest zones never reaching 50% at any time of day. Often, researchers observed individuals sitting at areas designed to support group work, the Central Atrium booth seating being one example. This, coupled with a general reluctance to sit next to another student occupying a table intended for a group, may explain the lower than perceived seat occupancy rate.

- **Noise level:** The overall noise level of the Collaboration Commons was unexpectedly low, given the openness of the area. Decibel readings in different parts of the library with similar types of open spaces showed that the Collaboration Commons’ decibel measures were within the range of the Paterno Reading Room and lower than the Global News Lounge and the Franklin Atrium. This is consistent with the interview findings, where students noted that while they felt comfortable talking in the space, they tended to moderate their voices and adopt self-regulating behaviors out of respect for others.

- **Group study rooms:** Overall room reservations saw a large increase with the opening of the Collaboration Commons, suggesting that before the addition of the additional units in the Collaboration Commons, the demand for group study rooms was greater than what the Libraries could meet. Most students interviewed had reserved a group study room and described using the spaces for working on assignments, brainstorming, and practicing presentations. They considered the group study rooms as places where they could talk freely. Students described how the equipment in the room including large monitors to connect their personal devices, writable glass walls, and large work surfaces, contributed to their productivity.

- **Comparison with other locations:** While some interviewees noted similarly designed spaces in other campus locations, they felt that they were more productive in the Collaboration Commons by virtue of being in a library and being in proximity to resources.
Implications for future spaces

**Design and lighting:** The qualitative data showed that students reacted positively to the environment in the Collaboration Commons, describing it as a place where they were productive and focused. They attributed these feelings to the design aesthetic and expressed the desire for other areas in the libraries to have a similar look and feel—a “face lift,” as one student described it. One of the strongest themes emerging from the qualitative analysis was the importance of light, whether overhead or natural lighting. Most students interviewed noted the brightness of the Collaboration Commons and many contrasted the space with other areas in the library that they felt were “dingy” and that had “yellowy lighting.” Future renovations in Pattee and Paterno should consider following the design aesthetic of the Collaboration Commons, which appears to foster an environment that students find conducive to work.

**Sound:** Despite its open layout, the Collaboration Commons is a quiet environment. Decibel readings taken in multiple zones showed that the sound level across the Collaboration Commons is closer to that of the Paterno Reading Room than the Global News Lounge. This finding aligned with the students’ commentary—most considered the area relatively quiet and moderated their voices in the presence of other students working. Future renovations can use the Collaboration Commons as a model of how to create an environment that is at once open and quiet. Maximum decibel readings in the Collaboration Commons were the result of loud door closures or other momentary interruptions. To address this, simple changes such as adjusting the restroom doors to make them soft closing could positively impact students working at adjacent tables.

**Functionality of furnishings:** Observation data consistently showed students using many different types of seating in the Collaboration Commons, except for seating with no back support. Large ottomans which took up space in two of the 16 observation zones, were considered by the research team as non-functional seating as they recorded minimal use throughout the observation period. Future planning aimed at maximizing the utility of limited square footage should primarily be comprised of functional seating—i.e. seating that can provide adequate support to a student who is either working on a laptop or writing. Integration of non-functional seating should be deliberate and supportive of an intended activity.

Another impact of the furniture choice that is worth noting is how it affected the overall seat occupancy rate, which was lower than perceived by users. By design, most of the furniture in the Collaboration Commons is intended to facilitate group work—round tables, a mix of seating types designed to be moved around as needed. However, the result of this is that students working alone, of which about half of interviewees were, would take up space intended for groups. Future spaces should accommodate high density seating to allow for greater seat capacity and facilitate individual study needs acknowledging the cultural reluctance of sitting next to a stranger at a table intended for collaboration.

**Need for different types of spaces:** The data support the need for maintaining different types of spaces in the Libraries, including quiet study spaces. While students enjoyed working in the Collaboration Commons, many noted that for intense study, they preferred an environment that was more secluded and private. The stacks and the carrels on the third floor of Pattee Library were described as locations of choice for these types of activities. Overall, students appreciated the availability of different types of spaces in the Libraries where they could go depending on their needs.
Appendix I: Interview script

*additional questions to ask: -- working in groups in the open areas, time of day they typically visit*

What is your academic level and your major?

Why are you using the Collaboration Commons today?

And where did you typically [do _____ ] before the Collaboration Commons opened?

What is your favorite part of the Collaboration Commons and why?

What is it about the space that attracts you?

How does the space make you feel?

In your view, how does this space help you get your work done?

How would you compare the Collaboration Commons with other spaces in the Library? On Campus?

Are there other locations like this on campus?

Have you used the group study rooms here? How do they compare with other group study rooms in different locations around campus?

How would you describe this space to a friend who’s new to the university?

Should the library create additional spaces like this? Why?

Do you have any other comments you’d like to share?

Appendix II: Focus group questions

Please talk about your experience using the Collaboration Commons.

What is it about the Collaboration Commons that attracts you?

How does the space make you feel?

In your view, how does the space help you get your work done?

If you didn’t have this space to work, where would you go instead?

How would you compare the Collaboration Commons with other spaces in the library? On campus?

Are there other locations like this on campus?

How many of you have used the group study rooms? How do they compare with other group study rooms in different locations around campus?

Do you have any other comments you’d like to share?
Appendix III: The 16 Collaboration Commons zones as defined by research team

(Seating availability in largest five zones indicated in parentheses)
Appendix IV: Architect’s seating plan used by research team to calculate occupancy by seat type per zone

Appendix V: Seat type (as defined by research team)

<table>
<thead>
<tr>
<th>Seat type</th>
<th>count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armchair</td>
<td>12</td>
</tr>
<tr>
<td>Barstool</td>
<td>67</td>
</tr>
<tr>
<td>Couch</td>
<td>8</td>
</tr>
<tr>
<td>Log</td>
<td>2</td>
</tr>
<tr>
<td>Ottoman</td>
<td>10</td>
</tr>
<tr>
<td>Rolling chair</td>
<td>105</td>
</tr>
<tr>
<td>Soft seating: armchair</td>
<td>10</td>
</tr>
<tr>
<td>Soft seating: armless</td>
<td>10</td>
</tr>
<tr>
<td>Soft seating: booth</td>
<td>22</td>
</tr>
<tr>
<td>Soft seating: desk chair</td>
<td>8</td>
</tr>
<tr>
<td>Stool</td>
<td>20</td>
</tr>
<tr>
<td>Chair</td>
<td>74</td>
</tr>
</tbody>
</table>