

MINNESOTA



POST-OCCUPANCY EVALUATION

Indoor Environmental Quality + Classroom Environment UMTC John T. Tate Hall (Tate Hall) Renovation Minneapolis, MN

**April 2019, Minneapolis, MN
Sustainable Post-Occupancy Evaluation Survey (SPOES)
B3 Guidelines**

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1.0 Overview

The purpose of this report is to examine the connection between sustainable design criteria used in the design of the UMTC John T. Tate Hall (Tate Hall) facility and occupants' satisfaction with their classroom environments located in this building. The Tate Hall facility renovation was designed using the 2009 B3 Guidelines (formerly known as the Minnesota Sustainable Building Guidelines or MSBG), which were in effect at the time that the new facility was completed for occupancy in August 2017. The B3 Guidelines track specific state-funded, B3 buildings as a means of demonstrating real outcomes aimed at the conservation of energy resources, creation and maintenance of healthy environments, and occupants' satisfaction with their environments. The Sustainable Post-Occupancy Evaluation Survey (SPOES) was developed to assess human outcomes in workplace, classroom, and residence hall settings in compliance with the B3 Guidelines project tracking requirements. This is a report of occupants' (hereafter called students) responses at 14 months post-occupancy. The survey was conducted in late-October through early-November 2018.

This SPOES report focuses on students' satisfaction with the physical environment as related to 23 indoor environmental quality (IEQ) criteria such as lighting, thermal, and acoustic conditions in their primary classrooms. Students' satisfaction with the facility (site, building, and interior) and the effect of the facility's physical environment on their perceptions of their academic performance and health also are included. Finally, a brief look at students' commuting and physical activities within the building are reported. The report provides descriptive information about students' perceptions of the IEQ of their classroom environments. In addition, this information serves the broader development of knowledge regarding the influence of IEQ on students.

2.0 Method

SPOES consists of a self-administered, Internet-based, questionnaire submitted to and completed by students. The SPOES questionnaire has been tested for **validity** (measures what it is intended to measure) and **reliability** (repeatability or replicability of findings). Students rate their level of satisfaction on a **Likert-type scale** (measurement scale) from 1 (very dissatisfied) to 7 (very satisfied) with IEQ of the facility and their primary classrooms. They also rate the influence of their physical environment on their perception of their academic performance and health on a scale from 1 (hindered) to 7 (enhanced).

The report provides a descriptive summary of the results stated as a **mean** (average of all responses), **standard deviations** (SD) (how different scores are from each other and the mean), and **number of responses** (N) for each question analyzed. The mean for a 7-point scale is 4.00. Lower or higher means reflect stronger tendencies towards dissatisfaction/satisfaction and hindered/enhanced. Means that are close to the center of the scale (4) are considered to be neither dissatisfied/hindered or satisfied/enhanced.

When interpreting **mean** responses, the following labels were used:

- 1.00 - 3.50 dissatisfied (or hindered)
- 3.51 - 4.50 neither dissatisfied (or hindered) nor satisfied (or hindered)
- 4.51 - 7.00 satisfied (or enhanced)

An IEQ Score is also calculated for students' satisfaction with IEQ in their primary classrooms. This is a statistical combination of category-level IEQ scores, which results in a single IEQ score for all respondents and is reported in an IEQ Scorecard.

2.1 Description of the Questionnaire

Students first rate their level of satisfaction with the facility (site, building, and interior) and the influence of their physical environment on their perception of their academic performance and health. Then they respond to questions about their satisfaction with their primary classrooms in relation to IEQ criteria from the B3 Guidelines. Additionally, students' physical activities and commuting practices are investigated.

In the SPOES questionnaire, the 23 IEQ criteria listed below are evaluated. There are two levels of criteria, categories and attributes. As shown in the list, the 'overall' criteria are boldfaced and called 'categories' or 'category level' criteria. A category is broader or more general such as Overall View Conditions or Overall Indoor Air Quality. Some categories have 'attributes' or 'attribute level' criteria and provide greater detail about the category. For example, Overall Thermal Conditions is a category level question, and there are four attribute level questions related to thermal conditions such as adjustability, air velocity (draft), humidity, and temperature. Overall Acoustic Conditions is a category with an attribute of students' ability to hear desired sounds. There are 11 category-level and 12 attribute level questions. Means are calculated and reported for all category and attribute-level criteria.

An IEQ Satisfaction Score is also calculated for students' satisfaction with IEQ in their primary classrooms. This is a statistical combination of the 11 category-level criteria only and results in a single, mean IEQ Satisfaction Score for students' satisfaction with the physical conditions of their primary classrooms. Attribute-level criteria are not included in the IEQ Score because unequal weight would be given to criteria that have both category and attribute-level questions.

In the following list, **category (boldface)** criteria are listed in alphabetical order. If a category has attributes, they are listed with the category.

Overall Acoustic Quality

- Ability to hear desired sounds (lecture, video, discussions, etc.)

Overall Appearance (aesthetics)

Overall Cleaning and Maintenance

Overall Daylighting Conditions

- Ability to adjust daylighting
- Amount of daylighting

Overall Electric Lighting Conditions

- Ability to adjust electric lighting
- Amount of electric lighting

Overall Furnishings

- Ability to adjust furnishings

- Function of furnishings

Overall Indoor Air Quality

Overall Technology (presentation, laptop support, etc.)

- Access to electric outlets

Overall Thermal Conditions

- Ability to adjust thermal conditions
- Air velocity (drafty/stagnant)
- Humidity (dry or moist)
- Temperature (hot or cold)

Overall Vibration and Movement

Overall View Conditions (ability to see instructor, screens, etc.)

2.2 Limitations

Students' participation is voluntary, and responses are self-reported. As is true with all survey research, the responses indicate students' perceptions. There were no physical measurements, e.g., temperature, humidity, or lighting levels of the environment taken. The classrooms are shown as a congregate measure, not analyzed individually. This study is limited to students' perceptions.

3.0 Sample Description

3.1 Description of Building

The Tate Hall facility resides at 116 Church Street SE, Minneapolis, MN. The Tate Hall facility (see Figure 1) is a seven-story, 198,079 square foot building. There is a sub-basement and basement below grade and of the five floors above grade, the fifth is a mechanical floor. Laboratories (60,070 square feet), classrooms (16,114 square feet), and lecture and seminar rooms are distributed across all occupied floors. In addition, there are faculty and staff offices; meeting, conference, and lounge areas; public (and circulation) space; support space and restrooms; and mechanical/electrical, and custodial space. Tate Hall is the principal classroom building for physics, astronomy, and earth sciences classes. Only the overall facility, laboratories and classrooms were included in this study.



Figure 1. Tate Hall (Photo courtesy of Patrick O'Leary, UMN Photographer)

3.2 Project Team

The relevant project team members to the SPOES process for Tate Hall was comprised of the owner, design team, commissioning agent, and general contractor. They are identified below, relative to their capacity and involvement.

Owner	Regents of the University of Minnesota
Architect	Alliance
Mechanical and Electrical Engineer	Affiliated Engineers, Inc.
Interior Designer	Alliance
Lighting Designer	Total Lighting Designs, Inc.
Landscape Architect	University of Minnesota
Commissioning Agent	University of Minnesota
General Contractor	JE Dunn Construction Group, Inc.

3.3 Description of Respondents

The Tate Hall had 6,120 students with classes in the constructed facility during the fall semester administration of the survey. The response rate to the questionnaire was approximately 18%. Of those responding, 51% were female, 48% were male, and 1% responded as 'other.' The mean age of respondents was 20 years; the range was 16 to 71 years.

Students responded that in their primary laboratory or classroom environment, 14% spend 1-2 hours per week in their primary laboratory or classroom environment, 36% spend 3-4 hours, 50% spend 5+ hours per week in their primary classroom or laboratory environment. This indicates how much they are exposed to the laboratories'/classrooms' IEQ.

4.0 Findings and Discussion

4.1 Tate Hall Facility (Site, Building, and Interior): Overall Satisfaction, Learning Experience, and Health

Students responded to questions concerning the Tate Hall facility (site, building, and interior) and their overall satisfaction with the facility, overall perceptions of their learning experience in relation to the facility, and their overall perception of their health in relation to the facility. Table 1 shows the means and standard deviations of their responses as well as how the responses are interpreted. Figure 2 is a graph that shows the mean for each question with a blue mark. The standard deviation is represented by a green/red, vertical bar with green representing satisfied (or enhanced) and red representing dissatisfaction (or hindered). Gray represents the 'neither/nor' range of responses. In cases where there were no dissatisfied responses, the bar will be all grey and green. This graph is simply a visual image of the findings from Table 1.

Table 1. Tate Hall facility - overall satisfaction, learning experience, and health

Overall	Mean	SD	N	Interpretation
Satisfaction	5.80	1.24	1,103	Satisfied
Learning Experience	5.20	1.31	1,104	Enhanced
Health	4.83	1.16	1,101	Enhanced

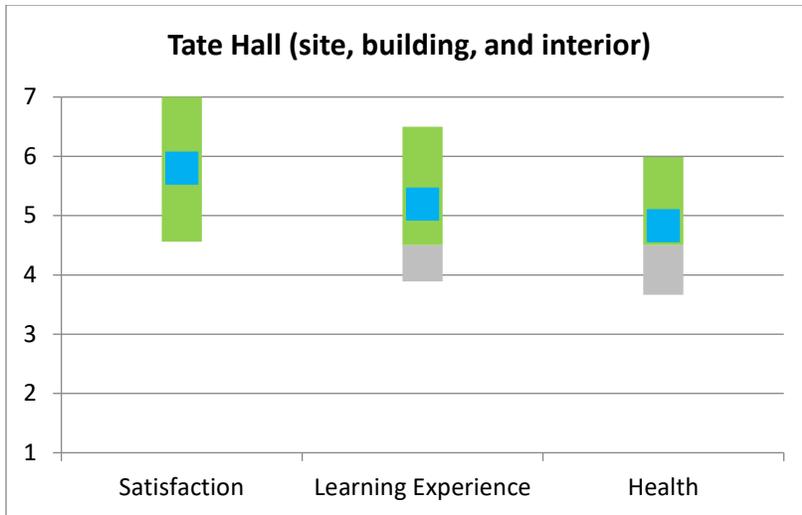


Figure 2. Tate Hall facility - overall satisfaction, learning experience, and health

Results indicate that students were **satisfied (M = 5.80)** with the Tate Hall facility (building, site, and interior) and reported that their overall learning experience was **enhanced (M = 5.20)** by the facility. Students reported that their overall health was **enhanced (M = 4.83)** by the facility.

4.2 Primary Classroom: Overall Satisfaction, Learning Experience, and Health

Students responded to questions concerning their overall satisfaction and overall perceptions of their learning experience and health as related to their primary laboratory/classroom. Table 2 shows the means and standard deviations of their responses as well as how the responses are interpreted. Figure 3 is a visual image of the findings from Table 2.

Table 2. Tate Hall primary classroom – overall satisfaction, learning experience, and health

Overall	Mean	SD	N	Interpretation
Satisfaction	5.37	1.51	987	Satisfied
Learning Experience	5.07	1.47	995	Enhanced
Health	4.80	1.17	992	Enhanced

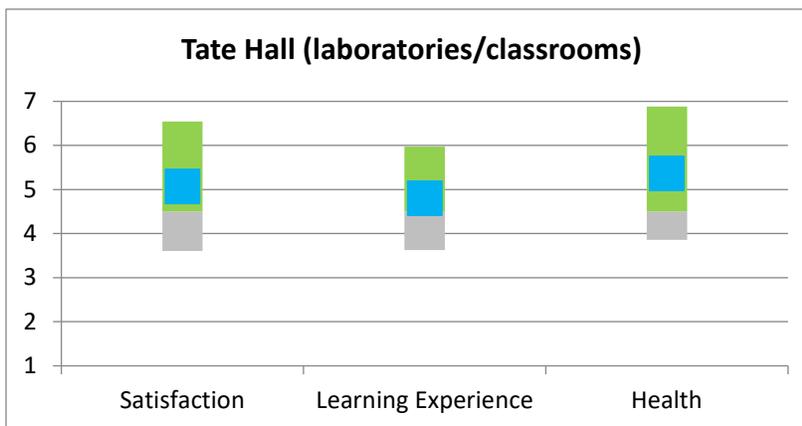


Figure 3. Tate Hall primary classroom - overall satisfaction, learning experience, and health

Results indicate that students were **satisfied (M = 5.37)** with their primary classroom, their overall learning experience was **enhanced (M = 5.07)** by their primary classroom, and their overall health was **enhanced (M = 4.80)** by their primary classroom.

4.3 Primary Classroom: Satisfaction with Indoor Environmental Quality (IEQ)

Students responded to questions concerning their satisfaction with IEQ criteria (thermal conditions, indoor air quality, acoustic conditions, etc.) related to their primary classroom. Table 3 shows the means and standard deviations of their responses in order from highest to lowest mean, as well as how the responses are interpreted. It must be noted that all responses, regardless of the classroom, were combined so these are composite means of all classrooms in Tate Hall. Figure 4 is a visual image of the findings in Table 3.

Table 3. Tate Hall primary classroom - satisfaction with IEQ criteria

#	IEQ Criteria (1-23) (Category level criteria are bold face)	Mean	SD	N	Interpretation (D = Dissatisfied) (S = Satisfied)
1	Overall cleaning and maintenance	6.09	1.16	987	Satisfied
2	Overall indoor air quality	5.95	1.17	993	Satisfied
3	Humidity (dry or moist)	5.84	1.20	987	Satisfied
4	Amount of electric light	5.81	1.34	989	Satisfied
5	Overall electric lighting conditions	5.79	1.41	991	Satisfied
6	Air velocity (drafty or stagnant)	5.74	1.32	990	Satisfied
7	Overall thermal conditions	5.72	1.37	995	Satisfied
8	Overall appearance (aesthetics)	5.67	1.47	989	Satisfied
9	Ability to hear desired sounds	5.67	1.48	994	Satisfied
10	Overall acoustic quality	5.62	1.48	992	Satisfied
11	Temperature (hot or cold)	5.61	1.46	992	Satisfied
12	Overall technology conditions	5.59	1.46	989	Satisfied
13	Overall vibration and movement	5.55	1.37	983	Satisfied
14	Function of furnishings	5.43	1.57	991	Satisfied
15	Ability to adjust electric lighting	5.42	1.52	985	Satisfied
16	Overall view conditions	5.35	1.75	991	Satisfied
17	Overall furnishings	5.28	1.64	993	Satisfied
18	Adjustability of furnishings	5.13	1.64	984	Satisfied
19	Adjustability of thermal conditions	5.05	1.56	984	Satisfied
20	Overall daylighting	4.72	1.92	987	Satisfied
21	Amount of daylighting	4.61	1.99	981	Satisfied
22	Adjustability of daylighting	4.49	1.92	975	Neither S or D
23	Access to electric outlets	4.43	1.84	988	Neither S or D

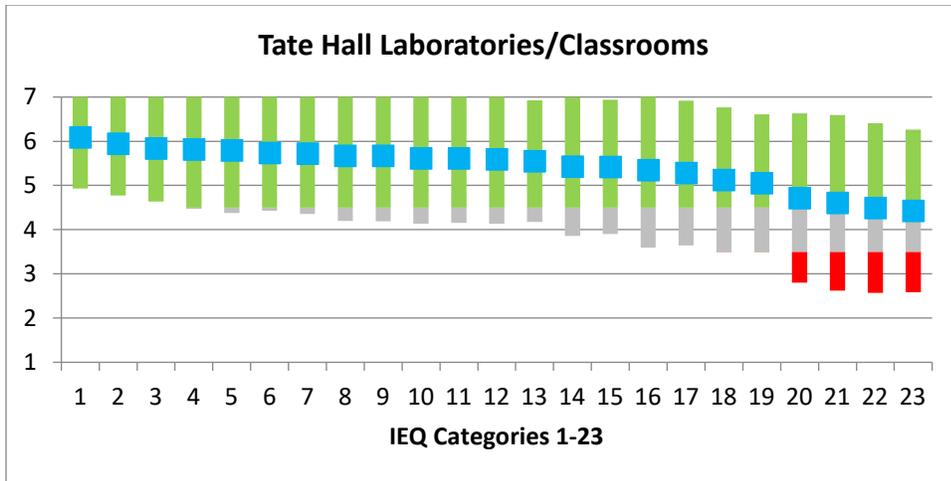


Figure 4. Tate Hall primary classroom - satisfaction with IEQ criteria (IEQ 1-23 are listed in Table 3)

Results indicate that students were **satisfied** with 21 of the IEQ criteria in their primary classrooms. Satisfied means ranged from **6.09** (Overall cleaning and maintenance) to **4.61** (amount of daylighting), i.e., means at or above 4.50. Students were neither satisfied nor dissatisfied with two IEQ criteria, ranging from a mean of **4.49** (adjustability of daylighting) to **4.43** (access to electric outlets). The criteria in the 'neutral' range should be considered for change. However, overall these findings support a **consistently positive level of student satisfaction** with the IEQ of their laboratories and classrooms. Further information about their perceptions can be found in Appendix A. Open-Ended Responses.

4.4 IEQ Satisfaction Scorecard

The IEQ Satisfaction Score is determined by calculating a mean of all 11 category level IEQ criteria. At this time, all criteria are weighted equally in this calculation as little evidence exists that provides rationale for weighting some criteria heavier than others. The IEQ mean can serve as a benchmark of students' satisfaction with the physical environment of their primary classroom. As shown in Figure 5, the **IEQ Satisfaction Score** for Tate Hall is **5.58**, which falls at the moderately high end of the satisfied range. The large number of criteria with scores above the mean contribute to this high IEQ Score.

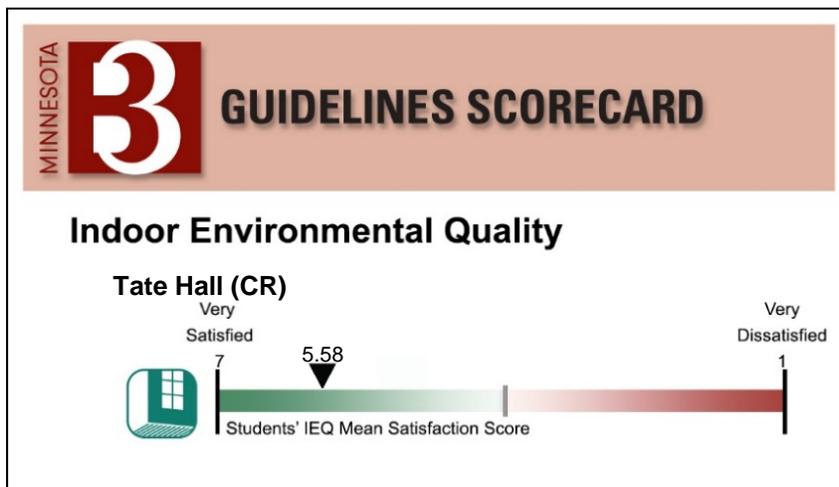


Figure 5. Tate Hall primary Classroom - IEQ Satisfaction Score

Overall, the students showed a positive satisfaction level with the IEQ of Tate Hall laboratories and classrooms as indicated by the mean score of **5.58**. As shown in Table 3, all IEQ categories were at or above **4.72**; five (5) categories were at or above **5.67** and helped to increase the IEQ Score. Please note that the IEQ Satisfaction Score only uses the category level criteria (those labeled 'Overall'; see section 2.1, paragraph 3 for explanation). This IEQ score sets a positive benchmark for continued assessment of students' satisfaction.

5.0 Physical Activity Engagement and Commuting Practices

In the final section of the survey, students responded to questions regarding their overall physical activity while at Tate Hall (site, building, and interior) and their commuting practices.

5.1 Physical Activity Engagement

Providing students with opportunities for alternative paths of travel around the classroom building, e.g., taking stairs as opposed to the elevator, provides opportunities to engage in additional types of physical activities. Engaging in physical travel throughout the learning environment can be associated with healthier lifestyles.

Table 4. Overall physical activity (walking, stair use, etc.) affected by the Tate Hall facility

Tate Hall Facility (Site, Building, and Interior)	Mean	SD	N	Interpretation
Overall physical activity (walking, stair use, etc.)	5.22	1.22	977	Enhanced

Results indicate that students felt that Tate Hall **enhanced (M = 5.22)** their physical activities (walking, stair use, etc.).

5.2 Commuting Practices

The Tate Hall facility resides in the center of the East Bank of the Twin Cities campus of the University of Minnesota. It is accessible via the Northrop Mall, Church Street Pedestrian Mall, or the Gopher Way Tunnel, with campus transportation via the East Bank Circulator on either Washington Avenue or Pillsbury Drive SE. Secure bicycle storage is available and vehicle parking at on-campus parking garages and parking lots. Note that the overall percentages may not total 100%, due to rounding.

Table 5 provides results on students' primary mode of transportation; Table 6 summarizes commuting distances between home and the Tate Hall facility; and Table 7 summarizes students' ability to commute using alternative choices (walk, public transit, bike, van, or carpool, etc.). These results, although not related to IEQ, do offer the University insight into students' commuting behaviors and opinions. These data can provide important information about commuting practices that can reduce transportation energy consumption.

Table 5. Commuting practices – Tate Hall primary mode of transportation

Commuting Practices Home to Tate Hall (N=978)	Walk	Public Transit	Bicycle	Drive alone (or with children <16)	Carpool or Vanpool	Other	Motorcycle or Moped
Students commuting mode (%)	60%	19%	12%	6%	<2%	>1%	<1%

Related to primary modes of transportation, 60% walk, 19% take public transportation, 12% ride a bicycle, and 6% drive alone (or with children under 16). A minority of students carpool or vanpool (less than 2%), take other modes of transportation not identified (less than 1%) or ride a motorcycle or moped (less than 1%).

Table 6. Commuting practices – Tate Hall commuting distance traveled

Miles Traveled One Way (N=978)	0-5	6-15	16-30	31-45	>46
Students commuting distance (%)	80%	10%	7%	2%	<1%

Results indicate that 80% of students commute 0-5 miles one-way between home and Tate Hall, followed by 10% who commute 6-15 miles, 7% commute 16-30 miles, 2% commute 31-45 miles, and less than 1% commute 46 miles or more to Tate Hall. All commuting mileage is reported as one-way miles.

Table 7. Commuting practices – Tate Hall location and alternative commuting behaviors

Tate Hall Facility (Site, Building, Interior)	Mean	SD	N
Ability to commute in alternative ways	5.18	1.31	973

Results indicate that the location of the Tate Hall **enhanced (M = 5.18)** students’ ability to commute to class in alternative ways, e.g., walk, public transit, bicycle, etc.

6.0 Conclusions

6.1 Summary

A post-occupancy evaluation was conducted of students of Tate Hall at approximately 14 months after its construction began in 2015. About 18% of the students who are enrolled in classes in Tate Hall responded to the survey.

The survey included questions related to students’ overall satisfaction with the facility (site, building, and interior) and influence of the facility on their overall learning experience and health. Students were **satisfied** with the facility (**M = 5.80**); they found the facility **enhanced** their overall learning experience (**M = 5.20**) and **enhanced** their overall health (**M = 4.83**). When students were asked these same questions about their primary laboratory or classroom, they reported overall **satisfaction (M = 5.37)** with their primary laboratory or classroom. They also reported that their overall learning experience was **enhanced (M = 5.07)** by their primary classrooms, and their overall health was **enhanced (M = 4.80)** by their primary laboratory or classroom. As the range of scores was from 1-7, these scores indicate satisfaction is moderately high.

Most of the survey questions related to students’ satisfaction with the IEQ criteria in their primary laboratories or classrooms. Students’ responses showed they were **satisfied** with 21 of the IEQ criteria. The scores ranged from **4.61** (amount of daylighting) to **6.09** (Overall cleaning and maintenance), with the remaining two IEQ criteria in the **neither satisfied nor dissatisfied** range with mean scores of **4.43** (access to electric outlets) and **4.49** (adjustability of daylighting). Overall, these means indicate a consistent and moderately high level of satisfaction.

From the students’ responses, an IEQ Score was developed and shows their **satisfaction** with the IEQ of all category level criteria. For Tate Hall, the IEQ Satisfaction Score was **5.58**. This score reflects a

moderately high satisfaction level with IEQ categories. Finally, students reported that Tate Hall **enhanced (5.22)** their physical activity, which is one of the sustainable design criteria that influences occupant behavior.

6.2 Recommendations

The satisfaction scores are certainly in the positive direction, however, it is important to continuously work on IEQ criteria before there is dissatisfaction. For example, for IEQ categories that have physical measurement possible, e.g., thermal, acoustic, and lighting, it is recommended that these measurements be taken in classrooms. Other recommendations follow that could help the University keep occupants' satisfaction positive.

Acoustic Conditions

- Identify acoustic criteria for overall requirements.
- Determine if any task areas differ now from their original spatial layout/use (e.g., classrooms adjacent to noisy spaces).
- Develop specialized acoustical performance requirements to support functional programming occupants' tasks (e.g., sources of recurrent noise that need to be controlled, special user populations that may have distinct auditory performance limitations, or multiple uses of building spaces that may have different acoustic criteria). Identify and apply appropriate acoustics modeling software for the project.
- Measure acoustic performance onsite with full building systems (heating, ventilation, and air conditioning) running.
- Identify occupants' privacy concerns via focus groups and/or log complaints relative to acoustical conditions for further evaluation.
- Consider occupants' tasks within shared spaces to determine if spatial layout changes can be made for increased acoustic control.

Lighting Conditions

- Identify occupants' lighting performance criteria that are to be met to achieve goals by conducting onsite measurements of existing illumination and compare them to standards for occupants' tasks as identified by the Illuminating Engineering Society (IES).
- Determine if any task areas differ now from original intent to be sure illumination level and quality of lighting are not impeded by physical changes to the space (i.e., walls, ceilings, furnishings, fixtures, or equipment).
- Develop additional quality lighting criteria as needed for special facility (e.g., influence of daylight quality or quantity) or occupant (e.g., age, task duration) issues.
- Log complaints related to lighting conditions for further evaluation.
- Identify poor lighting conditions caused by a lack of control over daylighting, which can cause glare and eyestrain.

Personal Adjustability

- Determine if adjustability issues arise with temperature, lighting, or furnishings via a focus group.
- Identify personal, individual problem areas and relate them to other IEQ issues via a log of complaints relative to adjustability.
- Provide education to occupants about any existing/achievable adjustment options, e.g., furnishings, air diffusers, lighting, temperature control, etc.

Privacy Conditions

- Identify occupants' privacy concerns via focus groups or log complaints relative to privacy to determine if visual or audio privacy is most affected.
- Determine if any task areas or responsibilities differ from original intent and develop alternatives or modifications.
- Consider adding noise masking equipment and/or visual screening depending on the nature of the complaints.
- Document and compare acoustic privacy problem areas with acoustic measurements to pinpoint specific problem areas.

Thermal Conditions

- Measure thermal performance conditions on site.
- Log complaints related to thermal conditions for further evaluation.
- Determine special thermal comfort requirements or problems that may be encountered in the building due to physicality of work activities, duration of sitting, or design/layout considerations. Focus groups can be useful in identifying problem locations.
- Determine if any occupants' task areas differ now from original layout to determine if air flow is meeting systems design intent.
- Review conditions that affect thermal comfort using ASHRAE Standard 55-2004 or Human Factors Design Handbook (see B3 Guidelines).

This study investigated students' satisfaction with the Tate Hall facility and primary laboratories and classrooms. IEQ satisfaction is individual, but the results of the survey show a central tendency to high satisfaction with the facility and IEQ criteria. The results can be used as a diagnostic tool to aid in continuously improving IEQ conditions for students and to set the benchmarks from which improvement can be measured in the future.

Appendix A. Open-Ended Responses

Students had the opportunity to raise specific concerns on the overall facility and their primary laboratories and classrooms. Important information can be gleaned from the numerous, open-ended survey responses. Tate Hall students raised a wide variety of concerns in addition to positive comments related to acoustics and privacy, amenities, appearance (aesthetics), daylighting/electric lighting and lighting controls, furnishings, indoor air quality (IAQ)/ventilation, operations and cleaning/maintenance, safety and security, spatial layout, study areas, technology/electrical, thermal conditions and control, and wayfinding and movement throughout the building. Generally, the comments are shown exactly as written.

Overall Positive/Negative

- It's my favorite building!
- Overall, it's a great facility!
- It's a very clean and modern hall. I love it.
- Tate Hall is my favorite building on campus, it is so beautiful!!!
- I really like the beauty of John T. Tate Hall. It's a nice environment.
- The hall itself is great. The classrooms are clean and usable.
- Well done.
- Overall, I really like Tate.
- Very good!
- For the size of lecture hall, it is one of the better ones.
- It is great!
- I love Tate Hall.
- Very clean and well-organized hall.
- It's a beautiful building and I enjoy this place very much. It makes my day a lot better coming to this hall knowing it's modern and a great place to learn and get stuff done. Wish more buildings on campus were like Tate hall.
- I like the building.
- It's one of the nicest buildings I've had class in. Lecture room is very spacious compared to similar areas such as Smith 100.
- The classrooms are fine and wonderful. Overall, it's a really welcoming and positive space.
- Tate B20 is one of the good lecture halls on campus.
- Gorgeous and functional building. By far my favorite on campus.
- It's a very nice building and it is very obvious where a majority of the funding on campus is directed to.
- I'm pretty happy, jazzed one could say, about the renovation although I hadn't been in it previously.
- Great space to study, especially for physics majors!
- I really like the new Tate.
- The physical environment of Tate is pretty nice. I don't think I'd change it in any way. It also doesn't really impact me in any noticeable way.
- I love the physics tutor room! That might be the best part.
- I honestly love coming to Tate for class and usually arrive a few minutes early so I can sit out in the hallway, study a bit, and enjoy the space! The building is very unique and receives a lot of daylight. The temperature and humidity levels are noticeably better controlled than in some of the older buildings on campus. Overall, it's just a nice place to be!

- The environment is very beneficial for lectures and labs.
- Very disappointing for a brand-new building.
- Too many people in classroom!!
- I like it! It would be nice if there were some windows or other sources of natural light, but I realize this isn't very possible because it's in the basement.
- Building is still not finished, and it has been open for over a year.
- Why didn't you build the big lecture hall in the basement big enough for us to take tests in? It's really dumb that I have to take my physics exams in Wiley.
- The old building was better.
- I like the building overall, the big windows and natural light. I like the large lecture halls (B60?), but the smaller lecture rooms are bad.
- Other than no natural light, the classroom is very nice.
- Lecture and lab spaces are just cramped.
- It's so disappointed that my tuition money has gone towards this hall. It's so cramped and during the beginning and end of class it's always so crowded in the bathrooms and hallways. The classrooms are bad too.
- The doors are very heavy.
- Overall, I really like the aesthetics of and the classrooms within Tate Hall. The redesigned Tate Hall, both in the lecture halls and in general, seems to have put form/looks over function and provides one of the weakest learning environments I've had the misfortune to have a class in, with it being almost as bad as Fraser 102.
- I love the character of the old building!! However, trying to get in and out of the wheel chairs at the hectogon tables is such a distraction
- Need better use of lobby areas and more places to sit and study.
- While I appreciate the large open vertical space within the building, this seems inefficient from a heating and cooling perspective.
- Tate is not a great building. It is hard to move around in Tate. There are no study spaces, no natural light, and the bathrooms are so hard to find. I genuinely do not look forward going to class because I don't like Tate.
- Very bad design. Light and chairs are the two worst.
- My dreams go to die here.
- Wondering why so much money was put into a building that isn't that functional and poorly designed.
- Very plain rooms with no natural light. It is a nice building, but it would be nice to have more room in the lab and tutor room.
- Whoever chose the concrete outside the building should be fired. It is so bright when the sun hits it that it reflects into my eyes and causes me physical pain. Tate should have sunglasses available for people when they walk outside because the concrete is so blinding.
- The floor is not at all slip resistant when it gets even a little bit wet, which isn't very good in the winter with the large amounts of snow tracked in on a daily basis.
- The bathrooms are always overcrowded.
- The doors are poorly designed.
- Haha, you guys should make it a gym too. Add a benchpress and a treadmill or something. Maybe the stairs could be stair climbing machines, I don't know.

Acoustics and Privacy

- I can't hear the professor.
- The acoustic quality is bad (hard to hear professor without mic, but most professors use mics, so why is it so bad?)
- The lecture hall is small, but the professor absolutely must use a microphone to be heard in the back 1/4 of the seats.
- It is just harder to hear the lecturer from the back of the room and there was a microphone but sometimes it would glitch to the point where I would miss an entire sentence.
- Also, it is hard to hear the instructor if they don't use a mic from the outer third section(s) even if they are talking loudly.
- The doors to the classroom are also unreasonably loud. If anyone enters or leaves the room during lecture, the sound from the door opening and then closing is jarring and pulls you right out of the lecture.
- The lecture room doors are extremely loud every time they are opened or closed.
- The doors are loud.
- Doors of classrooms are poorly designed. Loud sound can be heard if someone goes in or out during the lecture.
- Doors to the classroom make a loud clunk every time they're opened. Every time someone leaves early or enters late, it's pretty distracting.
- The doors to the lecture room are pretty loud.
- The latches for the doors are EXTREMELY disruptive. The first 10 minutes of lecture I cannot hear the instructor because the latches are so loud.
- During midday, the sounds from the main square in the basement carries over into the classrooms, which slightly hinders the professor's speech quality while in the back rows.
- The floor-to-ceiling glass doors and walls results in distraction every time someone walked by in the hallway.
- The constant white noise makes it easier to zone out and not focus.
- Gets kinda loud sometimes from the people passing by.
- Noise echoes in the hallway.
- The glass doors also make it difficult to concentrate because they do not block most noise from the hallway outside the rooms. They are also distracting because any movement in the hallway outside is easy to see from the whole room.
- You can hear the writing/tapping on the whiteboard in other classrooms during your own class in a different room.

Amenities

- Where are the water fountains on the first floor?! There are none by the bathrooms. The only sources of water on the first floor are from vending machines or the bathroom sink.
- Not enough drinking fountains. It is hard to find them, if they even exist.
- Where are the water fountains? I haven't seen any near room 105, the first-floor men's room, or the front or exits.
- Need water fountains downstairs.
- There are not enough drinking fountains/ water bottle filling stations, and the ones that do exist are kind of hard to find.
- No bathrooms or water fountain on 1st floor is very inconvenient.
- I don't see any drinking water faucet in Tate.

- I wish there were more drinking fountains or water bottle fillers in accessible places. They are hard to find, since they are not by most bathrooms
- I wish there were more drinking fountains in the building.
- Why is the drinking fountain not right next to the bathroom???? It took forever to find it.
- Please add more drinking machines.
- Space on the walls for coat hooks would be good, since winter weather can mean large coats and, while seats are normal size, they don't do quite as well when fitting both a student and a large coat. When the class is low population, there are enough extra seats to put coats aside, but a full lecture means no extra space for outerwear.
- The vending machines do not take Gopher Gold which can be frustrating.
- I would like an option for vending machines or some kind of snacks because my class is scheduled during lunchtime and I do not have time to stop for food before class.
- It would be good to have somewhere to buy food that is not a machine.

Appearance (Aesthetics)

- It's a very aesthetically pleasing building.
- It is a beautiful building.
- The aesthetics and feel of the building is beautiful.
- It is very pretty.
- It's a very pretty building
- It feels a bit like a prison with the vast, empty, white walls...maybe some murals or patterning would help?
- The building is pretty plain.
- White walls are boring.
- Needs more color. When you enter Tate, the building just looks like the classes in it will be boring.
- The classroom is very bland-looking.
- Building feels stale and cold with no personality.
- The walls and floors are boring and cold. It's depressing.
- There is nothing warm and cozy about the interior.
- The remodeling turned a great old building into a sterile white building which looks more conducive to selling Apple phones than taking classes. Doing this to a historic Beaux Arts building was an act of vandalism.
- It's a beautiful building and with time it will get better but as of right now it's mentally draining to be in for long periods of time due to the whitewash interior.
- It is very depressing (despite loads of natural light!) because it is so utterly soul-less. More art or even just colors other than off-white and grey would drastically improve the psychological experience of spending hours and hours in the Tate building.
- Any addition of art would be very appreciated.
- Please add more decorations to the barren white walls of this building. The addition of the rocks in the basement was nice and the greenery on the 2nd floor are welcome additions. I would like to see better use of wall space.
- Building is pretty, the graduate and higher-level class rooms seem to be really nice, the lower undergrad lab is small and seems like it was rushed to be put together.
- The fossils in the lab hallway and lab rooms are great! I love the diabloceratops skull and the cabinet full of awesome fossils!!!

- The sculpture things with the reflective tags on the back entrance is missing a lot of the tags.
- I really like the mirrored walls out in the back of Tate. I think it adds a lovely little aesthetic to the building.
- Please put in some sort of decoration or plant life. Right now, the building feels very sterile.
- The building is very bare. It could be a lot more beautiful. And we should get real art, not the hard-to-see pixel puzzles on the east side, and no meaningless sculptures. Or we could put up cool interactive displays like other physics departments sometimes do.
- The 101 classroom has a good shape, color, and ambiance that make it a nice environment to be in, say compared to any room in the basement of Vincent.

Daylighting/Electrical Lighting and Lighting Controls

- The amount of natural light is phenomenal.
- It's a bit too bright.
- I enjoy the natural lighting and openness of the lobby.
- In lecture rooms there is no daylighting.
- I prefer classrooms that have some type of natural light coming in, so the basement classrooms are not ideal.
- There are no windows in the classroom, so I put 4s for daylighting. If there were daylighting, it may make it harder to see the presentation, so it's probably a good thing there's no windows.
- Certain classrooms in the basement have no natural light whatsoever, which I find claustrophobic.
- All the rooms I use are central in the building with very little daylight. The main common areas have good lighting, but most rooms don't.
- More natural lighting?
- I love the natural light, and the plants in the windows. It feels like a very natural space and I feel I can study best in Tate. I don't feel closed in or cramped, and I don't have to worry as much about getting headaches from fluorescent lighting.
- There is also no natural light in lab rooms and the fluorescent lighting makes it feel cold and like I'm in a hospital, not like the warmth of more natural and yellow light like a building such as Coffman, Walter, or even Smith hall which has windows in the lab rooms. I dread going to a shorter physics lab in the afternoon more than I did going to an 8am lab for three hours in Smith.
- I do wish that there were more windows in this classroom and additional natural light.
- The lighting in my office gives me headaches.
- The lighting of the classroom whiteboards is very poor in that it creates shadows between the top and bottom boards.
- Some of the general lights in the lecture room create glare from reflecting off the metal surrounding the light fixture/hole (in the ceiling).
- The fluorescent lighting can be really harsh and makes it a little difficult for me to see sometimes, but overall it is fine.
- The lighting is so harsh that it triggers massive migraines for me, which makes me unable to learn or test in the environment. There are too many lights and they are not soft enough.
- It's so bright with lightbulbs and non-natural light and is really hard to navigate.
- Classroom 105 is extremely dark, with very poor board lighting. Most of the board is in shadow under max lighting conditions.

- Visibility is very poor due to the classroom having no slope. At the very least, more light should be installed to bring the board out of shadow.
- The lack of lighting in the lecture hall makes it difficult to see due to the dimness of the light. There should be brighter lights in the hall.
- In rm 105, the lights are harsh for using a tablet lying flat on the desks.
- The lecture halls I'm in at the center of the building provide a cool mock sunlight effect from the lights outside.
- When sitting in the lecture hall, looking up at the screens means being blinded by overhead can lights.
- It's super hard to see the whiteboard because there aren't any lights that point directly at it. Additionally, it is hard to see the projector screen without having to turn off all the lights, which makes students go to sleep and not focus.
- The atmosphere is uncomfortable with all the white and blinding lights.
- Lighting of classroom is fine, offices on fourth floor don't get as much natural light as I'd like.
- The lights would often turn off during our 4:40-5:55 class last year in B65 and we would have to go press the button to turn them back on. I don't know if this has been fixed.
- In Tate 105, there are 3 layers of sliding white boards up front and only the front board has good lighting, the back two get shielded when the front layer is pushed up and causes shadows that are hard to see.
- When sitting in front, the glass walls where the doors are give a direct line of sight to an extremely bright light that is at times irritating.
- The daylight is decent (way better than the modern physics lab) but because it is in the basement it still isn't great.
- I like the recessed lighting very much; even though B20 has no external light the room is not depressing or dim, nor is it too bright, hurting my eyes. The lights dim nicely for demos and presentations.
- Also, the lighting on the white board could have been done better considering that there is a constant shadow overcasting.
- It is relatively dark in my lecture room. It is easy for me to feel sleepy in such an environment.
- The lighting casts shadows on the whiteboard that makes it even harder to see.
- The upper boards cast shadows on the lower boards due to poor lighting design.
- The lighting at the front of the classroom sucks; there's too many shadows on the boards, even when the professor turns on all the lights. Additionally, if the professor tries to write on the back two boards (the board set up is really cool btw, good job), over half the board is covered in shadow, which makes it hard to see, which impedes our learning.
- The lighting in the basement rooms is not good because there are shadows on the whiteboard.
- The way the room is lit makes it way too easy to fall asleep. Others in the class have also expressed this sentiment to me. It would be best to have no lights at the front of the room so that we can see the projectors, but bright lights on the students so we can take notes. This is not possible to do currently.
- Lights/switches are poor.

Furnishings

- I prefer Tables like Keller 3-111 unless you are trying to do group work with groups larger than 2. Almost anything is better than Fraser 101. The screens and boards in Tate are way better than Anderson 370, the textured wall and slightly out of focus projector hurt my eyes, and heavily chalked chalk boards are hard to see even from the first row with 20/20 vision.
- More benches and tables would be nice.
- The lecture hall I am in does not have any left-handed style seats. It's less of a necessity, but a nice convenience.
- Lack of left-handed seating.
- Tate 101 doesn't have enough left-handed desks. The seats are a tad uncomfortable after two hours but that's not something I think needs to be fixed—any seats won't feel great after two straight hours.
- In lecture rooms there is little room for notes with the chairs.
- Some comfy desk chairs along the hallways and in the atrium would be nice (especially the padded and rolling type like in Walter Library 2nd floor atrium outside of the quiet study space).
- I wish there were more benches and seating in the main basement area? You see many students sitting on the floor along the hallways.
- Tables have different heights in B63, the one in the back is very high.
- In B80, the middle table is ~8 inches higher than the rest of the tables. It was clearly meant for higher chairs, or lab stools. It is hard to write.
- The chairs are so close together, it makes it easy to spread sickness.
- The chairs are very small and tight. The gaps with neighboring chairs is almost nothing
- This is just a comment about most writing tablets that are attached to lecture hall seats and study space chairs and some couches. Make them bigger or offer more tables for people to sit down and study at. We have books, notebooks, calculators, computers, and other materials to deal with when studying or doing homework. An oblong square foot of space is the worst work surface I have had to deal with when I need to use my computer and take notes at the same time.
- The tables on the basement level are very limited in number and uncomfortable. Just add more seating, especially comfortable ones.
- More benches for students to sit on while waiting for classes would be good (the first few weeks of the current semester when there were no benches at all, it sucked).
- There should be more mats out/ better ones. It makes it slippery in the building because no one can properly dry their feet.
- Added benches along the corridors are good.
- The benches are a nice addition.
- Please can we have more chairs and sitting areas?
- More seating, please.
- I personally really like the chairs with swing around desks.
- Also, there are no minorly comfortable chairs or lounging areas, and they would do well to have a few so that people can relax without needing to go all the way to Walter
- Because the heights of the chairs are all the same, it is hard to see the board when you are sitting in the back. I wish the chairs were elevated as they go more towards to the back.
- Not enough sitting space. Everyone has to sit on the floor.
- I wish there was more seating in the basement outside the lecture hall.
- Any additional seating (with desks) would be very appreciated.

- I'm glad benches have been added.
- Tables and chairs are always filled in the lower level common area
- The benches that were added are wobbly.
- Add tables and seating in the hall! Everywhere is full and I normally end up sitting on the ground waiting for my class/discussion/lecture.
- Please add more tables and chairs.
- The desks are too small.
- Need more chairs/tables in basement.
- Chairs nice.
- The benches are uncomfortable.
- The large whiteboards are nice.
- The desks are one of the largest issues.
- The arm desks are a nice size -- finally some that are big enough to at least support a full sheet of paper! The cushions on the chairs are nice.
- Additionally, while the sliding white boards in 101 and 105 are very nice, professors must be careful in the order in which they use them- pushing all the boards to the top creates shadows on the board furthest back which makes it difficult to read.
- The chairs are fun.
- The white boards have an interesting design being able to move up and down. I see a potential problem in the future involving them getting stuck or falling down.
- It's a hard problem to deal with white board space and making it visible to everyone. I mean while Keller hall has some wide boards it can get hard to see what's written on the far side. The ones in Tate give more vertical space and then can be placed up higher to be seen better which is good and limiting it to the center makes it so you can't have writing too far away. I'm sure Carl Sturtivant would have more to say about that.
- The desks are a nice size: large enough for more than half a notebook.
- Tables attached to chairs are always too small to handle more than 1 laptop or 1 notebook.
- Lecture hall desks are way too small.
- I think the whiteboard or the seats should be curved. As it is they are both straight lines, so it can be difficult for a person on the left side of the room to read the right side of the white board.
- It is hard to see the board and projector screens because it feels like you are looking up and other peoples' heads are in the way. If you could raise the projector screens a bit then everything would be better.
- I would like more places to sit out in the general building. Benches were recently implemented and that have been helpful, but more people have to wait for class to begin.
- The fold out desks are the only fold out desks I have ever encountered in this university that actually have enough space for a whole piece of paper.
- It would be nice to have more tables in the common area.
- The chair spacing is much better than before the renovation; I might go as far to say the front to back spacing is adequate, but spacing side to side is too tight.
- The desks are frustratingly small (as opposed to infuriatingly small before the renovation).
- There need to be more tables to sit at.
- There is not enough seating!!!! I am forced to sit on the floor almost everyday and the benches they put in are very uncomfortable.
- There should be more whiteboard space in Tate 105.

- I like the chairs.
- The chairs suck.
- There are not enough tables in the building in general a lot of people are sitting on the floor or benches which is not helpful if trying to complete homework or other things before class. There is plenty of space where tables would not make overcrowding of hallways, additional tables would be used. Also, the few tables that are there on only the basement level have no nearby outlets which seems silly since nearly everyone relies on their laptop to complete assignments or course work.
- The chairs /desks are designed for shorter people and I cannot adjust the height of the desk to avoid hunching while talking notes.
- The stools are fine for about an hour, but if you stay on them for more than 2 hours in a day (which is common for most people in the MXP lab), the hard surface becomes unbearable. Padding on the stool surface would be appreciated.
- Desks are tiny and are barely enough for all the students in the room.
- If anything, could there just be more seating in the open areas? Please? Sitting for such long periods on the ground while waiting for my classroom to open is beginning to hurt.
- I've never been a fan of the small flip-up 'desks' because there isn't even enough room to have a regular notebook on them. I can understand this for large lecture halls, but room 105 is a relatively small lecture hall and could use a setting with more surface area to take notes on.
- The desk supports laptops and tablets really well because the small point on the end of the desk. They should be in more places.
- No trash cans.
- The chairs are uncomfortable and it's hard to take notes while sitting in them.
- The new benches are uncomfortable and leave painful marks on my legs.
- The chairs with attached desks are very awkward to adjust between left and right side.

Indoor Air Quality (IAQ)/Ventilation

- The air velocity is nice.
- The HVAC system is far too loud.
- Air condition will make odd noises in the middle of class that can be distracting.
- The air conditioner or whatever that buzzes the whole time makes me want to fall asleep which definitely hinders my learning.
- In 105 there are very loud and noticeable air duct noises.
- Every once and a while some fan gets turned on and is loud enough that most of the class has trouble hearing the lecture. It really sounds like a plane taking off. Specifically, this is room 105.
- In rm 105, the AC is fairly loud (and seems to do some sort of cycle where it turns off, the turns back on at full power, then returns to normal, during class ~5pm Tues/Thurs).
- If the HVAC kicks in at all, the sound of the air moving into the room is distractedly loud and can sounds like an airplane is taking off.
- The only downside is the ventilation system is ridiculously loud in the back right corner (if you were looking at the screens).
- There is a constant, loud air blowing/HVAC noise that makes it extremely difficult to hear even in the front of the lecture space, without the microphone--either way the drone takes a toll on life.
- The vent in 105 that spans across the width of the class and is about 2/3 the way back is very loud so if you sit in the back half of the class it is very hard to hear the instructor.

- Always a loud vent noise in the room gets destructing when taking exams.
- There is a significantly loud rattling noise that has happened in multiple lectures. Could be from heating or something similar, but it is very distracting.
- Acoustics in Rm 105 are pretty bad. When the professor wears a mic it's fine, but the ambient HVAC noise is pretty loud.

Operations and Cleaning/Maintenance

- Very clean.
- It's very clean!!
- The basements are generally clean.
- The women's bathrooms are always dirty and do not have toilet paper.
- The male bathrooms (basement and 1st floor) and the classroom always seems to be filthy and disorganized
- Room is fine, but the women's bathrooms are like always out of toilet paper or paper towels
- Please can we have better maintained areas? Desks in classrooms and common areas are always filthy and I always get sick if I accidentally touch my face while I work at one of these desks. Sometimes I sanitize them myself because they look so gross.
- My only major complaint is that the vending machine in the basement is always out of order / non-functional.
- Please fix the water filters on the fountains, they're always red.
- Change the damn water fountain filter. It's been red for over a month.
- Drinking fountain always shows red light, which means bad filter conditions.
- I definitely enjoy that for sanitary reasons there are paper towels (because having access to paper towels is far more sanitary than only having dryers).
- Add soap dispenser to middle sink in basement bathroom.
- There should be more markers available. There is a limited number in the classroom which does not make it easy to work on the boards when with a group.
- Middle sink in bathroom basement needs a soap dispenser.
- Can we please have trash cans in classrooms?
- During lecture, the air vents or something like that and the lights by the door will randomly make noise and turn off. This has happened on at least two separate occasions
- Teachers don't know how to work document cameras.
- There are a few loose desktops connected to some of the seats in the classrooms.
- The lack of blackboards is frustrating. White boards require markers which are often dried out and blackboards are much, much easier to read from a distance.
- The board wobbles when written on.
- The motion sensors for the bathroom sinks need to be inside the sink bowl, not on the faucet. In order to get water to come out you have to hold your hands above the threshold of the sink, causing water to spray all over the counter so that by the end of a break between classes the countertop is usually under a layer of standing water.
- Some of the desk tables get stuck occasionally, but this is a very minor issue.
- One of my classrooms in the basement has a wet spot directly below the white board from a leak or some kind of precipitation accumulation?
- During some of the rainstorms B85's carpet got wet.
- The classroom did smell badly at the beginning of the semester.
- The single-person bathroom on the ground floor has a really peculiar odor.

- I have a class in one of the basement level classrooms, and the room itself must be connected to an outside wall of the building because when we get a lot of rain (more than one days' worth) there is a spot on the floor (facing the outside of the building I think) that get wet, and you can tell the carpet is wet as well.
- I wish there were a set way for this classroom to be set up because I have class in this same room twice a week and it's literally a different classroom setup for every class.
- In Tate 101, the markers for the board are constantly low.
- The tables and chairs are in different places every time I come in.
- The desks are always rearranged and scattered which make it difficult to move around the classroom.
- The only issue I have with our classroom is that every time we meet for lecture, the tables are arranged differently which makes it hard to have a consistent spot to sit/do partner work.
- Carpets are ripped and patchy looking in entrance.

Safety and Security

- Next time you build a new building, instead of trying to make offices look modern, it may be better to stick with tried and true doors that actually offer security.
- Many of the doors in the building are not safe and easily broken into. Out of all of the things about this building, security scares me the most.
- The barn style doors for the offices in Tate are hard to lock (in the 4th-floor geosciences at least). In some instances, the locking mechanism/pin has become broken or offset which makes it very difficult to lock the doors.
- Grad student office doors don't lock very securely.
- I have seen multiple people fall down the stairs in B20 because they are unevenly spaced and shallow.

Spatial Layout

- When a previous class goes long, there is congestion for changeover between classes. It takes a while for the previous class to leave, and for the next class to enter, and with the rows of seats being so narrow, a student asking the professor a question before gathering their belongings causes traffic. There is not a great place for students to wait outside the room before entering.
- There was so much space wasted when designing the atrium that could have been used as study space.
- Lecture hall is cool, but seats make it hard for people with long legs to sit. It has better room than other halls but is restricting.
- In the basement, the lab doors are not open before a teacher gets to the classroom, so in between classes, students sit on the floor with their feet out. This is DANGEROUS! I tripped over someone's feet once, and now wait until the halls are cleared before going down the halls to class. It would be very difficult to go through the halls with a wheelchair. My suggestion is to place more benches along the hall walls, so that the tripping hazard would be avoided, giving a couple more feel of walking clearance.
- Arrangement of lab tables in lab classrooms face away from instructor and tend to block the doorway to the classroom.
- The lack of inclined/stadium seating makes it hard to see the projector screens or boards while in the lecture halls especially considering how low the projector screens go. The desks are

generously-sized, and the seats are comfortable, but besides that there isn't much else positive to say beyond that it looks pretty.

- In my classroom, the height of the lecturer and board is not clear when sitting in the rows further to the back.
- Chairs and writing surfaces are a bit tight. These are fine for a normal lecture but if we have an exam, the table/ arm space is limited and tight.
- Room 180 seems almost too small for the maximum capacity of the room and is difficult to move around to do the labs in. It would be much easier to have a laptop and take notes if the desk part of the seats were smaller. The aisles could be slightly wider to make it easier to walk to a seat without nearly tripping on backpacks.
- In my lab classroom all of the tables are placed too close to each other which leaves no space between yourself and the person working behind you in another group, you always have to be careful when standing up and there is no room to comfortably walk in between the chairs.
- Some of the tables in labs rooms are also just flat out badly placed, we just got new lab groups and I ended up a table in a corner which cuts space enough already, and on top of that there is a pillar just at the end of the table where most experiments are set up and it severely cut down our available work space.
- Only the top 2/3 of the whiteboard are visible from anywhere but the first 2 rows.
- The two main rooms have no slope from the back row which makes it hard to see the white board, especially the lower half
- It's impossible to see the white board in the lecture rooms. the seats should be staggered on levels. If at the back row you can't see a thing.
- Lecture Halls seemed to be sloped backwards so it is impossible to see the front if you're in the back.
- In lecture rooms, raised seating for each row would be ideal. Also, staggering rows like a movie theater would improve visibility in the lecture rooms.
- The overall lay out of the lecture rooms 101, 105 are not ideal. If the professor uses the white boards (very useful in seeing and understanding derivations), one must be seated in the front and center of the room to have a hope of being able to make out what is being written. If a student is not in the front and center for use of the white boards, the width of the room introduces wide angles which, when combined with the fact that the auditorium-style seats are fixed, makes the students crane their necks for the complete lecture. Additionally, if the student happens to be average height or shorter and is not seated in the front row(s), it is even more difficult to see anything on the bottom third of the boards or screens.
- I have lecture in room 105 and it can be hard to see the white board and professor at times due to people blocking the view. If the floor was declined as you go towards the board then it would make it easier to see the board and the professor. Since that might be difficult to change, I guess elevating the front where the professor stand would make it easier to see the white board and see the professor teach.
- There are pillars that don't allow for the full use of the classroom space, but with the roving desks and class capacity this isn't a big problem.
- It is small for the large class, it occasionally feels like you are trapped for the class period.
- The lab space is sometimes too small with too many people or chairs in the way to perform certain labs.
- It might've been better to make the seats have a slight rise as they go to the back. Seeing over taller people gets hard when you're 5 rows back.

- If you are not in the first two rows of Tate 105 you cannot see the white board.
- In my lab room you cannot see the whiteboard from a single table. This has caused me to miss important notes.
- There is some issue with the classroom 110, with the split white board setup. There is a pillar in the middle which means professors can only address one side of the room at a time if they choose to write on the white board. Visibility of both boards simultaneously is not great from the front row.
- Room 101. sit in the back. check out the view of lecture. my professor noted this.
- The only problem is the Tate 105 and the room next to it. Those rooms make it difficult to see the white board.
- In room 105 the fold out writing surfaces stick out slightly (when folded down) and lead many people kicking their shins on them when walking in or out of lecture.
- Bruiniks 220 has a better layout of seating and spacing.
- Why isn't the lecture hall large enough for physics exams?
- It is difficult to walk through rows of seats when they are occupied by students. There is not much space for personal items.
- Sometimes it's hard to see the board in the big lecture halls, particularly from the sides towards the front.
- I can't see at all because the lecture seats are not raised toward the back!
- It is difficult to see the other side of the board if you are on the far end of the room.
- The way the room is designed it is very hard to see the whiteboards from the back third and outer third sections of the classroom; and with having a full class in the room there isn't much lee-way for switching seats.
- The floors are not sloped at all so it is nearly impossible to be able to see the screens or the board if you are sitting more than a couple rows back.
- The screens are also very difficult to see because they are low to the ground and very close to the edges of the rooms.
- The staggering of the chair heights is not significant enough. Meaning in a filled (lecture) classroom, it is difficult for students sitting farther back to see above the students sitting in front of them. Often, I find when I sit in the back rows I have to either move seats or crane my head left or right to see the white board.
- Can't really hear the professor sometimes during lecture and it is hard to see on the board when he is writing out examples, should use more of a projector right above his notebook to project from that. Or the professor needs to write bigger on the whiteboards.
- This was a very poorly designed lecture room with just the worst view of the front if you aren't sitting in one of the unobstructed seats in the first few rows.
- I do sort of wish that the desks in the lecture hall were a bit bigger, and/or that the walking space along each row was a bit bigger (particularly now that it's getting closer to winter, the limited space can be hard to navigate with backpacks and jackets in the way).
- The desks/tables are moved around to a different set up every day when I arrive and it's a bit annoying.
- Labs don't have enough space to conduct experiments while also having laptops, notebooks, etc., out.
- My classroom doesn't have any risers for the seats so anyone not in the front row cannot see the board.
- It can be hard to see the professor and presentation materials because the room is flat.

- Sometimes the people in front of me in Tate 101 inhibit me from seeing the screens because I can't see over their heads. The spacing of the desks is a lot better than most other lecture rooms
- When you're on the left side of class and the professor is teaching on the right projector screen it's pretty hard to see what he's doing and stuff like that.
- The space also feels really small for the number of people there once we're up doing lab.
- A lot of the board is covered by the front station, and most of the chairs face away from the front.
- The lack of seats and tables in the sub-basement level is a problem. I find myself on the floor sitting and waiting for class.
- This classroom does not have raised seating, so you can only see the board if you are sitting in the first 2 rows.
- It's sometimes hard to see the whiteboard.
- It is very hard to see the board unless sitting in the first two rows.
- The seats are all the same height off the ground meaning that people in the back can't read the board due to people's heads in the way.
- When there is a full classroom the space is too cramped. It makes it hard to see the professors writing also.
- This classroom it a bit cramped and crowded, but it doesn't affect my learning.
- I really like the back row of the lecture hall because it allows me to have my laptop and notebook out at the same time. The chairs with the small table that folds over my lap does not allow me enough space to fully engage in class.
- The seating space is not too wide for the board/screens (easy to see board/screens from sides of room near the front).
- The seating is not noticeably banked so from the back of people's heads are in the way.
- The lecture room is too small and always filled and crowded.
- The ends of the white board are of no use because half the room can't see it. Often my view is hindered by the demo equipment.
- In 105, it's impossible to see the entirety of the screen when you sit in the back because the rows aren't tiered.
- The layout of these classrooms is absolutely terrible.
- The screens in the small classrooms go too low. If someone is sitting in front of me over 5'8" I have to bend and sway just to see the bottom third of the screen. Big fan though of the two-board system.
- In room 110, opposite sides of the board are nearly impossible to see from the edges of the room.
- The view of the instructor and whiteboards is greatly reduced when not sitting in the first two rows because all of the seats are at the same elevation. Even a few inches up to the next row would be beneficial.
- The layout of the classroom is only ideal for students who sit in the first few rows. All of the seats are placed at the same level, so if you happen to sit in the back, you can see the board at all.
- Tate 105 is a flat classroom and is very hard to see the board if you sit more than a few rows back.
- My Main complaint is difficulty seeing from the back due to the lack of raised seating. This is an even larger issue in my other classes in the 1st floor lecture halls

- The only problem with this classroom is that the rows go down instead of up so it's hard to see if you're not in the front row.
- Desks are close together.
- In 101 and 105 there is no rise in the seats farther back in the classroom, and because of this, it becomes almost impossible to see the white board after about the third row back, especially in big classes.
- Lecture seating and desk space is cramped and tiny.
- Poles and columns often block portions of classrooms and labs.
- The lecture halls are not slanted at all, sitting in the back of the room is only possible if you can see over everyone else's heads
- The seats in the lecture are all at the same level and not on an incline like some others lectures. This makes it hard to see the front if you are in the back sometimes.
- I wish there were additional tables and/or chairs to use while waiting for class. Often times myself and others sit on the cold, hard ground which is very uncomfortable.
- The class I am in is a bit large for the space, especially when attempting to leave.
- The desk are too small. When you wear a winter jacket and need to take it off it becomes a problem. Plus you are just too close to your neighbors
- The white boards in our classroom are designed in a way where showing mathematical proofs is inconvenient. They are stacked behind each other horizontally, so using one board usually hides the others.
- If you sit on one side of the classroom you can't see the board if the instructor is teaching on the other.
- In Tate 101, the rising of the classroom does not lend itself to easily seeing the board when it is full.
- It is impossible to see the board from anywhere that is not the first two rows.
- It's difficult to see what's written on the whiteboard when not seated in the front row.
- It's impossible to see the instructor writing on the board from the other side of classroom, to such an extent that us students have come up with an elaborate system of exchanging photos of the whiteboard between sides of the classroom.
- The classroom is flat so people in the back cannot easily see.
- Not all lab tables can see the board which makes it very difficult to follow along.
- Can't see if you sit in the back of lecture.
- The floor isn't sloped enough; if you don't sit in the first two rows, it's nearly impossible to see the board over everyone else's heads. The seats don't have ANY elbow room; this makes writing down lecture notes annoying, frustrating, and difficult - which impedes our learning. Compound that with the fact that everyone is sitting in the first two rows, or trying to, so they can see the board, and we have a major problem.
- It's almost impossible to have a clear view of the board in the first-floor lecture halls because the chairs are not on an incline.
- Only problem is the lack of tiers in the class room seat rows. Makes it harder to see the board/ instructor.
- The slope isn't great enough so hard to see board if anywhere behind first two rows.
- You can't see the board from the back of the classroom because the seating isn't raked.

Study Space

- The hallways are spacious enough and it's good that there are additional tables for working.
- It would be good if there were more areas for studying. I would spend more time in the building if there were more study areas. The one you have is always full and not very inviting.
- I have enjoyed the improved “study environment” additions such as numerous benches. However, the space can feel crowded, especially as the front is so open and bare (the space that faces the sculptures outside with flickering glasses panels). Overall, the space feels unwelcoming as there are no places to study (besides the tables). If you are in Tate, you are there for a reason. Otherwise, the space pushes people to leave and go elsewhere.
- I understand aesthetics are important but other areas around campus have solutions that make it easy to study between classes.
- It would be nice if there were more public study spaces, there are (maybe) 5 tables and 7 benches that are open study spaces. Whereas if you go up further there are spaces that are sectioned off for certain individuals. If you want a more diverse group of students to use this building, make it usable for everyone.
- There should be more tables/work spaces in the common areas of the building!
- The building as a whole could use more study space, as many students find themselves sitting on the floors and benches with books/laptops in their laps.
- Additional tables and benches (mainly tables) should be added to increase the amount of workspace in the common gathering places (aka/ lobby area on level 1).
- Need more study spaces and seating outside classrooms.
- It would be good to have more study spaces.
- It would be nice if there were more study spaces in the building.
- I think more study space in the lower level of the atrium would be preferred.
- Tate hall needs more tables and chairs! Especially in the basement level. Students are often forced to sit on the floors outside the lecture halls waiting for class to begin.
- More table space in common areas.
- There is not enough space for everyone. There are eight tables for people to sit and work which is not nearly enough space.
- Not very many tables to study at so there are a lot of people sitting on the floor, maybe get more tables in basement level commons area to make better use of the space.
- There are almost no places in the hall to comfortably study. They just added a few benches recently, but they are small, uncomfortable, and don't keep many people from sitting on the floor.
- More tables to study at could be added.
- More study space with tables and chairs (that isn't reserved for specific majors/classes).
- It needs more study space or just somewhere to mill around rather than crowding right outside the doors of the 1st floor lecture halls blocking traffic and sitting on the floor.
- There needs to be study areas, or more tables in other places in Tate, only because people have small amounts of time before their next class, and either you sit on the floor, maybe get a table (these are usually filled) or get a bench, which is a nice new addition.
- Add more study spots.
- More workspace needed!!
- I think that more tables and comfortable chairs throughout the building would be more conducive to studying between classes.

- There should be more seating/study space outside the lecture halls for students who are waiting for class.
- There are not enough tables to work at before/after class.
- Not a lot of study space/places to sit before lecture.
- I think there should be more tables and places to sit in the areas that are outside of classrooms.
- The study area in the basement is horrendous, the tables are always full. Benches were an improvement, but they are so difficult to work at. Keller Hall has a really well set up study space.
- Put in more places to work.
- Not many study tables, lots of open wasted space.
- Not enough seating outside of the classroom for people waiting for classes.
- There could be more chairs/tables available for studying in Tate. It is often very crowded in the basement and people will sit on the floor because there is nowhere else to sit.
- More furnishings/study places benches could be used in the hallways.
- More study spaces and chairs are necessary.
- I would like to see more spaces to sit in the open hallways, such as benches or tables. It needs more study space, as there are open areas, and students waiting for class often are stuck standing or sitting on the floor.
- Put in more desks in the common area or open up rooms to do work in. There's no more space to do work.
- The common area outside of lecture hall B50 could use more tables and chairs for students who are looking to study/get work done before/after class.
- My classroom is fine, but outside the class there is nowhere near enough seats/tables to study at prior to or after class.
- My biggest complaint is that there aren't enough study spaces to spend time in between classes. There isn't a single study lounge available for undergrads, there are hardly any tables, and all of the wooden benches are super uncomfortable. I spend a lot of time sitting on the floor in Tate Hall because of this. Sometimes I go into the physics tutor room, just so I have an actual place to sit. Even just adding a cushion to the benches would make a big difference
- Not enough seating outside of classrooms for people waiting for class to start.
- More tables could be added.
- Could use more study spaces.
- Please put more tables with chairs (not more benches) everywhere. There is so much space and you aren't utilizing it at all. I want to study in Tate but there is no space.
- It would be nice to have more study tables in the basement area.
- Need more chairs and tables for work space.
- There are not enough study tables on the lower level.
- More tables would be nice.
- We need more tables in the basement!! It's a fight to find an open table, and they could definitely fit more of them.
- Please continue to add more benches and seating throughout the halls.
- More tables in the main area would be great. There are no study areas
- Having more study space (with outlets especially) would be really nice!
- Tate should be somewhere many students can go and study and work on physics, but with like 3 tables this is not possible.
- The building needs more tables/desks/benches outside of classrooms.
- Out in the common areas there are not enough places to sit and/or do homework.

- It would be nice to have more study spaces.
- There aren't many places to sit while in Tate. The tables on the lower floor are small and there are minimal sitting areas.
- There should be more seating available for study groups and accessibility to outlets.

Technology/Electrical

- Power outlet access is an issue.
- Electrical outlets are not readily available.
- More electric outlets are needed especially in the general-purpose classrooms in the basement.
- More accessibility to outlets would be nice.
- There could always be more accessible outlets/charging stations.
- Having access to power outlets is an issue.
- Limited power outlets.
- In the classroom which I have discussion there are outlets for me to plug in my laptop.
- Please add more outlets.
- Lecture halls have no outlets.
- There are no electrical outlets for your devices.
- Need more access to electrical outlets in the lecture halls and in the basement level open space.
- There are almost no outlets.
- There are no outlets anywhere!
- Need more electrical outlets for students.
- Electrical outlets in the labs are great, but if all the experimental equipment is plugged in there are no more outlets to charge a phone or laptop.
- There aren't any outlets.
- Wish there were more outlets.
- There should have been more outlets put in the basement hallways.
- There are no good outlet spots in the basement of Tate hall
- Electrical outlets at the tables in the lobby area would be a nice addition.
- In the classroom spaces there are rarely enough outlets to support device charging
- The microphone cuts out more than it should.
- The computer sign-in is a bit difficult.
- The mic. in the room (without fail) distorts the professors voice, which then distracts the class from the subject being taught.
- I believe there are microphones available in the room, but my professor won't use them, and without it it's extremely difficult to hear the lecture.
- The microphone keeps acting up, it's annoying.
- The microphone does not work at times.
- Room microphones have too much gain and are very distracting in lectures because the teachers don't know how to adjust them.
- It would be ideal if instructors, could be told/be able to adjust the volume of microphones to suit their speaking volume. My class has a lot of reverberation since the volume is set so high.
- In rm 105, the microphone frequently cuts out.
- The mics in my lecture sometimes make the prof's voice change.
- The professors' microphone cuts out, but that may be user error.
- Harder to hear the instructor in my large classroom. The professor must put on a mic and the mic often has sound errors. Voice suddenly gets deep and buzzing.

- The microphone in 105 always cuts out making it impossible to hear.
- The microphone that my professor uses glitches everyday at least 5 times in a 50-minute lecture. It's annoying and very distracting. For such a new building, I would think that shouldn't be happening at all.
- Microphone tends to cut out when the professor is in one area of the classroom.
- Lecture halls have had the auditory issue for the entire semester; I've been in contact with the technical division about it and it sounds like they will be pushing it back towards winter break; pretty discouraging.
- The feedback on my professors' mic in this room is not very good.
- The audio quality is one of the largest issues.
- The computers in 180 have a lot of problems: a few don't turn on/work, and others don't have the needed programs on them to do the lab work.
- In lecture, the professor struggles with his mic and we get feedback, though that is not really an issue with the sound systems.
- The monitors in the lab rooms are too high, it causes neck strain when trying to do things on them.
- Please organize the keys for all the doors in the hall so that there is an alternative method of accessing the rooms should the card access system be down. When the power went out earlier this semester, all my belongings including my home keys and laptop (with all my work on it) was locked in one of the basement labs and I waited for 5 hours in the dark for the heads of maintenance to come, only for them to look at the keyhole and say, "We don't have keys for that." Suffice to say, I couldn't retrieve anything that night. The fact that all the locks are electronically powered without a way to manually override them is so ridiculous. I'm all for technological advancements but at that time, I really wished the U had just stuck to the trusty, old-fashioned manual lock system.
- Why are the computers so dysfunctional with not all the necessary programs needed for classes? Also, the processing speed is garbage.
- Usually at least one computer isn't working, and we always need them for lab.
- The cell phone reception in the basement isn't the best. Now, I'm not sure if this is a solvable problem considering the need for giant slabs of concrete but there you are.
- In the sub-basement my laptop sometimes doesn't connect to the Internet.

Thermal Conditions and Control

- It would be nice if there were adjustable thermostats in our room!
- Could be warmer during the colder months
- It's cold.
- The building is too cold.
- Everything is fine now, it was just quite a bit hot the first few weeks.
- Very hot.
- Biggest issue is the temperature during class, it's way too hot, so we open the door. But then it gets way too loud from the hallways.
- Sometimes the classes are just way to hot.
- The classroom is often very cold when I have class since it is later in the evening.
- Tate 101 is cold.
- It gets to be pretty cold in the lab rooms.

- The room is consistently too hot no matter what time of day (I have a morning and early evening lecture in the room).
- Too hot!!
- Too hot.
- It can also get a little warm, but that may be because physics makes me heated.
- The lecture basement rooms always seem way too warm. Makes students sleepy in the early morning classes and struggle to stay awake because things are too warm and cozy. With having about 250 students in a classroom, things get almost uncomfortably warm.
- It's unbearably hot all the time.
- The classrooms in the basement are very cold compared to the rest of the buildings.
- Waiting for winter to see if this problem persists, but last year it was so cold!!
- Could be warmer.
- The room is too humid, and it makes me very sleepy.
- The classroom is always too hot.
- The classrooms are often too hot.

Wayfinding and Movement Throughout the Building

- Make the gopher way more visible.
- I wish the signs telling where classrooms were located were a bit more obvious. It seems like something a classroom can be nearly impossible to find unless you wander about. This is very apparent in the basement, where most of the lab rooms are located.
- Rooms are slightly hard to find and in an odd floor plan.
- The restrooms are hard to find.
- The set up and lay out of the building is so confusing.
- The basement is generally poorly signed [signage] and it is difficult to find any rooms if you don't already know the layout.
- I realize this is not really fixable at this point, but the way the classrooms are arranged is rather confusing. It took me a while to figure out where my classrooms are, and I still don't understand the overall setup. Also, the fact that you have to take a staircase or elevator up (or down) from the entry way to get anywhere, and then take another staircase or elevator which may be difficult to find can be very inconvenient (not speaking from personal experience, but this is especially annoying if you have crutches or a wheelchair).
- The stairways are too small near the back doors to get down into the basement levels.
- My main comment is that the main staircase (the one right outside the lecture hall) is too small. There's usually a line of people waiting for the stairs after lecture gets out. And it's almost like a single file line.
- Also, the stairs are too narrow to get more than one person up at a time. I often get smacked in the shoulder trying to walk up the stairs.
- Stairways are sparse and very crowded, some of the more high-trafficked ones are very narrow, making it difficult for two-direction traffic.
- It is mildly inconvenient after class to need to wait to use the stairs. Rather than have one central staircase, I feel like two stairways on the sides would be much more efficient.
- Need more staircases.
- The stairs are pretty narrow for the hordes of students trying to go up and down them
- People only use the main central staircase and the staircases on the sides are hidden or poorly marked creating a major traffic jam on the main stair.

- The staircase leading up can get crowded. Ideally, a staircase should lead from the back straight down than looping around (although I can understand how that may alleviate traffic as some people turn left or right).
- There is only one staircase to get between floors and it is usually crowded after the lectures get out.
- The stair case is too small to accommodate hundreds of people coming and going to lecture.
- The stairs are insufficient, no one can get through.
- The one stairwell between the ground floor and the basement can get quite congested when classes in B50 are switching.
- Because of the positioning of the stairs relative to the large lecture hall on the basement floor, when a lecture lets out it is very difficult to get up or down the stairs because of the number of students coming up.
- Stair design is poor. One staircase at the opposite end of where the main entrance is? And it's always crowded.
- Main stairwells are too narrow, causing congestion. Just seems like a very bad design.
- When waiting in between classes, there is nowhere near enough seating and desk space for students. Students sit scattered throughout the halls slowing down person traffic even.
- Lots of congestion in the hallways.
- I am an older student and need to use the elevator. It took me quite a while to be able to figure out how to get to the basement from the handicapped Church St. entrance, as the elevator from the lobby does not go to the basement. There should be a sign for directions to take the elevator up, go around to the middle of the building, take another elevator, etc. to get to the basement.
- Need more tables and seating areas within the Hall. Now there are benches, but people still sit on the floor before class.
- There are not enough chairs/seating in the hallway and common areas, so students end up sitting on the ground which clogs the hallways and makes it difficult to move between classes.

Appendix B. Glossary

Descriptive statistics

Statistics used to summarize large sets of data (i.e., means, frequencies, medians). Descriptive statistics describe only the sample under consideration and are not intended to infer results to the larger population.

Frequency

A descriptive statistic that provides information about how many of a particular response or measurement are observed.

Likert-type scale

A measurement technique, employed in questionnaires and interviews, that utilizes a range of standardized response categories such as strongly agree, agree, etc.

Mean

The average score of a set of data calculated by adding all scores together, then dividing by the number of scores.

N

The number of subjects or participants responding to the questions, or a single question, in the study.

Reliability

The repeatability or replicability of findings; the same results are produced each time. Instruments and procedures should produce the same results when applied to similar people in similar situations, or on a second occasion.

Standard deviation

A statistic used to measure the variability of a group of scores (how different scores are from each other and the mean). For example, if the range of scores is 1-7 and the mean (average) is 5.0 with a standard deviation of 1.0, then the scores are closely clustered around the mean, i.e., there is one unit of variation among all scores. If the mean was 5.0 and the SD was 3.0, there is a broader range of variation among the scores...a smaller SD means the scores are similar and the mean score is likely to be more accurate and more useful (this is better!).

Validity

The extent to which an instrument or procedure measures what it is intended to measure (internal validity). The generalizability of results to another population (external validity).