



Article

Looking and Listening: A Mixed-Methods Study of Space Use and User Satisfaction

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Abstract

Objective – This study was designed to assess users' reactions to two newly re-designed spaces – one intended for quiet study and the other for group study – in the busiest library branch of a large research university. The researchers sought to answer the following questions: For which activity (group work, quiet study, and lounging or relaxing) do the users feel the space is most effective? Which furniture pieces do users prefer and for which activities? How are these spaces being used?

Methods – Researchers used a mixed-methods approach for this study. Two methods – surveys and comment boards – were used to gather user feedback on preference for use of the space and users' feelings about particular furniture types. A third method – observation – was used to determine which of the particular areas and furniture pieces occupants were using most, for

which activities the furniture was most commonly used, and what types of possessions occupants most often carried with them.

Results – User opinion indicated that each of the spaces assessed was most effective for the type of activity for which it was designed. Of the 80% of respondents that indicated they would use the quiet study space for quiet study, 91% indicated that the space was either "very effective" or "effective" for that purpose. The survey results also indicated that 47% of the respondents would use the group study space for that purpose. The observation data confirmed that the quiet study space was being used primarily for individual study; however, the data for the group study space showed equal levels of use for individual and group study. Users expressed a preference for traditional furniture, such as tables and desk chairs, over comfortable pieces for group work and for quiet study. One exception was a cushioned reading chair that was the preferred item for quiet study in 23% of the responses. The white boards were chosen as a preferred item for group study by 27% of respondents. The observations showed similar results for group study, with the three table types and the desk chair being used most often. The lounge chairs and couch grouping was used most often for individual study, followed by the tables and desk chairs.

Conclusion – By combining user feedback gathered through surveys and comment boards with usage patterns determined via observation data, the researchers were able to answer the questions for which their assessment was designed. Results were analyzed to compare user-stated preferences with actual behaviour and were used to make future design decisions for other library spaces. Although the results of this study are institutionally specific, the methodology could be successfully applied in other library settings.

Introduction

Library spaces are increasingly transforming from those designed to house collections to those concerned with user comfort and support for activities beyond the use of the collection. When planning these user-centered spaces, it is common practice to assess the preferences and needs of the users who will ultimately occupy them. Some libraries have gathered user feedback both pre-design and post-design, prior to construction or renovation (Norton, Butson, Tennant, & Botero, 2013). But what of the users' opinions of these new or updated spaces once they are completed? Is it necessary to gather these opinions? An argument could be made that it is not essential if the designers of the space have been conscientious in polling users and applying their feedback. Feedback could also be risky in a situation where it would be difficult to change elements of the design should the user feedback be negative. What if, however, there were opportunities to duplicate the design,

or use elements of it, in other spaces? This consideration was at the root of the project described in this article.

The Humanities & Social Sciences Library at McGill University is comprised of two adjoining structures, the McLennan and Redpath library buildings (known in combination as the McLennan-Redpath Complex). The public spaces in these buildings have been updated at various times throughout their lifespans; however, there had not been any targeted efforts to determine whether the spaces were meeting students' needs. The first project was to assess a recently renovated quiet study area on the third floor of the McLennan Building. Upgrades included new lighting and furniture: specifically, long, electrified tables with dividers, large and small tables on wheels, simple desk chairs, and comfortable reading chairs.

The second project involved a deal with a local company to provide furniture pieces on a trial

basis that the library could either purchase or switch out for different types. The trial furniture was largely of the comfortable seating type but also included two configurations of tables and desk chairs as well as moveable and fixed white boards. In order to showcase these pieces, the library opened up an area of recently vacated staff space to create a large group work zone (including two enclosed, bookable group study rooms), dubbed the “furniture lab.” With these two projects in place, the library administration tasked the McLennan-Redpath Space Planning Working Group with gathering student feedback. Given the large number of new furniture types and pieces being used in these spaces, and the trade-in agreement for the furniture lab pieces, the administration was particularly interested in gauging student reaction to the individual types and pieces and finding out how the students were using the furniture and the spaces. If these spaces were well-received by users, they could be duplicated, either in whole or in part, in other areas of the complex and in other branches. The nature of these renovations also left some latitude for change if users were not satisfied.

Literature Review

In the past decade there has been an increasing body of library research devoted to space planning and space assessment in libraries. As Webb, Schaller, and Hunley (2008) note, “the proliferation of digital formats, the options for high density storage, and the increased ease of resource sharing have reduced the need for on-site collection storage thus opening up space for other types of services” (p. 407). “Library as place” has emerged as librarians look for ways to accurately measure how users are engaging with their spaces, what users want from their spaces, and what the space demands will be for the future. Future space demands are particularly hard to predict, especially with changing technology. For example, increasing the number of electrical outlets has been identified as a major space need in many studies given the rise of the laptop computer, something

that may have been difficult to imagine even 10 or 15 years ago (Brown-Sica, 2012; Halling & Carrigan, 2012; Norton et al., 2013; Vaska, Chan, & Powelson, 2009).

In the space planning literature, obtaining information on user preferences and space demands is addressed in various ways. One common method is to engage students directly about their desires for changes to library spaces. Many studies rely on traditional feedback methodologies such as surveys, focus groups, whiteboards, and comment boards to obtain information; however, more innovative strategies such as photo diaries and mediated drawing exercises are also being explored. For example, Crook and Mitchell (2012) had several of their students keep an audio diary to reflect on their study habits and behaviour. Similarly, Hobbs and Klare (2010) provided students with disposable cameras and asked them to photograph their interpretation of various pre-defined subjects such as their favourite place to study. Other studies focus on what students actually *do* in library spaces; these studies rely on observational methods to ascertain how users are engaging with their spaces. Bedwell and Banks (2013) partnered with an anthropology class at their university to make direct observations of students’ habits, activities, and behaviours in the library. Others have employed a mixed methodology, using several of these approaches to answer their research questions. For example, Pierard and Lee (2011) employed photo diaries, flipcharts, and a traditional user survey in their study, and Crook and Mitchell (2012) employed observation, audio diaries, and focus groups, while Foster and Gibbons (2007) used interviews, maps, photographs, and flipcharts. These less traditional means for obtaining feedback are considered ethnographic approaches. As Asher, Miller, and Green (2012) write, “ethnographers typically describe a particular situation or process by asking multiple people about it, and by analyzing multiple types of data, such as interviews, direct observation, photographs, journals, or cultural artifacts” (p. 3). Through combining various

feedback methodologies, researchers hope to obtain more well-rounded and comprehensive information about the population which they are studying.

Beyond library literature, the fields of urban planning and architecture provide insights into further feedback methodologies for public spaces. In addition to interviews and observation methods, Doxtater (2005) employed an online virtual recreation of a university residence to understand user experiences with the space. Hua, Göçer, and Göçer (2014) used interviews and surveys to understand user satisfaction with a newly LEED (Leadership in Environmental Energy and Design) certified university building. This data was then combined with objective measurements such as temperature and humidity and mapped spatially to create a visual representation of how effective the renovations had been. Within architecture literature, post-occupancy evaluations provide additional examples of obtaining user feedback about spaces. The San Francisco Public Library (2000) administered focus groups, staff and user surveys, observations, and interviews to evaluate library spaces. In her article, Cranz (2013) outlines the effects of this post-occupancy evaluation on the San Francisco Public Library. Preiser and Wang (2008) provide an additional example of a post-occupancy evaluation of a library space by architects.

Likewise, literature on urban planning involving citizen participation can also provide additional feedback approaches. Shipley and Utz (2012) provide a good overview of these methods, such as public meetings, focus groups, citizen juries, visioning, and scenario workshops.

One component discussed in several space planning research articles is furniture preference: do students prefer couches, carrels, booths, or other types of furniture? Research conducted by Halling and Carrigan (2012), Hobbs and Klare (2010), Pierard and Lee (2011), and Webb et al. (2008) identified a preference or

desire for soft or comfortable furniture. While most of the aforementioned studies relied on student comments or surveys to determine this preference, Webb et al. (2008) supported this through direct observation as well. They found there was a "higher than expected usage for soft furniture and computer stations" and a lower than expected usage for more traditional types of furniture such as large tables and chairs (Webb et al., 2008, p. 415). Foster and Gibbons (2007) came to this same conclusion. However, the preference for "soft" or comfortable is not consistent across all studies and there is often a difference between students' stated preference and their behaviour.

Contrary to the above, Vaska et al. (2009) discovered in their survey that carrel areas in the library were the most popular spaces, while Applegate (2009) noted through observation that study rooms were the most frequently used spaces (followed by "soft spaces"). Brown-Sica (2012) also noted through observation that traditional furniture such as tables and chairs were popular, reflecting a "need to 'get down to work' as opposed to socializing" (p. 223). This contrast in findings may best be explained by the diversity of functions that students wish their library to fulfill. Bailin (2011) found that students wanted more of everything out of their library space (more individual study spaces, more group study spaces, more computers) and that the breakdown of what spaces students said they used is fairly evenly divided across all options (e.g., group, individual, lounge, and others). Webb et al. (2008) noted through observation that 70% of the students were engaged in individual study (p. 416). Crook and Mitchell (2012) observed that approximately 50% of students were engaged in individual study while the rest were engaged in conversation of some variety (p. 128). This diversity of activities in libraries may best be summed up by Montgomery (2011), who ascertained that students "want to study alone but still need space to meet in groups" (p. 84). As such, a variety of furniture is required in order to meet those needs.

Based on the literature consulted, initial student feedback, and general observations, the Working Group had several assumptions about what the study would find. Given the ubiquity of laptops as well as the literature reviewed, they anticipated that students would desire more outlets. Additionally, even though the Humanities & Social Sciences Library is intended primarily for students in the Faculty of Arts, given the central location and size of the branch, the group anticipated that students from all disciplines would make use of the space. With regards to the furniture lab, they hypothesized that it would be used primarily for group study, as it is located in a high traffic area. Finally, given several studies which outlined student preference for furniture, and some initial student feedback they had received, the Working Group expected that students would prefer “comfy” or “soft” furniture in the furniture lab space. However, since this study was partly exploratory, the group hoped to obtain additional information beyond the assumptions outlined.

Methodology

The Working Group chose to use a combination of methods to obtain data about these spaces: surveys, observation, and comment boards. They designed a survey instrument with questions that focused on elements that could be changed (such as furniture) and questions that prompted the respondents to offer their opinion of what type of activities the space was best suited for. Similarly, they used the comment boards to solicit feedback on particular furniture pieces and general satisfaction with the spaces. To account for the potential difference in students’ stated preferences and their actual behaviour, the researchers also employed the observation method (Goodman, 2011). Using survey and observation methods together provided a more complete picture of user satisfaction with the spaces, as well as user preference for particular areas and furniture types. This mixed-methodology approach and combination of survey and observation data was

inspired by Webb et al. (2008), who combined video surveillance footage with surveys and web polls to obtain information on students’ library space use.

Although Webb et al. (2008) inspired this mixed methodology approach, due to privacy regulations, video surveillance was not an option for observing student behavior at McGill. For this reason, the Working Group modeled their observation method on Given and Leckie (2003), who describe how research teams at two Canadian public libraries used “an unobtrusive patron-observation survey, called ‘seating sweeps’” to answer questions about the use and functionality of central libraries as public space (p. 373). This observation method collects minimal user demographics (sex, estimated age) and data on user activity (what they are doing) and possessions (what they have with them) in a specified space at a specified time. The observation criteria used was also adapted from Given and Leckie (2003), particularly their list of possessions and activities. This method also allowed the group to compare the students’ survey responses and comments with their behaviour. Since there were two separate spaces being evaluated, all of the data collection elements had two parts – one for the furniture lab and one for the McLennan Building third floor space.

The Working Group's use of comment boards had its roots in two places. Several members of the group had prior experience with this method and had found that it complimented the use of surveys. Use of this approach was also inspired by Halling and Carrigan (2012) who utilized whiteboard voting in their study as one method for obtaining student feedback.

Survey Design

Both the McLennan Building third floor survey (Appendix A) and the furniture lab survey (Appendix B) instruments included seven questions: six multiple choice and one open-ended. Two of the questions were demographic

(type of patron and faculty/department affiliation) and four were designed to obtain the students' opinions about the effectiveness of the space and furniture pieces for particular activities (group work, quiet study, and lounging or relaxing). On both surveys, the final question was open-ended to allow for any additional comments or suggestions regarding the space or furniture. All of the questions on both surveys were optional and the surveys were completely anonymous.

Data Collection

Surveys

Both of the surveys were made available in paper and online format. The paper surveys were offered to students using a container attached to the boards through which comments were being solicited. A second container was used to collect the completed surveys. The group members also used these boards to indicate the web address where students could access the online version of the surveys, which were offered via SurveyMonkey. Both versions of the surveys were available for approximately two weeks.

Comment boards

In order to solicit comments on the boards, group members used a combination of open questions about the space and about specific pieces of furniture. Using the bulletin boards, the group members attached pictures of specific pieces of furniture spaced evenly throughout the board with the following solicitation across the top of the board: "We want to know what you think of the new group study space." Additional prompts were posted as well, such as: "Which is your favorite?" and "love it/love it not." Sticky notes and markers were available so students could write comments and attach them near the relevant furniture picture. The group members used the whiteboards to solicit comments about the space by writing: "What do you think of this space?" or simply: "Comments?" Group

members visited the boards several times each day to collect the completed surveys and to take pictures of (and refresh) the comment boards.

Observation

The group members set up two online forms (one for each space) using Google Drive to record and analyze the data from their observations. This gave the observers the choice of recording their observations on paper and entering the results in the online form at their leisure or using a laptop or tablet to record the data in the online form as they performed their observations. The observation forms (Appendix C) were designed using Given and Leckie's (2003) as a template. The group members decided to record the number of male and female users but not to estimate the users' age as this was not relevant to the study. They used some of the same variables as Given and Leckie (2003) in the possessions and activities categories and made some additions. They also added four categories to the form: interaction (students working alone/students working collaboratively/other), position (sitting/standing/other), whiteboard use (no whiteboard/not using/using individually/using interactively/there is writing on whiteboard but not clear if it is from current occupant/other), and adequate space provided for possessions (yes/no/other).

The group members mapped out both spaces in order to break them down into locations that would be observed. The McLennan Building third floor space includes several different types of seating in repeated groupings throughout the floor (Appendix D: Third Floor Area Map). The group members assigned numbers to each of these similar seating groups (e.g., tables with blue dividers, area #1, #2, etc.), as well as the four group study/seminar rooms, and added them as locations. A total of 14 locations were included in the observation form for the McLennan Building third floor space. The form for the furniture lab space also included 14 locations; however, on this form each of the

locations corresponded to individual furniture types (Appendix E: Furniture Lab Pictures). The group members planned 12 observations of each space at corresponding times spread over one week (Table 1). In total, 10 observations were completed for the furniture lab space and 11 for the McLennan Building third floor space.

Results

Surveys

Third floor

The Working Group received 41 completed surveys (38 paper and 3 online) for the McLennan Building third floor space and 88 (78 paper and 10 online) for the furniture lab space. The respondents to both surveys were primarily undergraduates (85% and 90%) and the largest number indicated that they were part of the Faculty of Arts (39% and 46%). This was not surprising as the Humanities & Social Sciences Library houses many of the materials the Arts students would need to complete their assignments, as well as the offices of the liaison librarians for the departments in the Faculty. However, it was notable that the second largest number of respondents to both surveys indicated they were part of the Faculty of Science (24% and 22%). Most respondents (77%)

to the McLennan Building third floor space survey indicated that they use the space for quiet study, and 91% rated the space either very effective (54%) or somewhat effective (37%) for this type of studying (Figure 1).

The comments regarding the McLennan Building third floor space design were very positive, in particular regarding the lighting, colour scheme, and designation of zones for quiet study. Several respondents suggested that the space could be improved if more electrical outlets were added and several others suggested that library staff should enforce the quiet study concept for those zones. Temperature is often an issue in the large buildings on the McGill campus (especially in the winter) so it was not a surprise that numerous respondents mentioned that the space was too cold.

Furniture Lab

The responses for space use preference in the furniture lab were more surprising, considering that the space was designed for group work. The largest group of responses (47%) indicated the intent to use the space for group work; however, 30% of respondents indicated that they intended to use the space for quiet study, and 23% indicated that they intended to use the space for lounging or relaxing (Figure 2).

Table 1

Observation Times for Furniture Lab and McLennan Building Third Floor Space
(Week of December 9, 2012)

Day	Time
Monday	10 a.m.
Tuesday	10 a.m., 2 p.m., 4 p.m.
Thursday	10 a.m., 2 p.m., 4 p.m.
Friday	10 a.m., 2 p.m., 4 p.m.
Saturday	5 p.m.
Sunday	8 p.m.

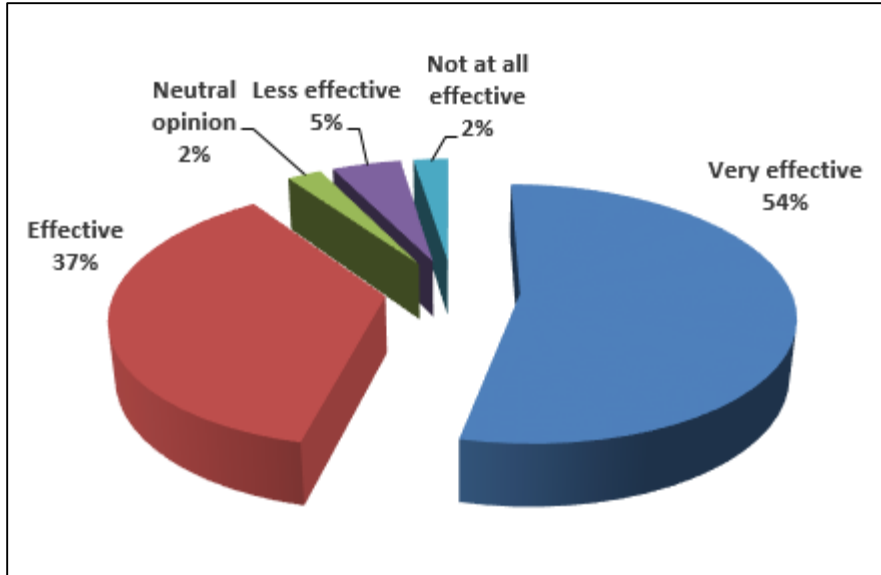


Figure 1
Effectiveness of the third floor study space for quiet or individual study.

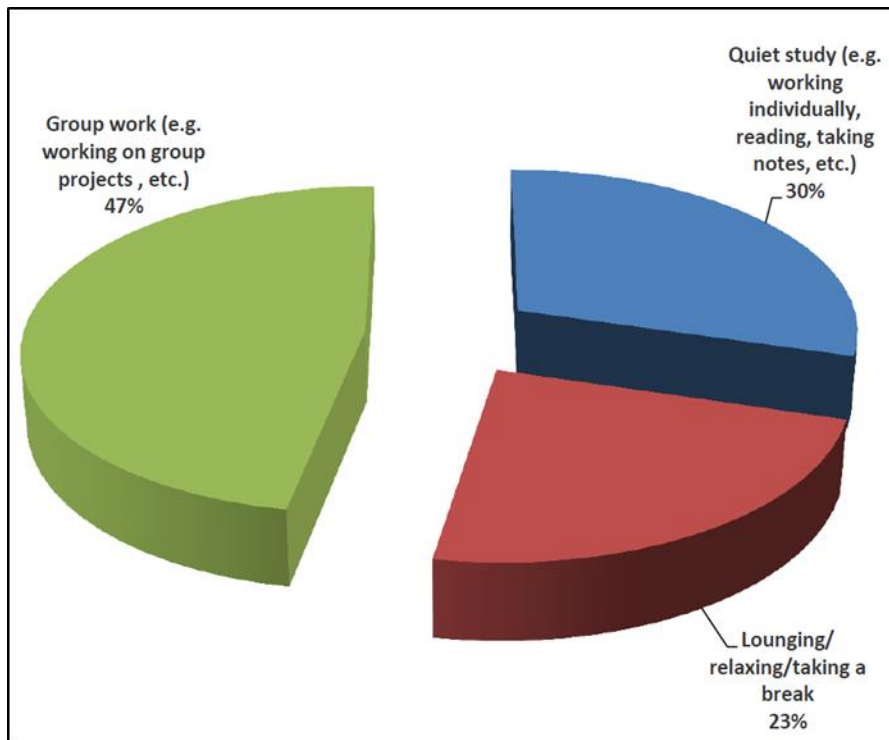


Figure 2
Preference for space use, furniture lab.

The survey form (Appendix B) offered a selection of 12 furniture pieces so that respondents could indicate their top preference for the three types of activity: group study, quiet study, and lounging or relaxing. For quiet study, 36% of respondents chose the Y-shaped divided table as the top furniture item, with the red desk-arm chair a close second at 23%. The other highly-rated item was the desk chair (17%),

which is used with the Y-shaped divided table and the U-shaped table (Figure 3). The top-rated item for group work was the portable whiteboard (27%), followed by the desk chair (13%) and the U-shaped table (11%) (Figure 4). The remaining 49% of the responses for this question were divided among the other nine furniture items.

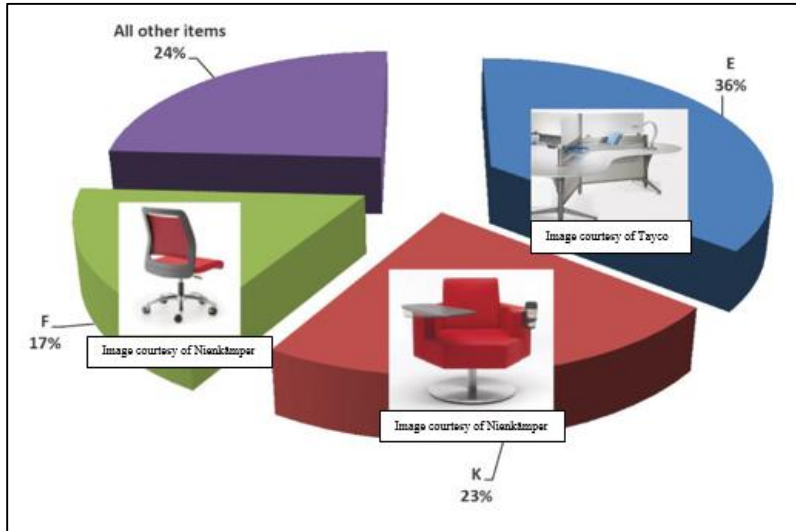


Figure 3
Furniture preference, quiet study.

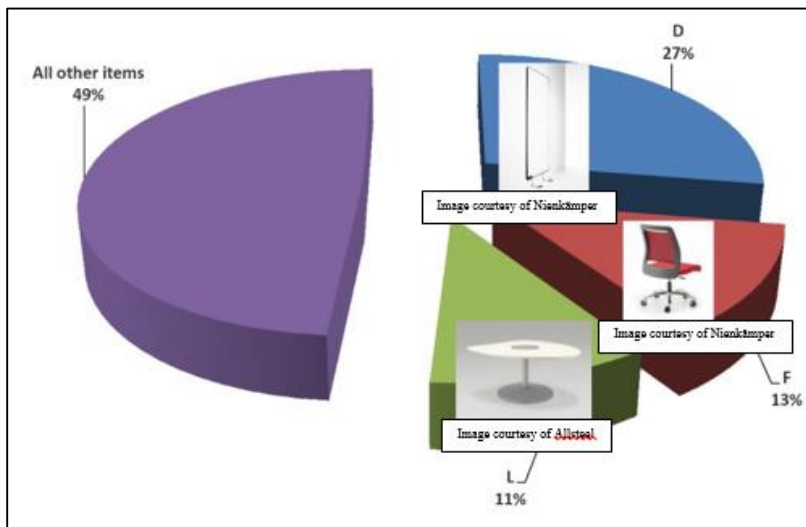


Figure 4
Furniture preference, group study.

There was a similar breakdown in responses for the top-rated item for lounging or relaxing. The question mark lounger was chosen by 23% of respondents, the reading chair with wooden arms by 20%, and the low-slung reading chair by 17%. The remaining 40% of responses were divided among the remaining nine items. The final question on both survey forms was an open-ended solicitation for comments or suggestions. The furniture lab survey respondents most commonly suggested that the space should have more tables, electrical outlets, and whiteboards. They also suggested that the whiteboard markers be replaced more frequently. The comments were generally positive toward the space, especially its design and designation as a group study space, though there was a mixed response to the furniture colours.

Comment Boards

The bulletin board and whiteboard comments were a mix of positive and negative; however, several items received consistently positive comments. These items included the moveable whiteboards ("more please"), the round and U-shaped tables and desk chairs ("the best"; "beautiful"), the low-slung reading chair ("this chair is pure happiness"), and the question mark lounger ("love it - so sassy"). It was notable that the three-sided table that had been the top choice in the furniture lab survey for quiet study received comments that confirmed it was not well-suited for group work ("chairs too close to each other"; "more appropriate for individual study space").

Observation

Third floor

During the 11 observations completed for the McLennan Building third floor space, the Working Group members observed a total of 1,565 occupants. With the exception of two of

the group study rooms, observations of each area showed a much higher instance (80% or greater) of occupants working alone than working together. In the areas where a whiteboard was present, all observations showed it was either being used or had been used (i.e., there was writing on it). The occupants in the third floor space were most commonly observed carrying out the following activities: using laptops or tablets, reading, writing, and using earphones (Figure 5). The most common possessions observed were laptops or tablets, books, paper, backpacks or totes, and earphones. Many of the occupants were observed in possession of beverages and most often (>60% of the time) these were in closed containers. Eating was observed infrequently (<20% of the time).

Furniture Lab

In the 10 observations completed for the furniture lab space, a total of 490 occupants were observed. Though the space was designed for group study, observations showed occupants using the space equally for independent study and for collaborative work. Collaborative work was observed most often in the group study rooms, at the Y-shaped divided table, and at the U-shaped and round tables. The whiteboards paired with the U-shaped tables were in use most often, followed closely by the whiteboards in the group study rooms. The main activities taking place in the furniture lab space were virtually the same as those most commonly observed in the McLennan Building third floor space; however, drinking was slightly more common than using earphones (16% vs. 13%). Eating was indicated in approximately 18% of the observations, most commonly at the round and U-shaped tables. Occupants at the round tables, the U-shaped tables, and on the rounded chairs were most often observed reading. The most common possessions observed were identical to the McLennan Building third floor space. Occupants in the furniture lab space were in possession of drinks (most often in closed containers) on average 35% of the time.

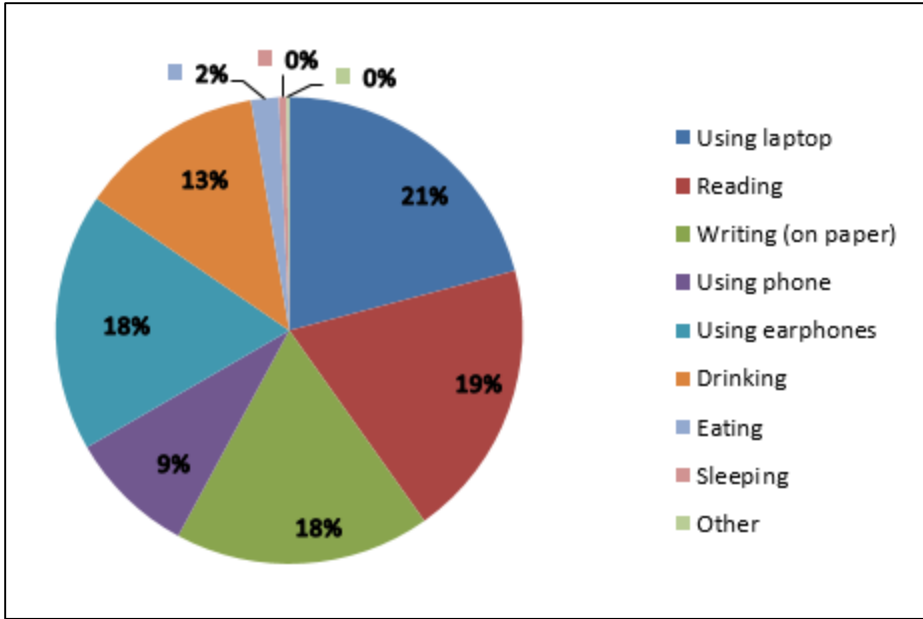


Figure 5
Occupant activities, third floor.

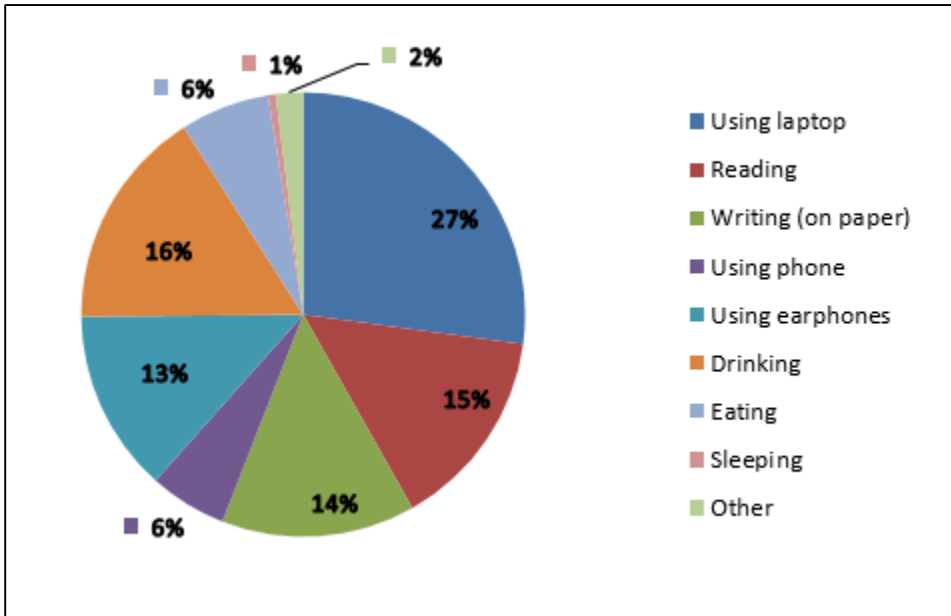


Figure 6
Occupant activities, furniture lab.

Discussion

Two of the Working Group's initial assumptions proved to be accurate: that students would desire more outlets and that students from all disciplines would make use of the space.

It was not surprising, given the consensus in the literature that one of the students' most frequent suggestions was for additional electrical outlets (Brown-Sica, 2012; Halling & Carrigan, 2012; Norton et al., 2013; Vaska et al., 2009). This was doubly confirmed via the observations, during which it was noted that both in the third floor quiet space and in the furniture lab, the most commonly observed item in the occupants' possession was a laptop or tablet. These results, together with the studies mentioned earlier, provide evidence for including ample access to electricity in the design of any library space.

In reviewing the results from the surveys and comment boards, some were as expected, particularly the use of the spaces by students from a wide range of disciplines. Even though the McLennan-Redpath Library complex serves primarily students in the Faculty of Arts, its location at the centre of campus makes it a hub for students in all faculties. This was demonstrated in the survey responses showing that all faculties were represented; notably, students in the Faculty of Science made up almost one quarter of those surveyed (Figures 7 and 8).

Two of Working Group's other assumptions proved to be inaccurate: that students would prefer "comfy" or "soft" furniture and that the furniture lab would be used primarily for group study.

Both the survey responses and observations revealed a desire among users for more traditional furniture such as tables and desk chairs. The observation data showed that tables were the most commonly used item in the furniture lab for group study and that the lounge chair and couch grouping was only

slightly more commonly used than the tables for individual study. In the surveys, the tables, desk chairs, and moveable whiteboards were the most preferred items. One cushioned reading chair was the only "comfy" item to show as preferred (23% for quiet study). As libraries are more and more becoming a "home away from home" for students, the Working Group members had anticipated users would express a greater preference for "comfy" furniture. There is also considerable evidence for this furniture type preference in the literature (Halling & Carrigan, 2012; Hobbs & Klare, 2010; Montgomery, 2011; Pierard & Lee, 2011; Webb et al., 2008). This divergence from the existing body of evidence indicates potential for further investigation; however, it may be attributable to the difference in survey design. The furniture lab survey instrument (Appendix B) provided the opportunity for users to rate furniture based on its intended use (i.e., individual study, group study, or relaxing). Other furniture preference studies asked more generally what type of furniture students would prefer without providing the option for selecting furniture based on different use scenarios. Additionally, given that this study dealt with particular furniture pieces, it is possible that the respondents and occupants choices may indicate a lack of truly comfortable options rather than a true preference for desks and tables.

Foster and Gibbons (2007) discuss in their chapter on library design and ethnography that in their experience, library "zones" are "neither determined nor enforced by the library staff. Rather the students develop and enforce them" (p. 20). Given that assessment, the researchers should not have been surprised to discover that the furniture lab space was not being used as they had initially intended. The furniture lab is located in a busy, high-traffic area of the library; however, almost one-third of survey respondents indicated that they used the furniture lab for individual or quiet study. This was also confirmed through the observation results (Figure 9) that show occupants working collaboratively just under 50% of the time.

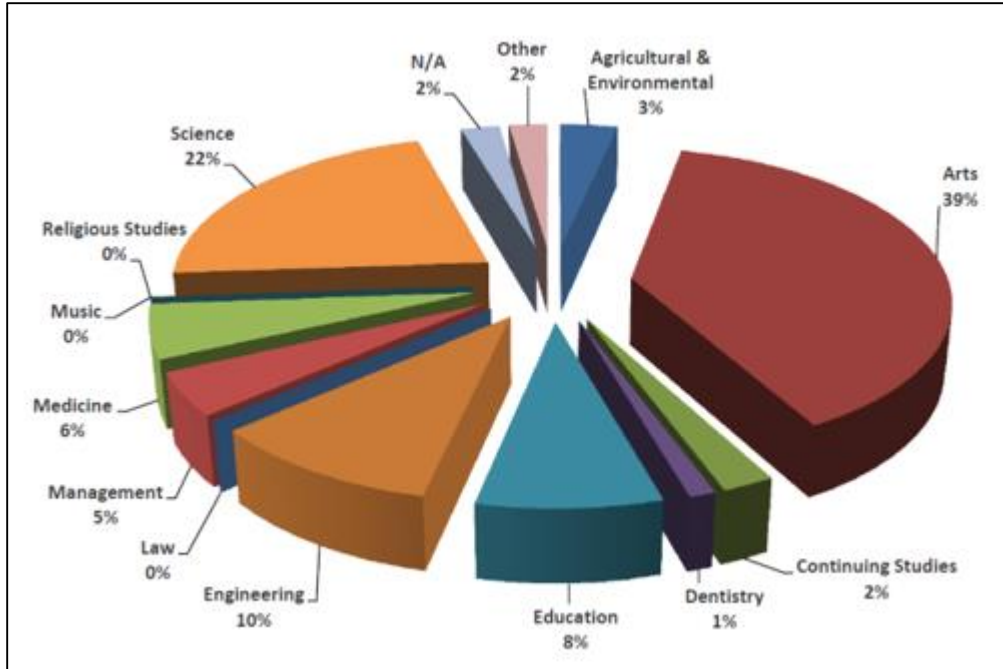


Figure 7
Survey respondents by faculty, furniture lab.

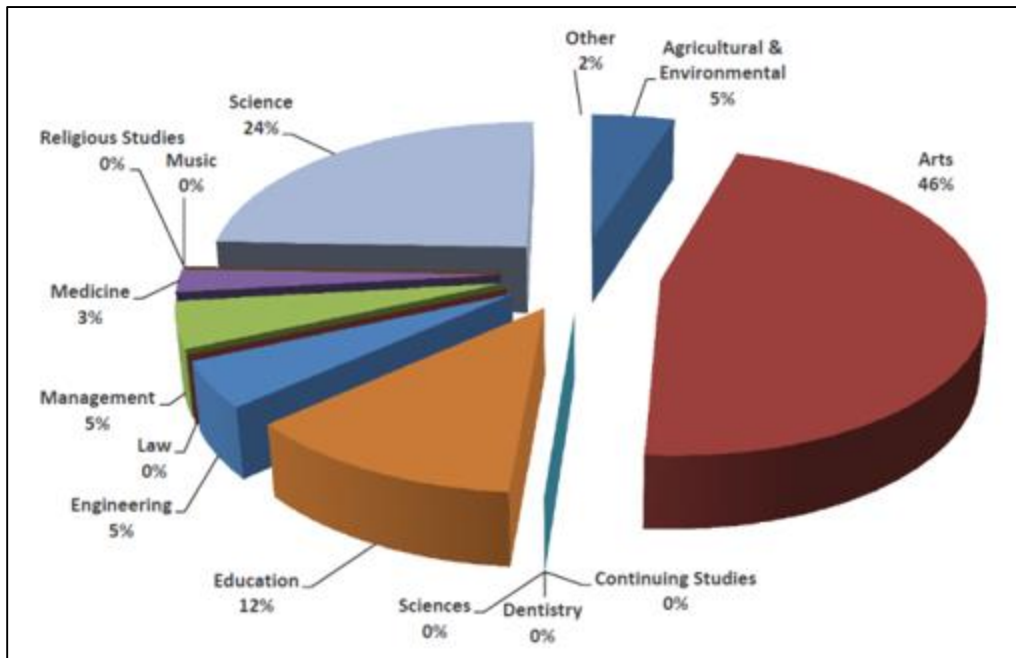


Figure 8
Survey respondents by faculty, third floor.

Several other studies have found similar results (Bryant, Matthews, & Walton, 2009; Crook & Mitchell, 2012; Harrop & Turpin, 2013), which suggests this could be a common pattern in the use of space designed for group work. It would require further analysis to determine if students were willingly choosing to do their quiet study in that area or if this was not so much a choice as a necessity, given the lack of sufficient quiet space elsewhere in the library.

Beyond validating or contradicting initial assumptions, the multi-method approach allowed the Working Group to discover additional information. In both the furniture lab and the third floor quiet space, the most commonly observed activities were the same: using laptops or tablets, reading, writing, and using earphones. This is consistent with other studies utilizing the observation method. Given and Leckie's (2003) results, gathered over ten years ago when laptops were less prevalent, found that reading and writing were the most popular activities, followed by computer use. Bryant et al. (2009) found similar results, as did Lehto, Toivonen, and Iivonen (2012).

However, it was encouraging to learn both through observation and through survey analysis that the third floor space was being used for its intended purpose (i.e., quiet study) and that it was generally regarded to be effective in fulfilling that objective.

Limitations

In embarking on this project, the Working Group members' objective was to get a better sense of what users liked and did not like about the re-designed spaces and how they were using the spaces. With this in mind, the group did not set out to be exhaustive in their data collection; they focused instead on using several methods to gather sufficient data to answer their questions without overextending staff time or annoying users. This approach limits the analysis and the strength of the conclusions that can be drawn from the data. The library is open to the public and the survey and comment boards were made freely available, thus the population size is unknown and the response rate cannot be defined. For this same reason there was no way to control for duplication or

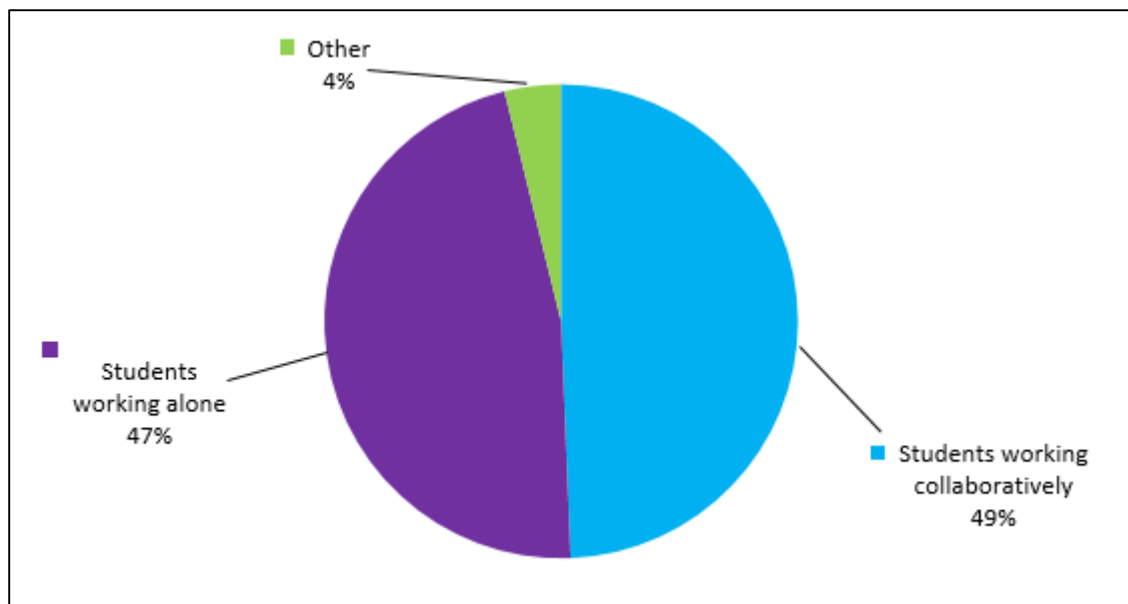


Figure 9
Observed occupant interaction, furniture lab.

multiple responses from the same individual. The results from the observations do not provide a complete picture, as data was not collected during the late night or early morning hours. Finally, as is the case with any study done in a single site involving a particular population, the results of this investigation cannot be assumed to be typical or indicative of the opinions and preferences of other university populations. However, the authors feel that the methods could be successfully applied in other library settings.

Conclusion

As library spaces continue to adapt to meet the changing needs and expectations of their users, it is important for library administrators to gather feedback on user preferences and usage patterns. The past twenty years have seen radical changes in the physical layouts and use of space in libraries and there is no doubt that library spaces will continue to adapt and evolve over the course of the next several decades.

The authors found that a mixed method analysis was particularly useful for this project to determine both what users want out of their library spaces and how they are currently using them. Observation data demonstrated usage patterns that may have been overlooked by traditional survey methods. Conversely, survey responses provided important user feedback and comments. By combining the methods, this study illuminates some key issues, notably, the desire for traditional furniture (tables, chairs), as well as the need for more electrical outlets in all areas of the library, and the positive return on investment (high incidence of usage and user satisfaction) for the relatively low-cost addition of whiteboards. It also confirms that some library spaces are satisfying their anticipated need: the third floor quiet study area is in fact being used for that purpose and a majority of respondents find it effective in that respect.

The results of this project have been used to inform purchasing decisions to outfit other spaces in the McLennan-Redpath Complex as well as in other libraries on campus. The furniture lab space is being expanded such that it will more than double in size. Following the findings of this study that the space was used for both group and individual work, the expanded space has been laid out accordingly and filled with the furniture items identified as most popular for each type of work. The most popular items from the furniture lab have also been installed in another branch's new group space, and whiteboards have been added in several branches. The positive student response to the third floor space has been a factor in renovation design decisions for the first and second floors of the McLennan Library Building. The furniture in both areas has been updated to include long wood-finish tables (some with dividers, some without), similar to the ones observed to be popular in this study. All re-designed spaces and new tables will have multiple power outlets per seat (plug and USB). Going forward, the library plans to continue obtaining user feedback to inform space planning decisions and to adapt the results of the research undertaken here to other library spaces on campus.




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Appendix A
Third Floor Survey Instrument

	<h1>McLennan</h1> <h2>3rd Floor Survey</h2> 																	
<p>1. Are you a:</p> <p><input type="checkbox"/> Undergrad <input type="checkbox"/> Grad <input type="checkbox"/> Faculty/Staff <input type="checkbox"/> Alumni <input type="checkbox"/> Visitor <input type="checkbox"/> Other</p>																		
<p>2. Please select one for your faculty:</p> <table border="0"><tr><td><input type="checkbox"/> Agricultural & Environmental Sciences</td><td><input type="checkbox"/> Arts</td><td><input type="checkbox"/> Continuing Studies</td><td><input type="checkbox"/> Dentistry</td></tr><tr><td><input type="checkbox"/> Management</td><td><input type="checkbox"/> Education</td><td><input type="checkbox"/> Engineering</td><td><input type="checkbox"/> Law</td></tr><tr><td><input type="checkbox"/> Science</td><td><input type="checkbox"/> Medicine</td><td><input type="checkbox"/> Music</td><td><input type="checkbox"/> Religious Studies</td></tr><tr><td></td><td><input type="checkbox"/> N/A</td><td><input type="checkbox"/> Other _____</td><td></td></tr></table>			<input type="checkbox"/> Agricultural & Environmental Sciences	<input type="checkbox"/> Arts	<input type="checkbox"/> Continuing Studies	<input type="checkbox"/> Dentistry	<input type="checkbox"/> Management	<input type="checkbox"/> Education	<input type="checkbox"/> Engineering	<input type="checkbox"/> Law	<input type="checkbox"/> Science	<input type="checkbox"/> Medicine	<input type="checkbox"/> Music	<input type="checkbox"/> Religious Studies		<input type="checkbox"/> N/A	<input type="checkbox"/> Other _____	
<input type="checkbox"/> Agricultural & Environmental Sciences	<input type="checkbox"/> Arts	<input type="checkbox"/> Continuing Studies	<input type="checkbox"/> Dentistry															
<input type="checkbox"/> Management	<input type="checkbox"/> Education	<input type="checkbox"/> Engineering	<input type="checkbox"/> Law															
<input type="checkbox"/> Science	<input type="checkbox"/> Medicine	<input type="checkbox"/> Music	<input type="checkbox"/> Religious Studies															
	<input type="checkbox"/> N/A	<input type="checkbox"/> Other _____																
<p>3. What do you or would you intend to use this space for (check as many as apply):</p> <p><input type="checkbox"/> Quiet study (e.g. working individually, reading, taking notes, etc.) <input type="checkbox"/> Lounging/relaxing/taking a break</p> <p><input type="checkbox"/> Group work (e.g. working on group projects , etc.)</p>																		
<p>4. Rate how effective this space is for quiet study:</p> <p><input type="checkbox"/> Very effective <input type="checkbox"/> Somewhat effective <input type="checkbox"/> Neutral opinion <input type="checkbox"/> Less effective <input type="checkbox"/> Not at all effective</p>																		
<p>5. Rate how effective this space is for group work:</p> <p><input type="checkbox"/> Very effective <input type="checkbox"/> Somewhat effective <input type="checkbox"/> Neutral opinion <input type="checkbox"/> Less effective <input type="checkbox"/> Not at all effective</p>																		
<p>6. Rate how effective this space is for lounging/relaxing/taking a break:</p> <p><input type="checkbox"/> Very effective <input type="checkbox"/> Somewhat effective <input type="checkbox"/> Neutral opinion <input type="checkbox"/> Less effective <input type="checkbox"/> Not at all effective</p>																		
<p>7. Additional comments and/or suggestions:</p>																		

Appendix B
Furniture Lab Survey Instrument



Furniture Lab Survey





1. Are you a:
 - Undergrad
 - Grad
 - Faculty/Staff
 - Alumni
 - Visitor
 - Other
2. Please select one for your faculty:
 - Agricultural & Environmental Sciences
 - Arts
 - Continuing Studies
 - Dentistry
 - Education
 - Engineering
 - Law
 - Management
 - Medicine
 - Music
 - Religious Studies
 - Science
 - N/A
 - Other _____
3. What do you or would you intend to use this space for (check as many as apply):
 - Quiet study (e.g. working individually, reading, taking notes, etc.)
 - Lounging/relaxing/taking a break
 - Group work (e.g. working on group projects, etc.)
4. Based on the images below, please rank your top 3 furniture items for **quiet study** (enter corresponding image letter):

1st choice ____ 2nd choice ____ 3rd choice ____
5. Based on the images below, please rank your top 3 furniture items for **group work** (enter corresponding image letter):

1st choice ____ 2nd choice ____ 3rd choice ____
6. Based on the images below, please rank your top 3 furniture items for **lounging/relaxing** (enter corresponding image letter):

1st choice ____ 2nd choice ____ 3rd choice ____

A



B



C



D



E



F



G



H



I



J



stool/ottoman

K



L



table with electrical outlet

7. Additional comments and/or suggestions:

Images and re-use permission provided as follows: A-C, D, F, G, I-K – courtesy of Nienkamper, E – courtesy of Tayco, H & L – courtesy of Allsteel.

Appendix C
Observation Data Collection Form

<p>How many male occupants? (enter whole number in box)</p> <input type="text"/>
<p>How many female occupants? (enter whole number in box)</p> <input type="text"/>
<p>Occupant interaction (choose all that apply)</p> <ul style="list-style-type: none"><input type="checkbox"/> Students working collaboratively<input type="checkbox"/> Students working alone<input type="checkbox"/> Other: <input type="text"/>
<p>Occupant activities (choose all that apply)</p> <ul style="list-style-type: none"><input type="checkbox"/> Using laptop<input type="checkbox"/> Reading<input type="checkbox"/> Writing (on paper)<input type="checkbox"/> Using phone<input type="checkbox"/> Using earphones<input type="checkbox"/> Drinking<input type="checkbox"/> Eating<input type="checkbox"/> Sleeping<input type="checkbox"/> Other: <input type="text"/>
<p>Occupant Positions (choose all that apply)</p> <ul style="list-style-type: none"><input type="checkbox"/> Sitting on chair<input type="checkbox"/> Sitting on table<input type="checkbox"/> Sitting on floor<input type="checkbox"/> Standing<input type="checkbox"/> Other: <input type="text"/>

Whiteboard use

Indicate how occupants are using the whiteboard (choose as many as apply)

- No whiteboard nearby
- Occupant(s) not using whiteboard
- Occupant(s) using whiteboard individually
- Occupants using whiteboard interactively
- Writing on whiteboard, not clear if it is from current occupants
- Other:

Possessions

(choose as many as apply)

- Books
- Laptops/Tablets
- Backpacks/Totes
- Printouts/Papers
- Phone
- Earphones
- Drinks (in closed container)
- Drinks (in open container)
- Food
- Other:

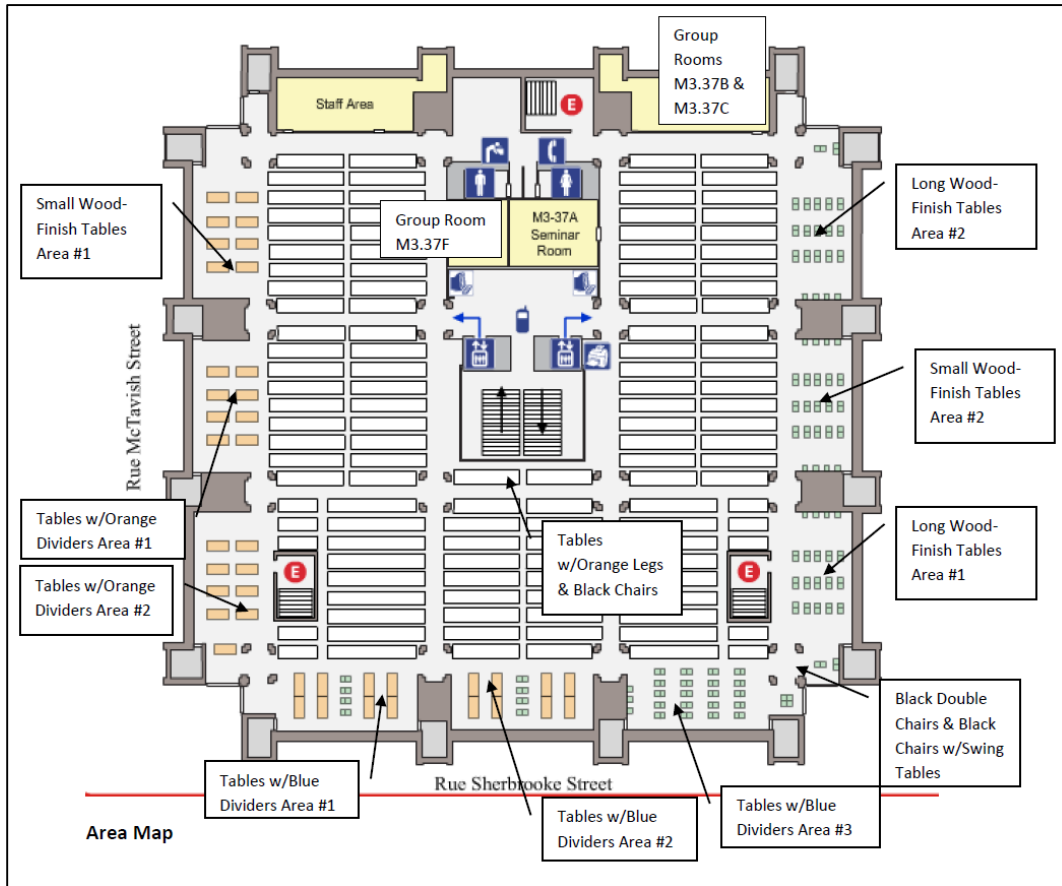
The furniture provides adequate space for occupants' possessions

(choose one)

- Yes
- No
- Other:

Add any comments below

Appendix D Third Floor Area Map



Appendix E
Furniture Pictures



Armchair Grouping



Y-Shaped Divided Table



Rounded Chairs (red & orange)



Question Mark Lounger



Lounge Chairs



Couch (grouped w/lounge chairs)



U-Shaped Tables



Grey Chairs with Desk Attachments



Round Tables



Couches with High White Backs



High-Backed Chair with Sides



Pink High-Backed Couches



Black Chairs with Swing Tables



Long Wood-Finish Tables