

MINNESOTA



POST-OCCUPANCY EVALUATION

**Indoor Environmental Quality + Classroom Environment
UMTC Health Sciences Education Center + Phillips Wangensteen Building
Renovation (HSEC+PWB)
Minneapolis, MN**

**December 2021, 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 and construction of the UMTC Health Sciences Education Center (HSEC) and the partial design and renovation of the Phillips Wangenstein Building (PWB) facility and occupants' satisfaction with their classroom environments located in this building. The HSEC+PWB facility 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 March 2020. 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 nearly 20 months post-occupancy. Because of COVID-19, the HSEC+PWB space was used at a reduced capacity until full class schedules resumed in the building in September 2021. The survey was conducted in November 2021.

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 HSEC facility is located at 526 Delaware Street SE, Minneapolis, MN. The HSEC facility (see Figure 1) connects to the Phillips Wangensteen Building (PWB) located at 516 Delaware Street SE. Four floors (2, 3, 5, and minimal space on 4) of the PWB (55,283 square feet [SF]) were renovated as part of this project. The HSEC is a seven-story, 148,231 SF building. It is comprised of a sub-basement and basement below grade and of the five floors above grade. Active Learning Classrooms (25,811 SF), Simulation Labs (SIMS; acute care, inpatient, outpatient, operating room, workshop, and trauma) (7,044 SF), brief and debrief rooms (3,990 SF), and Seminar Rooms (5,648 SF) are distributed throughout the facility. 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. HSEC+PWB is the principal classroom building for interprofessional health sciences education and training for future health professionals. Only the overall facility and learning spaces noted above were included in this study.



Figure 1. HSEC+PWB (Photo courtesy of Peter Sieger)

3.2 Project Team

The relevant project team members to the SPOES process for HSEC+PWB 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	Perkins+Will (architect-of-record) with SLAM
Mechanical and Electrical Engineer	LKPB Engineers
Interior Designer	Perkins+Will
Landscape Architect	Perkins+Will
Commissioning Agent	University of Minnesota
General Contractor	JE Dunn Construction Group, Inc.

3.3 Description of Respondents

The HSEC+PWB had 2,651 students with classes in the constructed facility during the fall semester administration of the survey. The response rate to the questionnaire was approximately 15%. Of those responding, 71% were female, 22% were male, and 1% responded as 'other.' The mean age of respondents was 24 years; the range was 18 to 59 years.

Students responded that relative to their primary laboratory or classroom environment, 20% spend 1-2 hours per week in their primary laboratory or classroom environment, 29% spend 3-4 hours, 47% spend 5+ hours, and 4% spend 40 hours or more 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 HSEC+PWB Facility (Site, Building, and Interior): Overall Satisfaction, Learning Experience, and Health

Students responded to questions concerning the HSEC+PWB 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. HSEC+PWB facility - overall satisfaction, learning experience, and health

Overall	Mean	SD	N	Interpretation
Satisfaction	6.15	1.07	397	Satisfied
Learning Experience	5.89	1.17	396	Enhanced
Health	5.34	1.20	396	Enhanced

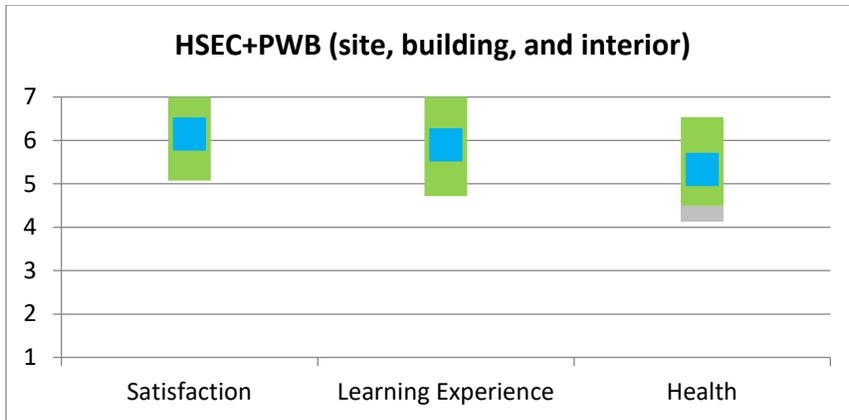


Figure 2. HSEC+PWB facility - overall satisfaction, learning experience, and health

Results indicate that students were **satisfied (M = 6.15)** with the HSEC+PWB facility (building, site, and interior) and reported that their overall learning experience was **enhanced (M = 5.89)** by the facility. Students reported that their overall health was **enhanced (M = 5.34)** 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. HSEC+PWB primary classroom/laboratory – overall satisfaction, learning experience, and health

Overall	Mean	SD	N	Interpretation
Satisfaction	6.02	1.14	330	Satisfied
Learning Experience	5.83	1.24	330	Enhanced
Health	5.28	1.25	330	Enhanced

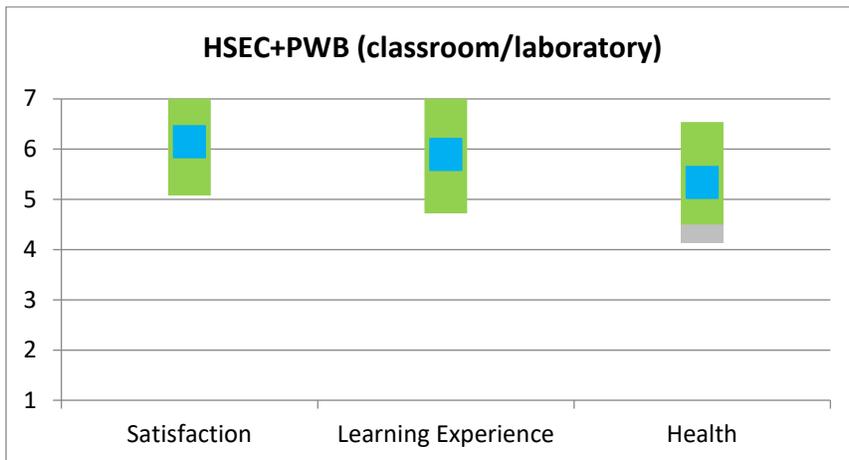


Figure 3. HSEC+PWB primary classroom/laboratory - overall satisfaction, learning experience, and health

Results indicate that students were **satisfied (M = 6.02)** with their primary classroom, their overall learning experience was **enhanced (M = 5.83)** by their primary classroom, and their overall health was **enhanced (M = 5.28)** by their primary classroom.

4.3 Primary Classroom/Laboratory: 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 HSEC+PWB. Figure 4 is a visual image of the findings in Table 3.

Table 3. HSEC+PWB primary classroom/laboratory - satisfaction with IEQ criteria

#	IEQ Criteria (1-26) (Category level criteria are bold face)	Mean	SD	N	Interpretation (D = Dissatisfied) (S = Satisfied)
1	Access to electric outlets	6.33	1.09	325	Satisfied
2	Overall appearance (aesthetics)	6.24	1.08	325	Satisfied
3	Overall cleaning and maintenance	6.17	1.24	325	Satisfied
4	Overall indoor air quality	6.15	1.06	327	Satisfied
5	Amount of electric light	6.07	1.15	327	Satisfied
6	Overall electric lighting conditions	6.05	1.21	327	Satisfied
7	Humidity (dry or moist)	5.99	1.12	327	Satisfied
8	Ability to hear desired sounds	5.99	1.25	327	Satisfied
9	Function of furnishings	5.97	1.34	325	Satisfied
10	Overall acoustic quality	5.96	1.16	327	Satisfied
11	Overall furnishings	5.93	1.39	324	Satisfied
12	Overall technology conditions	5.92	1.31	325	Satisfied
13	Overall vibration and movement	5.90	1.11	325	Satisfied
14	Air velocity (drafty or stagnant)	5.89	1.11	327	Satisfied
15	Adjustability of furnishings	5.76	1.43	323	Satisfied
16	Overall view conditions	5.76	1.48	326	Satisfied
17	Overall thermal conditions	5.73	1.28	329	Satisfied
18	Ability to adjust electric lighting	5.63	1.36	324	Satisfied
19	Temperature (hot or cold)	5.49	1.47	329	Satisfied
20	Overall daylighting	5.30	1.93	326	Satisfied
21	Amount of daylighting	5.23	1.98	326	Satisfied
22	Adjustability of thermal conditions	5.10	1.51	322	Satisfied
23	Adjustability of daylighting	5.07	1.91	324	Satisfied

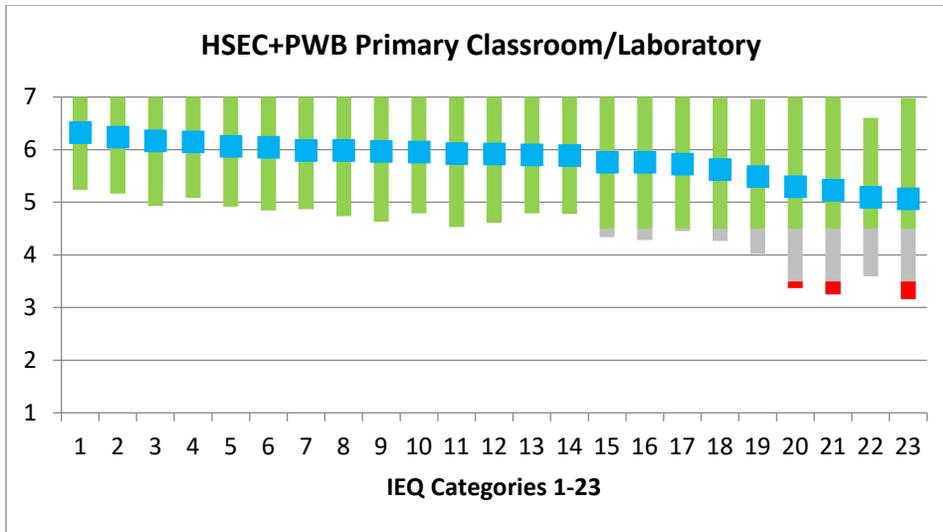


Figure 4. HSEC+PWB primary classroom/laboratory - satisfaction with IEQ criteria (IEQ 1-23 are listed in Table 3)

Results indicate that students were **satisfied** with all 23 of the IEQ criteria in their primary classroom/laboratory. Satisfied means ranged from **6.23** (access to electric outlets) to **5.07** (adjustability of daylighting), i.e., means at or above 4.50. These findings support a **consistently positive level of student satisfaction** with the IEQ of their primary classroom/laboratory. 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 HSEC+PWB is **5.92**, 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.

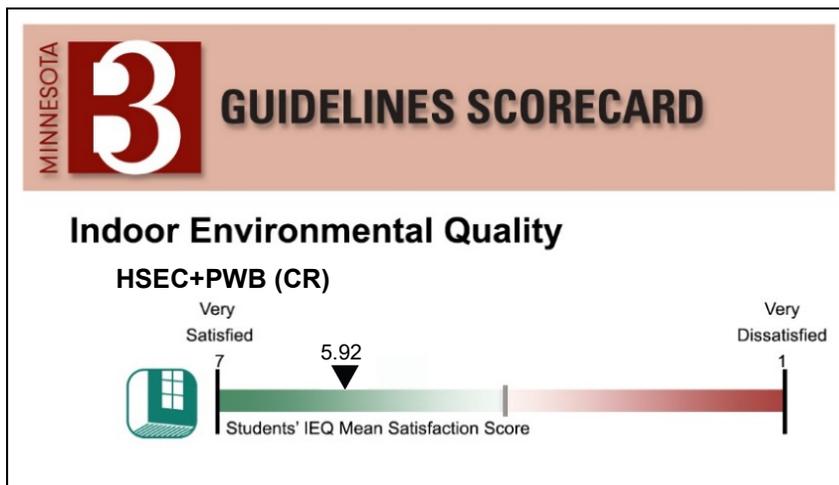


Figure 5. HSEC+PWB primary classroom/laboratory - IEQ Satisfaction Score

Overall, the students showed a relatively high positive satisfaction level with the IEQ of HSEC+PWB laboratories and classrooms as indicated by the mean score of **5.92**. As shown in Table 3, all IEQ categories were at or above **5.30**; eight (8) categories were at or above **5.90** 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 HSEC+PWB (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 HSEC+PWB facility

HSEC+PWB Facility (Site, Building, and Interior)	Mean	SD	N	Interpretation
Overall physical activity (walking, stair use, etc.)	5.70	1.10	322	Enhanced

Results indicate that students felt that HSEC+PWB **enhanced (M = 5.70)** their physical activities (walking, stair use, etc.).

5.2 Commuting Practices

The HSEC+PWB facility resides in the center of the East Bank of the Twin Cities campus of the University of Minnesota between Washington Avenue and East River Road Parkway. It is accessible via the Eastbank light rail station or the Gopher Way Tunnel or Skyway, with campus transportation via the East Bank Circulator on Harvard Street SE. Secure bicycle storage is available and vehicle parking at on-campus parking garages and meters.

Table 5 provides results on students’ primary mode of transportation; Table 6 summarizes commuting distances between home and the HSEC+PWB 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 – HSEC+PWB primary mode of transportation

Commuting Practices Home to HSEC+PWB (N=323)	Walk	Drive alone (or with children <16)	Public Transit	Bicycle	Carpool or Vanpool	Other
Students commuting mode (%)	>35%	28%	22%	8%	6%	<2%

Related to primary modes of transportation, 35% walk, 28% drive alone (or with children under 16), 22% take public transportation, 8% ride a bicycle, 6% carpool or vanpool, and 2% take other modes of transportation not identified. (Due to rounding error, the percentage does not equal 100%.)

Table 6. Commuting practices – HSEC+PWB commuting distance traveled

Miles Traveled One Way (N=324)	0-5	6-15	16-30	31-45	>76
Students commuting distance (%)	62%	18%	16%	2%	1%

Results indicate that 62% of students commute 0-5 miles one-way between home and HSEC+PWB, followed by 18% who commute 6-15 miles, 16% commute 16-30 miles, 2% commute 31-45 miles, and 1% commute 76 miles or more to HSEC+PWB. All commuting mileage is reported as one-way miles. (Due to rounding error, the percentage does not equal 100%.)

Table 7. Commuting practices – HSEC+PWB location and alternative commuting behaviors

HSEC+PWB Facility (Site, Building, Interior)	Mean	SD	N
Ability to commute in alternative ways	5.17	1.57	324

Results indicate that the location of the HSEC+PWB **enhanced (M = 5.17)** 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 HSEC+PWB at approximately 20 months after its initial occupancy in March 2020. About 15% of the students who are enrolled in classes in HSEC+PWB 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 = 6.15**); they found the facility **enhanced** their overall learning experience (**M = 5.89**) and **enhanced** their overall health (**M = 5.34**). When students were asked these same questions about their primary laboratory or classroom, they reported overall **satisfaction (M = 6.02)** with their primary laboratory or classroom. They also reported that their overall learning experience was **enhanced (M = 5.83)** by their primary classrooms, and their overall health was **enhanced (M = 5.28)** 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 all 23 of the IEQ criteria. The scores ranged from **5.07** (adjustability of daylighting) to **6.33** (access to electric outlets) 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 HSEC+PWB, the IEQ Satisfaction Score was **5.92**. This score reflects a

moderately high satisfaction level with IEQ categories. Finally, students reported that HSEC+PWB **enhanced (5.70)** 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 HSEC+PWB 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. HSEC+PWB 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 spaces, technology/electrical, thermal conditions and control, and wayfinding and movement throughout the building. Generally, the comments are shown exactly as written.

Overall Positive/Negative

- Love it!!
- Very nice!
- It's very nice.
- Overall, the HSEC is wonderful; it's pleasant and comfortable to be in.
- Love the space, I think it's a great place to do a lot of things!
- The aesthetics are really nice! Feels modern and clean inside.
- The learning space is great and aids in student to class interaction.
- HSEC is a beautiful new building and I really enjoy the class that I have there.
- Overall, I am very impressed with the environment of the building and its amenities.
- Beautiful, clean, and functional learning space. Especially impressed by the ability of mixed in-person/zoom classrooms to feel so natural in this space. Really helps to facilitate hybrid learning.
- Generally speaking, the building is spacious, modern, and a great setting for class!
- I love having classes in this building and it is my preferred study location on campus.
- I like how accessible the common space is overall, with restrooms/classrooms/study areas within a comfortable distance. It is nice and airy as well.
- I really enjoy the building and am grateful for my classes in the building.
- A really big mental health boost to be in a beautiful space with lots of natural light.
- The HSEC is a state-of-the-art facility - excellent job. I love learning here.
- I really like the HSEC classrooms.
- HSEC 2-101 A/B is an excellent space for learning.
- I LOVE the makers' space - it is so well equipped and staffed. Everyone there has been really helpful and having the opportunity to use those new technologies is really helpful.
- Connecting HSEC to the skyway and GopherWay systems was a great idea! It's so helpful to be able to get where I'm going without needing to go outside
- I think you did a great job with sustainability - I would like if you would share the data with students on building consumption and what went into the design to make it sustainable.
- Love it! I love the natural lighting and all of the different sitting/standing options to study.
- I think there is a lot of great space there, but it always seems that I cannot find a place to study after class.
- It is very aesthetically pleasing. Thank you for your time for doing this survey!
- Some audio issues [in classrooms], but overall, very satisfied.
- With social distancing, there is not always a convenient place to work with a table between classes.
- It's a nice space and I'm glad to be out of the Mayo basement and into a nicer learning space.

- The library room on the fifth floor is really great. It has a good variety of seating/desk options and it's always super quiet and overall, a really great study space.
- Overall, the building is just kind of ostentatious and pretentious, without basic services like reliable WiFi.
- It feels overly crowded frequently. It can be hard to find places to study. There are a lot of undergraduate students occupying the building.
- Parking is a nightmare.

Acoustics and Privacy

- The common areas near the front of the building (3rd floor, street level) gets pretty loud if anyone is talking above a whisper. The sound bounces off everything and produces a lot of sound.
- [In the ALC] tables are a good idea, but the acoustics are terrible when groups of 8 people are all trying to work together at the same time. It's very noisy and people have to shout to be heard, which compounds the issue.
- During group work, the tables are so large that the people at one end of the table cannot easily hear the people at the other end of the table.
- I have a hard time hearing even when working in a pair with someone sitting adjacent to me.

Amenities

- I utilize the CHIP Lounge quite a bit, and it is a very beautiful setting for studying that really enhances my learning.
- I love the compost and battery disposal options.
- Plants would be nice to add throughout HSEC, especially during the winter, as it can help clean the air and cheer up those who miss seeing greenery.
- The Cafe Stop should be open.
- Please get the café on the main floor (3rd) open!
- Snack vending machine on 2nd floor works half the time and I wish there were more healthy beverage options. Furthermore, I wish the coffee shop was open so there is an accessible place to get food/beverages.
- There are also not enough library spaces that can be booked, since they are always all booked up when I need to reserve one.
- It's frustrating that the men's restroom on the 5th floor next to the quiet study space (and on my other floors too) only have two urinals and one stall for a large number of people. Especially given the large size and mostly unused space of the restroom.
- There are not enough bathrooms, with the basement ones being closed most of the semester and the first floor Men's Room only having one stall.
- Scarcity of bathrooms is a problem.
- There should be more gender-neutral restrooms.
- We need more stalls in women's bathroom on level 2.

Appearance (Aesthetics)

- I enjoy having a brightly painted wall and a well-lit environment.
- The building as whole could use some more art to bring together the arts and sciences that we see in the health sciences. It feels a little stale.

- While I like the modernness of the space, it feels very formal and un-relaxed especially in the first-floor rooms where my classes are.
- The bright red/orange wall colors are a little anxiety/stress inducing.
- The red color of the back wall in the active learning classroom is VERY distracting. There are studies showing that red is a color that puts your body on alert.

Daylighting/Electrical Lighting and Lighting Controls

- Good natural light.
- I like the natural light spaces and would like to have as much natural light available as possible.
- It would be nice to have a classroom with windows, especially if it's a two-hour class. Otherwise, it's a good space.
- Some of the rooms do not have access to daylight.
- Wish there was more natural lighting in the rooms downstairs
- My classroom is in the basement so there is no natural light.
- Sitting in the same room for hours is not conducive to learning, ESPECIALLY being in the basement for 20 hours with no daylight at all.
- There is also no natural lighting [in my classroom].
- No windows a problem.
- My classroom has "0" natural light because it's in the basement. This can make for some very long lectures and days when I might not see any natural light for a few hours.
- Basement classrooms do not get any daylight down there (no windows), don't like it.
- There are no windows in my assigned classroom because it is on the 2nd floor below ground.
- The upper spaces are much better, I think because they have windows. Basement classrooms are not the most tranquil/relaxing spaces where I would like to learn.
- I wish there was a way to get more natural sunlight in some of the classes that have no windows.
- My class is always in the basement so there is no (0) natural light, and the electric lights are a cool white. I wonder if a little more natural shade of white with a bit more yellow in it would resemble more natural light.
- The outpatient MSIM rooms have overhead lights that will randomly turn off while students, instructors, or standardized patients are in the rooms and moving around. It's incredibly distracting to learning and requires the student to press the light switch up to 3 times during a 20-minute simulation encounter to keep the lights in the room on. That needs to be fixed.
- The automatic lights in CHIP hinder studying because I have to get up every 10-15 minutes when I'm there late and I end up studying in the dark when I'm focused.
- When I am studying in these rooms, the lights often shut off after 15 minutes. I wish that they would stay on for longer.

Furnishings

- I think that HSEC could have some more comfortable furnishings
- The lounge chairs are uncomfortable and hard to do work while sitting in, there needs to be more tables and chairs [in the study areas] as this is a learning environment not a studio for watching Netflix.
- It would be nice to see even more seating. Obviously, there's already a lot but it's hard to find somewhere to sit in the middle of the day. Everywhere is full

- Furniture outside rooms (in hallway study areas) look nice but are uncomfortable. Difficult to avoid back pain.
- The classroom chairs are very uncomfortable for everyone of shorter stature in our class. This leads to poor posture and high fatiguability.
- I just wish there were more tables in the facility itself to study because I don't like to learn over when I have to sit on a low couch. I like to have my laptop or notebook propped up.
- The chairs in the classrooms are not the most comfortable (arms are very stiff, back is not super supportive), particularly for 2-hour lectures.
- The chairs in all the rooms are very uncomfortable.
- In PWB 132 it is hard to fit 2 people at each side of the table cause the legs of the table go inward.
- Would like for there to be more tables at sitting level, not couches when you have to look down.
- I need a place to hang or leave my backpack in my big active learning classroom.

Indoor Air Quality (IAQ)/Ventilation

- My seminar room seems to have a smell to it like staleness.

Operations and Cleaning/Maintenance

- It is very clean
- The blinds over the windows on the 3rd floor constantly open and close which can be distracting while studying, so perhaps some calibration on the amount of light needed to close them would be helpful.
- I wish there were more frequent cleanings of the classrooms. Several times I have found food, spills, hairs, etc. on the desks and crumbs on the chairs. I think cleaning - using antibacterial products and vacuuming - should be a larger priority, especially considering COVID cases continue to increase.
- The curtains [in HSEC 2-101 A/B] have not been working however, which can be distracting as the walls are glass and we can watch students walking by. The CHIP center is often very messy, especially the kitchen, due to students not cleaning up after themselves.
- CHIP could be cleaned more.
- There need to be garbage cans added to the study rooms.
- Just need the basement bathroom fixed in a timely manner.
- Downstairs toilets are always closed???
- The bathroom on the 2nd floor has been closed for over a month. Bathroom stalls on third floor are usually putrid (women's).
- Fix the bathrooms on the basement floor please!
- The bathrooms on the lower level are often out of order. Not convenient when we have a short break, and many people need to search building for open bathroom.
- Please bring back the basement bathrooms.
- The 4th floor bathroom needs to be cleaned more and restocked more often than once daily.
- The bathroom on the second floor has been closed for a very long time.
- The bathroom on the floor where all of my classes take place has been broken for almost two months now. We're all hoping that can be fixed soon so if we need to use the restroom during class, we don't need to take the elevator to a different floor and miss more class.
- The bathroom in the basement has been broken for a month.
- The bathroom in the lower level has been taped off for weeks and there isn't another bathroom

close by. It really causes problems, and wastes time when everyone has to use the next closest one which is on another floor.

- The downstairs bathrooms have been out of service for months, which is very inconvenient.
- Additionally, the basement bathroom has been closed for a few weeks now.
- The restrooms frequently have overflowing trash and no soap.
- Wish the bathrooms on level 2 by the study rooms would be fixed.
- Please fix the bathroom on the second floor. It has been out of order since September.
- The bathroom on the 2nd floor has been unavailable to use for most of the semester which has caused a lot of bathroom traffic during our limited breaks between classes.
- The bathrooms on the second floor have been out of order for a long time now. I have not seen maintenance working on fixing the bathrooms for a long while now. It is frustrating having to go to different floors to use the restroom taking time out of class.
- The bathroom in the basement level of HSEC has been out of order since orientation. This needs to be fixed.
- The bathrooms in the lower level have been closed for a majority of the semester and it's very inconvenient.
- The bathrooms nearest the classroom have been out of order for the majority of the semester, which means that there is never enough time to use the facilities during break because there is always a line at the second nearest restroom.
- Paper towel trash bins in bathrooms (especially on 3rd/2nd floors) are almost 90% overflowing with paper towels, to the point where you're stepping on dirty paper towels when you enter the bathrooms.
- I wish the 3rd floor bathrooms would be cleaned more frequently.
- One of my classes gets done around 3:00-3:30 and they are always out of paper towels in the women's bathroom by then and the trash is overflowing. I think staff clean around 4:00 pm so its fine after, but my class is very large, and a lot of people get frustrated with no paper towels when they go right after class.
- Fix the bathroom on level 2 near the stairs.
- Please clean/fix the bathrooms.
- Bathrooms on level 1 have been closed. Hassle to go upstairs to level 2 bathrooms.
- The ladies' restroom on floor 3 of HSEC near the elevators is out of soap for days on end. I have made a habit to use other restrooms because there has been no soap in that bathroom on so many occasions.

Safety and Security

- Make sure there are safety protocols as it's next to the medical center.

Spatial Layout

- I'm only dissatisfied with the bathroom locations. They're inconsistent between floors and I find it to be a little confusing and frustrating.
- The [class]room is quite small which makes social distancing impossible. Other than that, it is nice.
- Would be great to have more classrooms/ space available for virtual learning—we oftentimes must be on campus for an in-person class and have a virtual class shortly after and it's difficult to find a space to sit during these times.

- It seems to be overcrowded at times and as if more space would help enhance the ability to study.
- The only thing about PWB 132 is that everyone is sitting sideways and has to turn neck the whole time to see the speaker.
- The classroom we use for our seminar is really tight. Enough seats for everyone but we must sit elbow to elbow. Not sure why this room was chosen for our group.
- The setup of rooms makes it hard to see the boards, and the projectors are very light.
- The screens can be difficult to see in such a large classroom.
- Great classroom which makes a great use of space, but when it comes to the number of screens in the classroom, it was not necessary.
- Way too many screens and half the chairs face away from the professor - I might as well be on a zoom class since I still am just staring at screens and can't engage because it is hard to see the professor and I have to watch lecture on the video anyway.
- The way the desks are set up having half the class face away from the professor is not ideal.
- There is a large beam that obstructs my view of the instructor.
- Room 7-150/2 is set up a bit inconveniently sometimes. It is hard to listen to a lecture or someone speaking at the front of the room because our chairs and tables are facing other students at the table. I have also noticed that it is difficult for students to use the microphones at the table as they have to lean over the table to speak.
- When you are sitting in the view of the camera [in the classroom], it can be very distracting and made me personally focus more on being on camera than the class content. This function is very, very distracting, and stressful to many students that I have talked to. Also, facing backward away from the teacher is very hard because there is no screen against the back wall, so I have to crane my neck to see the PowerPoint on the screen. Facing backward also is stressful because the teacher can see what is on your screen.
- I find it extremely annoying that for the active learning classrooms half the class is facing the back of the room and cannot see the instructor without looking at a screen. The only real complaint I have with the classrooms is that a few of the rooms have poles in them that make it difficult to see the instructor if you're sitting at certain tables.
- The tables are very helpful when in small group discussion and allow for collaboration with classmates, however, it makes it very difficult to listen while in lectures. If I am sitting on one side of the table, I am unable to see the professor for the majority of the lecture.
- The cameras are helpful if the professor stands in one spot, which rarely happens.
- I really like the big active learning classroom I'm in on the 3rd floor, but sometimes it's hard to see the instructor. I'd rather not have to look at a screen to see them the entire lecture.
- Not facing the lecturer [in classroom] is inconvenient and less engaging.
- In the active learning classrooms, it's hard to see the white boards on opposite sides, professors also prefer one side so the other side doesn't see as much. Also, I would prefer to take exams in a different room in rows rather than at a table with 8 people facing each other
- Some of the active learning classrooms are set up with tables in rounds, which puts a bunch of people with their backs to the screens, forcing them to twist or turn around to see anything on the screen. The room is at capacity, which forces some people to sit in those spaces.
- Our class is set up as a discussion-based classroom, but my classes are not discussion based. It makes it difficult and uncomfortable to see the presenter and the screens for the people with their backs forced to the front of the room.

- I hate that you must go up stair to return books. All the other libraries have outdoor book returns. Why can't this library have the same?
- Lockers are in the lower level and yet going downstairs there is a locked chained gate in the middle of the stair well. I have clinicals next door that starts at 7 AM so getting to use my locker is not ideal.

Study Space

- Could somehow add more areas to study in?
- I wish there were more reservable study spaces!
- The lack of useable study space is disappointing.
- Need more available study spaces. Access to classrooms for students to study would be extremely helpful to enhance learning.
- The building is beautiful, but it is frustrating to not be able to have a quiet place to work with a table and keep a comfortable social distance.
- Availability to obtain study rooms is a challenge, they are mostly all fully booked.
- It's a hassle to kick people out of meeting rooms when there is a reservation. You should consider having green/red light flashing when time is up so that the other group who reserve the room can use it. Or have digital room schedule listed outside so that people know that the room is reserved
- The study rooms are often booked weeks in advanced, making it nearly impossible to take a private zoom meeting when on campus. I suggest that preference be given to health students (Med, pharm, dental, nursing, etc.) or please limit how advance rooms can be reserved. This is has become a real issue as many classes are now going with a hybrid model.

Technology/Electrical

- The microphones work really well when a student has a question for the instructor. that's great!
- Overall, technology and support are wonderful! Please fix the WiFi.
- WiFi has been non-functional half of the time, both in classrooms and in library study rooms in HSEC and PWB.
- During NURS 5030, IT had to come every class to fix the system.
- I think we would all learn better if there were fewer screens and microphones.
- The table mics and cameras induce anxiety.
- We've had trouble with the speakers in the classroom.
- Oftentimes the push-to-talk microphones in the Wagensteen classroom will not work, which disrupts learning, as students will have to shout to get their question heard.
- The screens in the classroom aren't set to the professors so they just get in the way.
- We need more outlets is my only real complaint.
- Some outlets don't work
- Some outlets in the large lecture hall (stadium type one) do not allow for mac computer chargers to be plugged in due to the angle and size of the outlet opening.
- Some outlets don't work in the couches.
- I wish that individual tables in the active learning classroom could plug in their laptops and use the TV next to each table for group work.
- The only thing I would say is that there are too many TVs. Two flat screen TVs per table in a 20-table room is a lot.

- I don't like being unable to see the professor easily. The screens give me headaches and the Internet fades often. The microphones are spaced out and make speaking up intimidating and uncomfortable.
- Whenever professors play video or audio it is often delayed compared to the visuals on the TVs at individual tables. It is distracting.
- I feel as if I am overstimulated by this classroom. It is very difficult to concentrate with so many monitors as well as students squished in the room.
- In classrooms there are too many screens. Microphones hinder participation. The camera going onto the speaker hinders participation.
- The one thing that gets distracting is when using the microphones at the table in the classroom, the camera panning to the speaker is unnecessary and weird.
- TVs at each table are VERY helpful. It makes it easier to see the professor's screen and the camera feed.
- I do not appreciate the cameras that turn on when the microphone is activated. It is distracting when trying to talk to the class. I would (and many of my classmates agree) appreciate the ability to turn that function off and on.
- I have three classes held in the active learning classrooms and all three instructors have had issues all semester with the technology. They haven't been able to share their PowerPoint presentation for the class while also hosting the Zoom meeting for the online class members.
- For the large classroom HSEC 3-110, there needs to be a projector screen behind the instructor because it's really irritating when the instructor is referring to the PowerPoint slides but we can only look at her OR a screen, not both at the same time.
- I'm in HSEC 3-110 and if you're in a seat that faces the big window, you can't see any of the projectors without turning. I know that seems like a silly thing to say but my seat is in that position, and I have to turn to see the slideshow and I keep accidentally kicking my classmates
- The computer in the visualization lab is very slow, for such a modern building the technology does not deliver.

Thermal Conditions and Control

- Students should be able to adjust the temperature in the study rooms.
- The classroom has good temperature and is comfortable.
- New PT classrooms were having issues with the temperature being too hot; it has since been addressed though and is much better.
- When the sun is out, it gets very warm (like a greenhouse) in the lobby/common areas, and the heat is not adjusted to accommodate that.
- It has been cold in the HSEC active learning classrooms. There is a vent in HSEC 2-110 that keeps blowing out cold air. That isn't appropriate since we are well into November.
- The classroom I am assigned to is always very warm.
- I find myself cold a lot in my basement classroom.
- It's so cold all the time.
- It is always quite cold in the downstairs area.
- It's on the colder side right now.
- It is almost always too cold in the classrooms.

Wayfinding and Movement Throughout the Building

- Very difficult to find rooms. Poorly labelled. I tried to find the CHIP lounge but could only find the meditation and related spaces.

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).