LABORATORY OCCUPANCY SURVEY

IMPROVING INDOOR SUSTAINABILITY

SUSTAINABILITY OFFICE AT UTM

ENV332H, APRIL 2020

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Executive Summary

Our project, the Laboratory Occupancy Evaluation, was to collect the evaluations of the current University of Toronto Mississauga (UTM) population of undergraduate and graduate students and faculty. The evaluations were based on the experiences of the population from within the UTM Davis building lab rooms. The main objective of this project was to provide feedback on current lab design in the Davis building and provide recommendations for future lab design and construction in the newly proposed science building on the UTM campus. The Sustainability Office at UTM has a commitment of obtaining a minimum LEED Silver Certification for the new science building, and a goal of obtaining a LEED Gold Certification. Therefore, due to our client's expectation of a LEED Gold Certification, we designed our study around collecting information of the current lab user's experience in areas that would help obtain the certification by improving indoor environmental quality.

To collect information, we used a survey approach that focused on natural light, thermal comfort, noise levels, air quality, and space. We decided to have two different surveys, one for undergraduate students and one for graduate students and faculty. The decision to split the populations was done because undergraduate students mostly use the labs for class only, meaning their experiences within labs is minimal so the questions provided were simple rating scales. On the other hand, graduate students and faculty spend years in labs and while they had similar questions, there were also in-depth short answer questions for them to provide their opinions on the labs. From there, data was analyzed using excel to determine any correlations in the data.

In total there were 84 responses to our survey, with 63 being undergraduates and 21 being graduate students or faculty. Undergraduate students were found to have a lower overall satisfaction rate of the labs than graduate students and faculty with a rating of 3.3/5 compared to 4.5 of the Davis labs. For the undergraduates it was noteworthy that if the noise levels were rated high, the overall comfort of the labs was lower than if the noise levels were average. Air quality was rated 3.1/5 by the undergraduate students with only 7.9% rating the air to be fresh. For the graduate students it was noteworthy that they found the temperature to be too cold in the winter

for both males and females, and they believed that the amount of space in the lab was too little, with an overall rating of 2/5.

Recommendations for future lab design and construction within the new building are improvements of to the HVAC system to provide better air quality and reduce noise in the lab rooms, independent thermostats within each room to improve thermal comfort, an increase in natural lighting or creating variable light levels in the lab like the newer classrooms have and finally improving space efficiency by increasing shelving space to decrease lab clutter and improve space within the labs.

Introduction

The Sustainability Office at UTM uses the phrase “Grow Smart, Grow Green” to guide them in their decision making regarding environmental impacts on the University campus. UTM is located on 225 acres of forest around the Credit River. The Sustainability Office has committed to creating innovative building designs to maintain the natural aspect of the area surrounding campus, and to bring that green space within the campus. The Sustainability Office at UTM is involved in decision making in areas such as energy usage on campus and its sources, transportation, buildings and renovations, taking care of the natural environment surrounding campus, handling waste and recycling and water management. To give students an idea of the challenges and obstacles faced by the Sustainability Office at UTM when conducting its own investigations and projects, our project, the Laboratory Occupancy Evaluation, was created. The Laboratory Occupancy Evaluation was designed to collect the experiences within the Davis lab rooms on the University of Toronto Mississauga (UTM) campus of the current undergraduate students, graduate students (both masters and PhD) and faculty populations. Our project was provided to us by the Sustainability Office at UTM to provide a detailed report on the feedback of lab design and construction of the Davis building lab rooms, and recommendations on future lab design and construction for the newly proposed science building on the UTM campus from student’s and faculty’s opinions and further research on other institutions. The Sustainability Office at UTM is interested in student and faculty evaluations of the lab rooms in Davis because

they are looking to obtain a LEED Gold Certification for the new science building. To provide feedback and recommendations we created two surveys, focusing on areas indoor environmental quality. Specifically looking at the number of hours spent within the lab, air quality, thermal comfort, natural and artificial lighting, noise levels and space issues within the Davis lab rooms.

Challenges and obstacles during our study were prevalent throughout. Firstly, due to the project being only a few short months, timelines were short for each deadline and difficult to meet because of other schoolwork. Deadlines for areas such as creating the survey were only one week. This was challenging because the project was in its infancy so creation of questions that were necessary for meeting the client's expectations and completion of the project was challenging. Trial and error of the questions was limited, and we suffered with questions such "How would you rate the noise level in the lab?" and "How does the number of people in your lab impact your work attitude?". For the noise question, we were trying to assess what lab room noise levels were like, but with our Likert scale ratings of 1-5 with 1 being too noisy and 5 being too quiet, it seems respondents were confused about the wording, and rightly so. How would one answer if a room is too quiet and would that be an issue when a person is trying to focus? For the second question issue, we were trying to convey two points, space issues within the lab due to the number of people and does that limit or expand your productivity. However, we received complaints about the wording again as most people did not see it as a space issue, and more often than not faculty took the word productivity as the measure of output their lab has and not how productive they themselves are. For example, one professor said that when he has more people in his lab, there is more work being done so the lab is being more productive. We were trying to convey something along the lines of, are you specifically more or less productive based on the number of people in the lab? Tying to ask if increased people may cause disturbances that hinder your productivity or being able to speak to others and bounce ideas off one another may increase your productivity. Another question which could have been better was the number of hours spent in the lab for the graduate survey, with the options to answer being: 0, 1-3, 4-6, 7-9, 10-12, 13-15 and 16+. All the responses under 9 hours except 2 for 9/21 responses, were from faculty, while the other 12 responses were for 13-15 or 16+, greatly skewing the results to the extreme values only. This question could have been improved through further probing of what time is spent in the lab compared to what time is spent doing research outside the lab and such, so we could see how graduate students and faculty actually spend their time. Another challenge was with the

Coronavirus or COVID-19, in person surveying was no longer an option. Response rates declined when the survey was emailed, most likely because it was easier to ignore the email than ignoring the surveyors in person. Also, with campus shutting down, reaching undergraduate students for their responses was made much more difficult and data collection eventually stopped because of the virus and fears of spreading it.

Data analysis was ongoing throughout survey collection to help maintain the short deadlines. Overall, undergraduate students rated the Davis labs a 3.3/5, with only 11.5% of students thinking the labs were satisfactory. The main issues according to the undergraduate student population was the lack of a window view and natural light, and the air quality within the lab. Thermal comfort was not an issue present in either summer or winter according to the students. Noise levels however, influenced the overall comfort rating. If undergraduates thought that the room was too loud, the overall rating of the lab declined and if the lab was not noisy, the overall rating was increased. Comparing these results to the graduate students and faculty, the overall lab rating was 4/5. Indicating that the faculty and graduate students much prefer their lab spaces than the undergraduates. For graduate students and faculty, females noted that the temperature was too cold in the winter, with an average rating of 2.57/5 compared to a 3.25/5. While during the summer, both found it too cold with an average rating of 2.85/5 (female) compared to 2.91/5 (male). The two noteworthy results of this survey found that only 40% of the graduate and faculty populations had a window view, but 66% of the population mentioned it does/would positively impact their work ethic, and that space seemed to be the biggest issue among graduate students and faculty. Window views were noteworthy because of the dominant agreement with which they would positively impact workspace. When speaking with professors during in-person surveying, it was noted that they were glad their offices had window views and natural light if their labs did not. Space is most likely an issue for graduate students and faculty because of the small size of labs, and the number of items and equipment needed to complete research, labs were probably cramped.

Based on the findings of the above research we recommend that the Office of Sustainability at UTM that the HVAC system be improved so that the air quality is better within the labs as both undergraduates, graduate students and faculty made note of the not-fresh-air within their lab spaces. Thermal comfort for undergraduates was not an issue, but with graduate students it seemed to be, and based on their recommendation and our findings, an adjustable thermostat within each

lab room was requested by graduate students and faculty and we recommend this based on the results found from our surveys. Natural lighting was a positive impact on overall satisfaction and productivity within the lab and it is recommended to include as much natural light as possible in future lab design for the new science building. However, if this is not possible because the lab is located in the basement for example, LEED guidelines recommend having adjustable lights. LEED guidelines also suggest having variable light controls throughout the room so that different areas of the room can have their light levels adjusted, like in some of the newer classrooms on campus. Improvements in noise levels correlated with improvements in overall satisfaction, and therefore we recommend including soundproofing windows and doors, minimizing noise from heating, cooling and equipment like fume hoods in the lab to improve satisfaction levels within the new science building. Finally, improving space in the labs would normally mean creating larger labs, however this is most likely an unlikely solution as the lab building can only be so large. Therefore, we recommend inputting more shelving space, another study can be done on improving the design of labs by speaking to students and faculty on how current space is utilized and how design improvements can be made.

Background Information

The University of Toronto has proposed a Low Carbon Action Plan 2019-2024 in order to achieve the goal of reducing their greenhouse gas (GHG) emissions by 37% from 1990 levels by 2030. The plan outlines several projects across the 3 campuses that will help close the gap between current emissions and this goal. The Mississauga Campus accounts for 9% of the university's emissions and it is part of the plan to reduce this contribution by building a new science building at UTM using Geoexchange systems, a low-carbon energy source for heating and cooling. The new building, expected to be completed in 2021, will be one of the most energy efficient biological and chemical research laboratories in the world and will use 65% less energy than a conventional building. Through the geoexchange system and other measures, such as a solar PV system, they aim to reduce GHG emissions by 860 Tonnes eCO2/year (University of Toronto, 2019).

Additionally, the building is aiming to achieve a minimum of Silver certification in the Leadership in Energy and Environmental Design (LEED) green building certification process (Galea-Pace, 2019), but ideally is looking to achieve a gold certification. LEED is the most widely

used green building rating system in the world that aims to construct buildings that are efficient and resilient, improve occupant health and reduce carbon emissions in both the building and operating stages. The UTM science building will register under the LEED v4.1 BD+C (building design and construction) rating system. To earn gold certification, the building must acquire 60-79 points. The point system is categorised into 6 areas; location and transportation, sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality, and the building is awarded points based on the extent to which they achieve various strategies (USGBC, 2020).

The GHG reduction measures outlined above will help achieve points in various categories, however our project will focus on the improvements that can be made to human comfort and health, earning points in the indoor environmental quality category. This has the purpose of improving the productivity, comfort and well-being of building occupants by establishing standards for indoor air quality, acoustic performance, thermal comfort, interior lighting, daylight and quality views. We have been asked by the UTM Sustainability Office to conduct surveys on students and faculty that use the current laboratories on campus, to give us an insight into their levels of comfort and satisfaction. The results would then be used to provide recommendations for improving the above areas in the new lab building, using some of the strategies in the LEED rating guide.

We chose to conduct the surveys on users of the labs in the William G. Davis Building on the Mississauga campus. This building was built in 1974 and is the campus' largest academic building. The majority of the labs were built in the 1970s and some have not been updated since (UTM, n.d.). Major renovations were undertaken on the 3rd floor chemistry labs and 1st floor physics labs in 2013 (UTM, n.d.) and in 2018, a $17.1million upgrade on 63 of the labs was completed (Wahl, 2018). This upgrade modernised the building and increased the energy efficiency, however, none of the labs are LEED certified.

Problem Statement

As of now, UTM has established a few LEED certified buildings with Hazel McCallion Academic Learning Centre as the first LEED certified building across all three campuses (UTM,

n.d). These buildings are built recently with significant improvement in their conventional system, building materials and indoor design. However, UTM has not successfully renovated laboratory rooms and research areas in the Davis buildings to be LEED certified as the majority of the labs were built in the late 1970s (UTM, n.d.). In UTM's contribution towards the U of T Low Carbon Action Plan 2019-2024, the university is looking to build a new science building that can achieve a minimum LEED silver certification to offset the old Davis building. Indoor environmental quality is one of the key prerequisites for achieving a LEED certified as mentioned, through comparison, the evaluation and opinion we collected from the Davis building will help form the basis of improvements on indoor comfortability and design for the construction of the new lab building. Our recommendations will be based on the user's feedback and references from the LEED v4.1 BD+C guideline (U.S. Green Building Council, 2019). Since the university has also established very few studies towards lab users' experiences, our report will act as a consultation for the Sustainable Office towards building the new LEED certified science building.

Methods

We created two surveys (refer to Appendix) through Google Forms for the graduate and undergraduate populations in this project. The graduate population includes undergraduate students working as ROP students or as research assistants in a lab. The questions were based on an existing survey we received from Sylvia Coleman from the Sustainable Office. We modified those questions by removing irrelevant categories such as age and questions about work habits like how long do you spend in front of a screen. However, we kept the likert scale style of the questions because the format was highly conducive to quantitative analysis. The close ended questions asked respondents to rate the air quality, light, temperature, space, productivity, and the impact of a window view on their lab experience. The graduate survey had an additional open-ended question asking what changes should be made to the lab, we only asked the graduates because the sample size includes faculty and they spend a substantial amount of time in the labs compared to undergraduates.

We disseminated the online surveys through Google Forms and we offered respondents a chance to win a $25 Starbucks gift card. Initially, we planned on selecting a winner through a lottery but due to the pandemic we had to forego this plan. Nevertheless, we posted the

undergraduate survey online on social media groups in order to gather responses. We also approached students after their labs and advertised through professors' announcements. In addition, Dillon and Violet approached professors with physical surveys to obtain more graduate responses. Ultimately, we collected 63 responses from the undergraduate survey and 21 responses for the graduate survey. Most of the charts were exported directly from Google forms with the exception of the one analyzing temperature in the graduate survey. The latter was analyzed and constructed in Excel.

Findings

Undergraduate Survey Summary

We received a total of 63 responses to the undergraduate survey, the majority from 4th year students (42.9%) and females (73%). The average overall comfort rating was 3.3 out of 5 which indicates that undergraduate students think the Davis labs are only okay and, since only 11.1% of students thought the labs were satisfactory, there is room for improvement (figure 1). When analysing the results to see which factors influenced people's comfort rating the most, it was found that the main issues were; whether there was a window view, levels of natural lighting and air quality. Temperatures in the summer and winter didn't appear to be much of an issue for most students and neither did the number of people in the lab. Noise did have an influence on the overall comfort rating; however, the majority of people thought the noise levels were fine as they were.

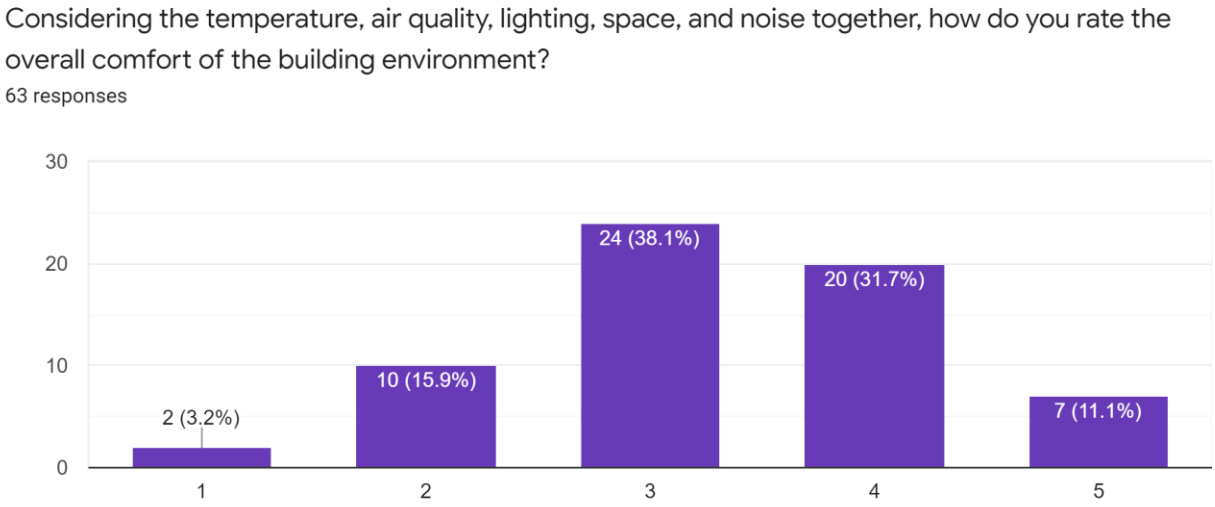

Figure 1: Cumulative average of air quality, lighting, noise, and space for undergraduates.

Window View

- 65.1% of labs did not have a window but most people (49.2%) felt that having a window positively impacts their experience (figure 2).
- 72% of people with a window view said it has a positive impact and gave on average a higher overall comfort score of 3.6 /5
- People without a window view gave an average comfort score of 3.2 / 5

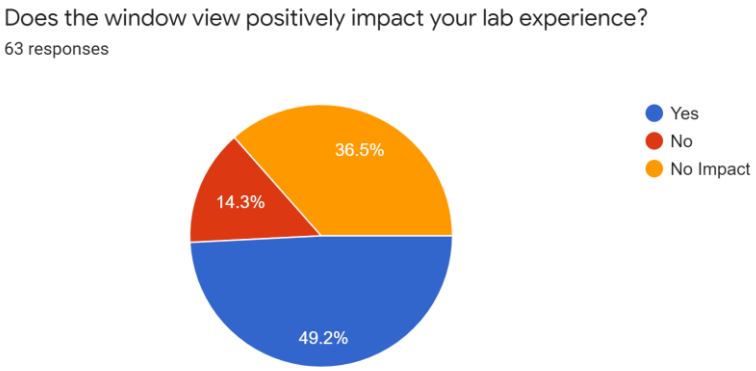

Figure 2: The presence of a window view in the labs

Natural light

- Average rating of 2.3, with 57.1% saying there was too little natural light (< 3) (figure 3)
- No one said there was too much natural light (5) – windows only positively impact the lighting
- Whether they had a window impacted the natural light score
    - People with a window gave lighting a middle rating of 2.7 on average (just right amount of natural light), people without a window rated lighting 2
- Impacted overall comfort:
    - Too little natural light (<3) = 3/5 comfort
    - Average lighting (3) = 3.6/5 comfort
    - Too much natural light (4) = 4/5 comfort (too much is not a negative)

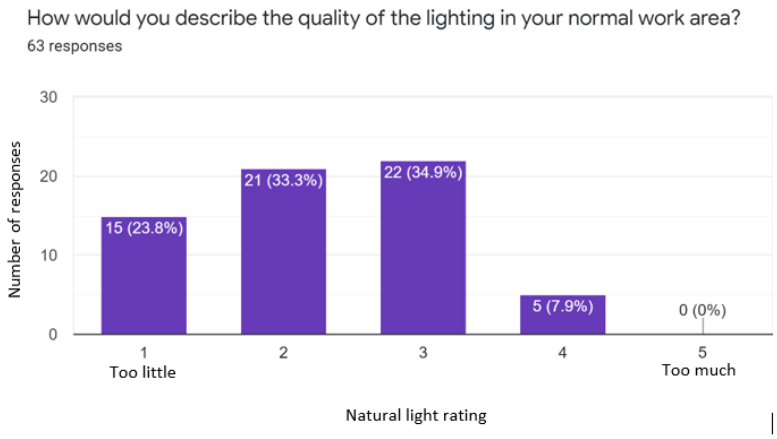

Figure 3: The rating of the natural light levels in the labs

Air Quality

- Average rating of 3.1 indicating air quality is only average and could be fresher, only 7.9% of people rated it fresh (5) (figure 4).
- The rating given to air quality impacted the average overall comfort
    - Fresher air (> 3) = 3.6/5 comfort
    - Average air (3) = 3.4/5 comfort
    - Stale air (< 3) = 2.9/5 comfort

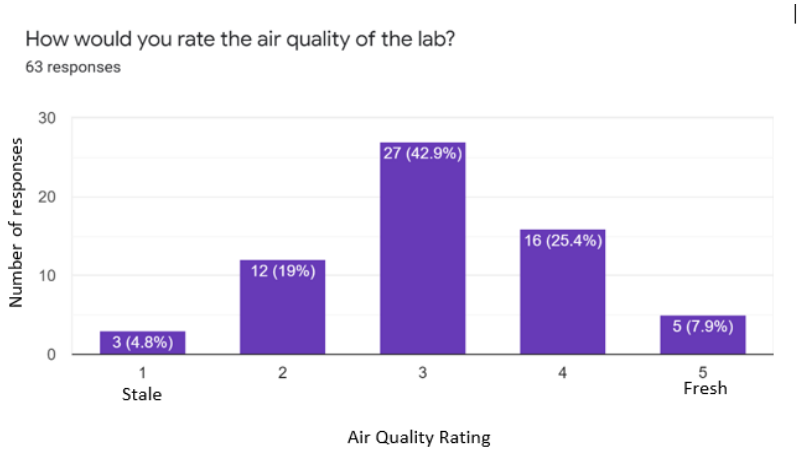

Figure 4: The rating of air quality in the labs

Noise

- Average score of 2.8 = noise levels are fine in the current labs
- However, too much noise does impact comfort levels:
    - 30.1% rated it too noisy (< 3) = 2.8/5 comfort
    - Average or too quiet noise levels = 3.5/5 comfort
    - Indicates that too quiet is not a negative thing and most people prefer average or quiet noise levels

Temperature

- Not much of an issue in summer or winter; most people rated it in the middle
    - 60.3% thought temperatures were fine in winter and 56.5% fine in summer
- Not much of an impact on overall satisfaction, slightly lower comfort rating if they thought it was too hot or cold but not significant

Number of people

- Didn't negatively or positively impact people's experience, average score of 3.1

There were some factors that could have affected or skewed our results. These include:

- Misinterpretation of questions; some were too vague or worded badly. For example, people without a window view may have been unsure on how to answer the question on how a window view impacts their experience.
- Time spent in labs ranged from 0-10+ hours. People who spent more time in the labs may have different views than people who only spend a couple of hours a week.
- Most of the responses were from females which could mean our results were not representative of the overall student population. Women could have different views to men (as demonstrated in the graduate results).
- Some students may have not answered the questions truthfully and clicked any response just to enter the giveaway. This was obvious for one of the respondents whose answers were consequently removed before analysis so that the results weren't affected, however this could be the case for other responses.
- Some people commenting on the same lab room gave different answers to whether there was a window or not. This could be the result of someone not answering truthfully or making a mistake.

Graduate Survey Summary

The findings from the graduate survey demonstrated notable results in temperature perception, space, and the impact of a window view. The ratings for air, light, and noise were fairly decent, refer to figure 10. The cumulative score of all these components was a 4 out of 5. In terms of temperature, the results were broken down by season, refer to figures 5 and 6. Women reported feeling substantially colder during the winter, they rated it a 2.57 out of 5. By contrast, men rated the temperature a 3.25 out of 5 during the winter. However, both men and women rated the temperature at 2.89 out of 5 during the summer which suggests the labs were too cold. Similarly, the rating for space was low at 2 out of 5 as the respondents found the labs too cramped. The results for the presence and impact of a window view were equally noteworthy, refer to figures 7 and 8. Only 40 percent of the respondents had a window view, yet 66.7 percent of them stated it positively impacted their lab experience.

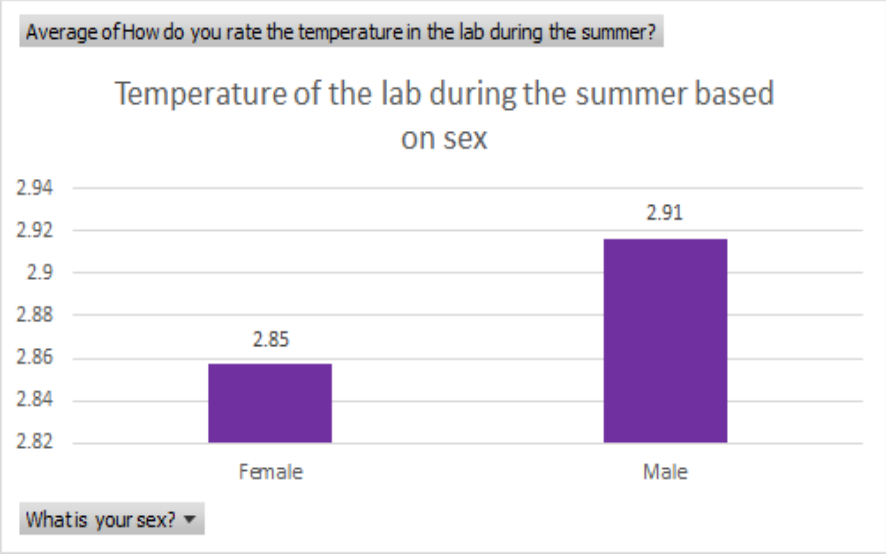

Figure 5: Average rating of lab's temperature during the summer based on sex.

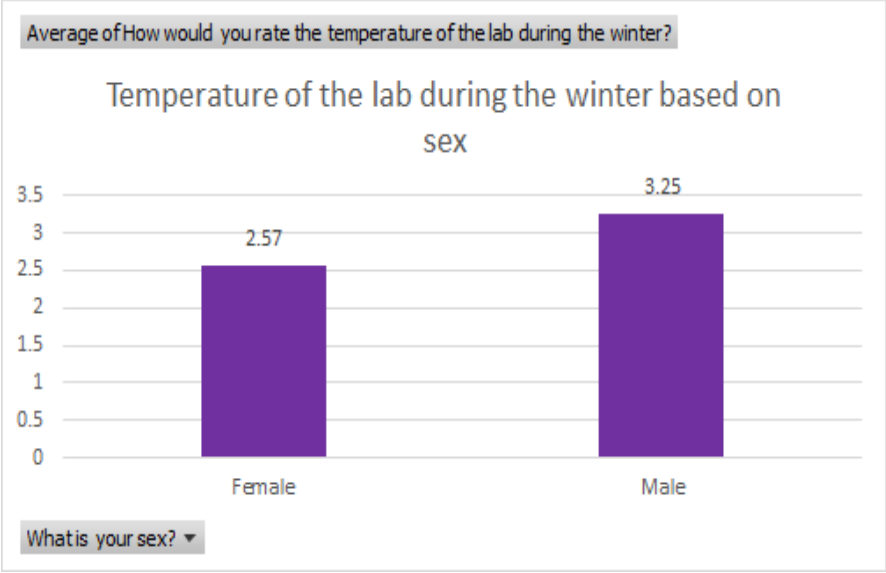

Figure 6: Average rating of lab's temperature during the winter based on sex.

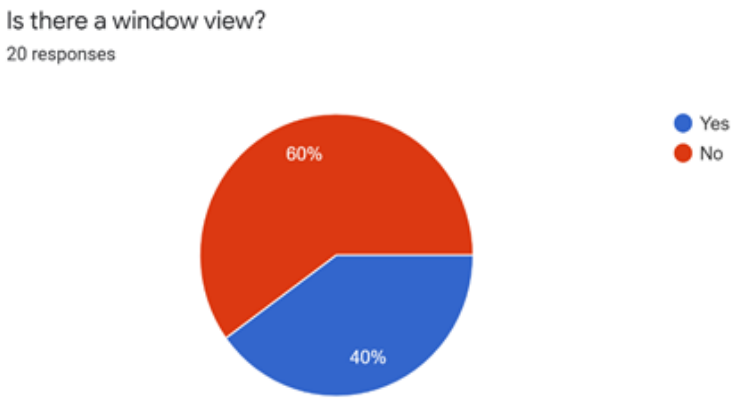

Figure 7: Breakdown of whether there is a window view in the lab.

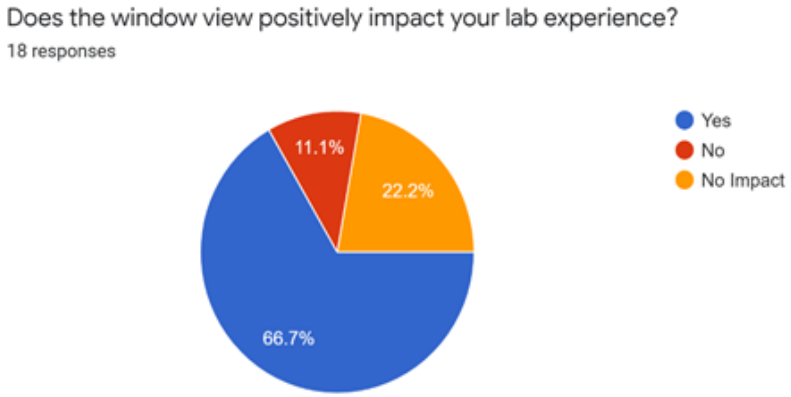

Figure 8: Breakdown of whether the window view has an impact on lab experience.

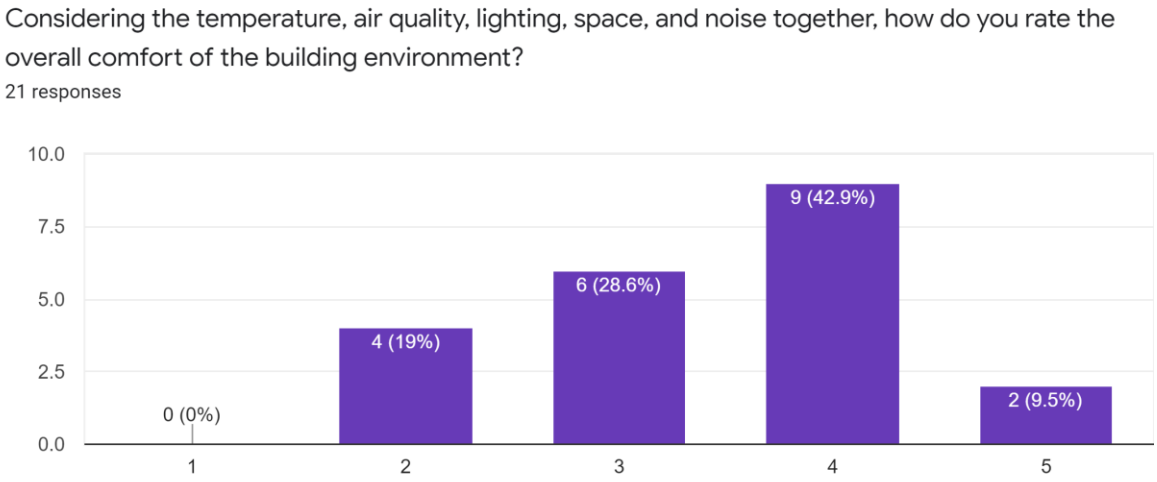

Figure 9: Cumulative average of air quality, lighting, noise, and space for graduates.

Recommendations

All of our recommendations about the new lab building are to help achieve better indoor quality to such an extent it can be LEED Gold certified. Both our undergraduate and graduate surveys indicated we need to account for air quality, thermal comfort, lighting, quality views, noise. For air quality, only 8.1% of undergraduate students thought that the air is fresh in the labs. Poor air quality could negatively impact the production of work and the students' health. To achieve the LEED Gold certified in air quality, we can implement permanent entryway systems that capture dirt and particles entering the new lab building such as grates, grilles, and slotted systems (U.S. Green Building Council, 2019). In addition, having a professional staff maintaining the permanent entryway systems on a weekly basis would be a plus. Furthemore, air purifiers and ventilation equipment with particle filters or air-cleaning devices can be set up for better air quality (U.S. Green Building Council, 2019).

The current thermal comfort in Davis does not play a significant issue for undergraduate students. Based on our survey result, 61.3% of undergraduate students felt normal in winter, and 56.5% of undergraduate students felt normal in summer. There is not a big difference between winter and summer. Undergraduate students did not feel this had much of an impact on overall

satisfaction. For the graduate survey, women reported substantially that they felt colder during the winter compared to men. To provide the best thermal comfort condition for both undergrad and graduate students, we can follow the standards of LEED by providing individual thermal comfort controls with adjustable features on air temperature, radiant temperature, air speed, and humidity in their surrounding area for at least 50% of individual occupant spaces (U.S. Green Building Council, 2019). HVAC systems and group thermal comfort controls can be implemented in shared multi-occupant spaces. Besides, to make it more energy-efficient, the new building can be geothermally powered like IB to regulate temperatures more sustainably in general.

As for lighting, we recommend the utilization of as much natural lighting as possible but if this is not the case, we suggest following the guidelines from the LEED certified standards (U.S. Green Building Council, 2019). This would include having the ability for most individuals to adjust lighting in their own preferences with at least 3 lighting levels. When considering a working space, we recommend putting in a multi zone control system where lighting can be controlled separately from all other control. For natural lighting, we recommend a good range of lighting at between 300 lux and 3000 lux (U.S. Green Building Council, 2019), and the use of translucent materials that have high surface reflectance. Anti-glare devices may also be used in situations to control the amount of sunlight received. Moreover, based on both surveys, most of the labs in Davis building did not have windows, and many students felt that windows positively impacted their experiences and production of work. It is essential to provide the new building occupants a connection to the natural outdoor environment by providing quality views. We recommend designing more windows for every lab in the new building and follow the protocol of having a window or viewing space that can cover visibility to up to 75% of the room. We would also want to emphasize that the view must be clear with no obstructions (U.S. Green Building Council, 2019).

For noise, both undergraduate and graduate students thought the noise level was acceptable. However, 29.1% of students rated it as too noisy, which seemed to affect their overall satisfaction negatively. According to the guidelines from the LEED-certified standards: the noise has to achieve a background noise level of 35 dBA or less from heating, ventilating, and air-conditioning systems in lab rooms and other core learning spaces. Design classrooms and other core learning spaces have to meet the sound transmission class requirements of ANSI S12.60–

2010 Part. Exterior windows must have an STC rating of at least 35 unless outdoor and indoor noise levels can be verified to justify a lower rating to get the gold-certified (U.S. Green Building Council, 2019). As a result, to improve the quietness of the labs, we recommend using soundproof doors and windows. In particular, the construction can appropriately increase the thickness of the wall to isolate the noise among labs or using soundproof walls or white noise machines that can be installed to reduce noise levels. Besides, we can improve the distance between labs to decrease the amount of noise that travels between rooms.

Conclusion

In all, our ultimate goal is to help UTM successfully contribute to the UofT Low-Carbon Action Plan by helping to make the new lab building LEED Gold certified. This is achieved by providing the Sustainability Office with recommendations based on our survey results and also the LEED v4 building design and construction guideline.

We have generally found that windows positively impacted the overall lab experiences in both populations. Physical discomfort such as low air quality and very little natural light was reflected in our undergraduate population survey. Thermal comfort was within an acceptable range but females generally felt colder in the labs. To address these problems, suggestions for improvements include but are not limited to installing more windows to maximize the natural lighting, considering the merits of a geothermally powered building like IB, installing air purifiers, and self-adjustable thermal control. We also recommend using soundproof walls and thicker insulation walls to mitigate noise levels.

Beyond adapting to the LEED v4 building design and construction guideline (U.S. Green Building Council, 2019), we have suggested various useful recommendations targeted towards the improvement of air quality, natural lighting, noise and thermal control for the new building. We have provided specific standards and justifications to turn our recommendations into options. We believe that these suggestions will significantly improve not only the positive environmental benefits that the building brings to the UofT Low-Carbon Action Plan, but also the students' overall learning experience and faculty's research experience. Our next step would be contacting the Sustainability Office and formulating a plan of action that will best accommodate everyones' needs.

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Appendix

ENV332 Undergraduate Student Survey

1. Email address:
2. What year of undergraduate studies are you in?
3. What is your sex?
    - Female, Male, Other
4. What program are you in? (NO abbreviations)
5. How many hours do you spend in the lab per week?
    - 0, 1-3, 4-6, 7-9, 10+
6. Is there a window view?
    - Y/N
7. Does the window view positively impact your lab experience?
    - Y/N
8. How do you rate the temperature in the lab during winter?
    - 1. Too Cold 2. Cold 3. Neutral 4. Warm 5. Too Warm
9. How would you rate the temperature in the lab during the summer?
    - 1. Too Cold 2. Cold 3. Neutral 4. Warm 5. Too Warm
10. How would you rate the air quality of the lab?
    - 1 to 5, Stale to Fresh
11. How would you describe the quality of the lighting in your normal work area?
    - 1 to 5, Too little natural light to too much natural light
12. How does the number of people in your lab impact your work attitude?
    - 1 to 5, Not productive ~ Highly productive
13. How would you rate the noise level in the lab?
    - 1 to 5, Too noisy to Too quiet
14. Considering the temperature, air quality, lighting, and noise together, how do you rate the overall comfort of the building environment?
    - 1 to 5, Unsatisfactory overall ~ Satisfactory overall
15. If you have multiple labs, which lab room are you most comfortable in? (State the building code and number: example, DV3320)
16. If possible, specify the lab room number you are commenting on in this survey (Eg. most of your opinions come from using the biology lab, put down DV2048

ENV332 Graduate Student Survey

1. Email address:
2. What is your current level of education?
    - Undergraduate Researcher, Master's Student, PhD Student, Faculty, Other
3. What is your sex?
    - Female, Male, Other
4. What program are you in? (NO abbreviations)
5. How many hours do you spend in the lab per week?
    - 0, 1-3, 4-6, 7-9, 10-12, 13-15, 16+
6. Is there a window view?
    - Y/N
7. Does the window view positively impact your lab experience?
    - Y/N/No Impact
8. How do you rate the temperature in the lab during winter?
    - Too Cold 2. Cold 3. Neutral 4. Warm 5. Too Warm
9. How would you rate the temperature in the lab during the summer?
    - Too Cold 2. Cold 3. Neutral 4. Warm 5. Too Warm
10. How would you rate the air quality of the lab?
    - 1 to 5, Stale to Fresh
11. How would you describe the quality of the lighting in your normal work area?
    - 1 to 5, Too little natural light to too much natural light
12. How would you rate the amount of space in the lab?
    - 1 to 5, too little to too much
13. How would you rate the noise level in the lab?
    - 1 to 5, Too noisy to Too quiet
14. How does the number of people in your lab impact your work attitude?
    - 1 to 5, Not productive ~ Highly productive
15. Considering the temperature, air quality, lighting, and noise together, how do you rate the overall comfort of the building environment?
    - 1 to 5, Unsatisfactory overall ~ Satisfactory overall
16. If you have multiple labs, which lab room are you most comfortable in? (State the building code and number: example, DV3320)
17. If possible, specify the lab room number you are commenting on in this survey (Eg. most of your opinions come from using the biology lab, put down DV2048
18. What improvements would you suggest for the lighting, temperature and space?
19. Are there any other improvements you would suggest besides light, temperature and space?