Indoor Environment Quality + Workplace Environment
Folwell Hall (FH)
University of Minnesota, Minneapolis, MN
Report 1

February 2015, 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 Folwell Hall facility (FH) and occupants' satisfaction with their work environments located in the FH. The FH facility was designed using the B3 Guidelines (formerly known as the Minnesota Sustainability Guidelines or MSBG) and completed for occupancy in 2011. 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 work 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 employees) responses at 3.5 years post-occupancy. The survey was conducted in February 2015 and is the first of two required survey events for this building.

This SPOES report focuses on employees' satisfaction with the physical environment as related to 25 indoor environment quality (IEQ) criteria such as lighting, thermal, and acoustic conditions in their primary workspaces, i.e., offices. Employees' satisfaction with the facility (site, building, and interior) and the effect of the facility's physical environment on their perceptions of their work performance and health also are included. Finally, a brief look at employees' commuting and physical activities within the building are reported. The report provides descriptive information about employees' perceptions of the IEQ of their work environments. In addition, this information serves the broader development of knowledge regarding the influence of IEQ on employees.

2.0 Method

SPOES consists of a self-administered, Internet-based, questionnaire submitted to and completed by employees. The SPOES questionnaire has been tested for **validity (**measures what it is intended to measure) and **reliability (**repeatability or replicability of findings). Employees 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 workspaces. They also rate the influence of their physical environment on their perception of their work performance and health on a scale from 1 (hinders) to 7 (enhances). There were no physical measurements taken of environmental conditions such as temperature or acoustic level. This study is limited to employees' perceptions.

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 hinders/enhances. Means that are close to the center of the scale (4) are considered to be neither dissatisfied/hinders or satisfied/enhances.

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

- 1.00 - 3.5 dissatisfied (hinders)
- 3.51 - 4.5 neither satisfied (enhances) nor dissatisfied (hinders)
- 4.51 - 7.0 satisfied (enhances)

An IEQ Score is also calculated for employees' satisfaction with IEQ in their primary workspaces. This is a

statistical combination of all IEQ scores, which results in a single IEQ score for all employees on all IEQ variables and is reported in an IEQ Scorecard.

2.1 Description of the Questionnaire

Employees 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 work performance and health. Then they responded to questions about their satisfaction with their primary workspaces in relation to IEQ criteria from the B3 Guidelines.

In the SPOES questionnaire, the 25 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 attributes of employees' ability to hear desired sounds and their ability to limit undesired sounds. There are 12 category-level and 13 attribute level questions. Means are calculated and reported for all category and attribute-level criteria.

An IEQ Satisfaction Score is also calculated for employees' satisfaction with IEQ in their primary workspaces. This is a weighted mean statistical combination of the 12 category-level criteria only and results in a single, mean IEQ Satisfaction Score for all employees' satisfaction with the physical conditions of their primary workspaces. 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
- Ability to limit undesired sounds

Overall Appearance (aesthetics)
Overall Cleaning and Maintenance
Overall Daylighting Conditions
- Amount of daylighting
- Adjustability of daylighting

Overall Electric Lighting Conditions
- Amount of electric lighting
- Adjustability of electric lighting
- Adjustability of task lighting

Overall Furnishings
- Function of furnishings
- Adjustability of furnishings

Overall Indoor Air Quality
Overall Privacy
Overall Technology
Overall Thermal Conditions
- Adjustability of thermal conditions
- Air velocity (drafty/stagnant))
- Humidity (dry or moist)
- Temperature (hot or cold)

Overall Vibration and Movement
Overall View Conditions

Additionally, employees' physical activities, commuting practices, and recycling behaviors within the building were investigated.

2.2 Limitations

Employees' participation is voluntary, and responses are self-reported. As is true with all survey research, the responses indicate employees' perceptions. There were no physical measurements, e.g., temperature, humidity, or lighting levels, of the environment taken.

3.0 Sample Description

3.1 Description of Building

Folwell Hall is located at 9 Pleasant St. on the East Bank campus at the intersection of University Avenue SE and Pleasant Street SE in Minneapolis, MN. It is in a walkable community that is in close proximity to other campus buildings, open green space, public transportation, restaurants, student housing, and grocery and retail stores. In 1907 Folwell Hall was constructed to replace the Old Main Hall building that was destroyed by fire. It is 111,500 square feet over five floors. It houses the College of Liberal Arts language departments and includes office spaces, classrooms, and other supporting work spaces for students, faculty, and staff. It underwent a major renovation in 2011. The building is on the Minnesota Historic Register (see Figure 1).

Figure 1. Folwell Hall (Courtesy of University of Minnesota)

3.2 Description of Respondents

The FH had approximately 251 employees were assigned workspace in the facility during the fall semester period and administration of the survey event. The response rate to the questionnaire was approximately 26%. Of those responding, 27% were male, 69% were female, and 5% were other. The mean age of respondents was slightly over 47 years, with a range of 25 to 73 years.

The renovation and expansion of FH were completed in 2011. Since that time, 80% of the respondents reported that they had worked at the FH for more than 3 years, which means they experienced the pre-renovation work space. Nine percent of employees had worked in FH for 2-3 years, 2% had been there for 1-2 years, and 9% of employees spent less than 1 year at this site. Relating to hours worked during a typical week at FH, 15% of the respondents reported they spend 40+ hours a week in the facility; 29% spend 30-40 hours a week at FH; 32% spend 20-29 hours at FH; and 23% spend less than 20 hours in the FH facility. Relating to the percentage of time respondents spend per week in their primary workspace,

29% reported they spend more than 75% of their time per week in their primary workspace; 24% spend 51-75% of their time per week in their primary workspace; 30% spend 25-50% of their time per week in their primary workspace; and 17% spend less than 25% of their time per week in their primary workspace.

FH is an academic building that houses both office spaces and classrooms. Private offices and workstations (cubicles) serve as primary workspaces. Results indicated 48% of the respondents have private offices, 25% share private offices with other people, 17% work in a cubicle (enclosed by partitions), 5% work at a desk in an open area, and 5% have other types of workspaces. They also indicated that 68% of their primary workspaces were located within 15 feet of an exterior window.

4.0 Findings and Discussion

4.1 FH Facility (Site, Building, and Interior): Overall Satisfaction, Work Performance, and Health

Employees responded to questions concerning the FH facility (site, building, and interior) and their overall satisfaction with the facility, overall perceptions of their work performance 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, horizontal bar. The standard deviation is shown by the green/red, vertical bar with green representing satisfied (or enhanced) and red representing dissatisfaction (or hindered). Gray represents the 'neither/nor' range of responses. This graph is simply a visual image of the findings from Table 1.

Table 1. FH facility - overall satisfaction, work performance, and health

FH Facility (site, building, and interior)	Mean (1-7)	SD	N	Interpretation
Overall satisfaction	4.74	1.76	65	Satisfied
Overall work performance	4.33	1.86	65	Neither hinders nor enhances
Overall health	4.27	1.37	65	Neither hinders nor enhances

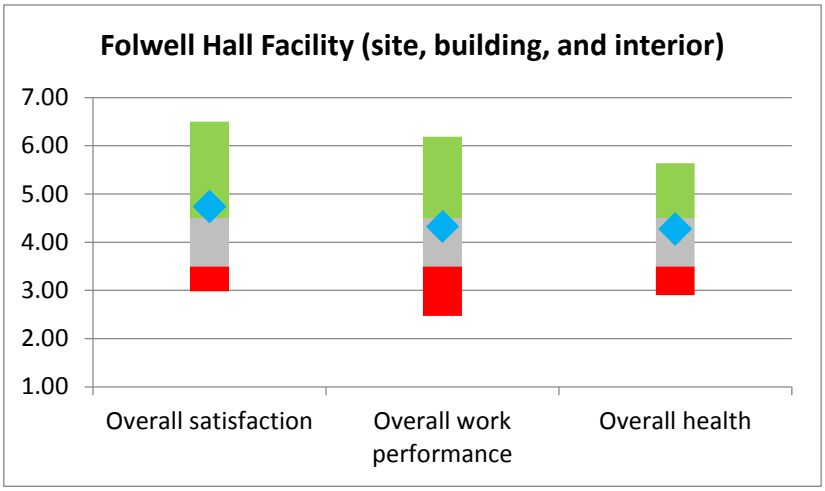

Figure 2. FH facility - overall satisfaction, work performance, and health

Results indicated that employees were **satisfied** (**M = 4.74**) with the FH facility (building, site, and interior) and reported that their overall work performance was **neither hindered nor enhanced** (**M = 4.33**) by the facility. Employees reported that their overall health was **neither hindered nor enhanced** (**M = 4.27**) by the facility. (See discussion of SD in Section 4.3.)

4.2 Primary Workspace: Overall Satisfaction, Work Performance, and Health

Employees responded to questions concerning their overall satisfaction and overall perceptions of their work performance and health as related to their primary workspace (e.g., private office, workstation, or other primary workspace). 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; an explanation of the graph was given for Figure 2.

Table 2. Primary workspace – overall satisfaction, work performance and health

Primary Workspace	Mean (1-7)	SD	N	Interpretation
Overall satisfaction	4.24	1.71	65	Neither dissatisfied nor satisfied
Overall work performance	4.09	1.65	65	Neither hinders nor enhances
Overall health	4.27	1.39	65	Neither hinders nor enhances

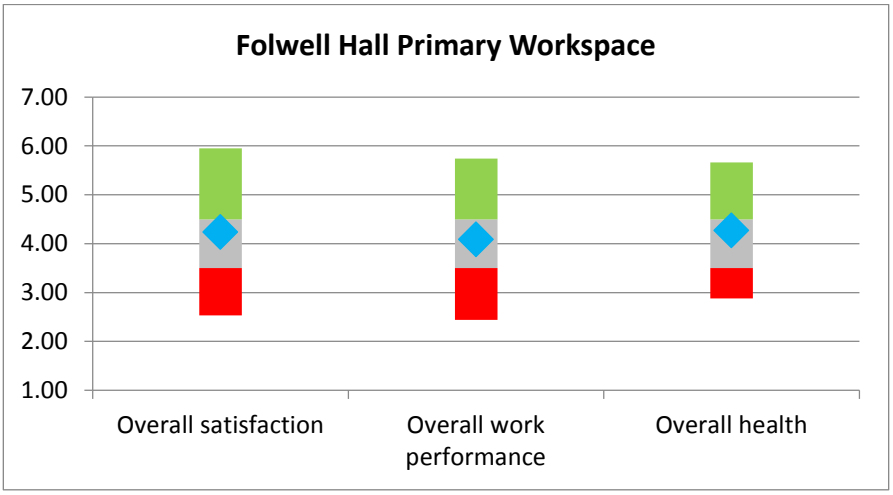

Figure 3. Primary workspace - overall satisfaction, work performance, and health

Results indicated that employees were neither dissatisfied nor satisfied (**M = 4.24**) with their primary workspace. Their overall work performance was neither hindered nor enhanced (**M = 4.09**) by their primary workspace, and their overall health was neither hindered nor enhanced (**M = 4.27**) by their primary workspace. (See discussion of SD in Section 4.3.)

4.3 Primary Workspace: Satisfaction with Indoor Environment Quality (IEQ)

Employees responded to questions concerning their satisfaction with IEQ categories (thermal conditions, indoor air quality, acoustic conditions, etc.) related to their primary workspace (e.g., private office, workstation, or other primary workspace). Table 3 shows the means and standard deviations of their responses as well as how the responses are interpreted. Figure 4 is a visual image of the findings from Table 3; an explanation of the graph was given for Figure 2.

Table 3. Primary workspace - satisfaction with IEQ conditions

FH Primary Workspace					
IEQ Criteria (1-25) Category Level Criteria are Boldface)		**Mean**	**SD**	**N**	**Interpretation** (D = Dissatisfied) (S = Satisfied)
1	**Overall technology**	**5.09**	**1.60**	**65**	**Satisfied**
2	**Overall cleaning and maintenance**	**5.06**	**1.73**	**65**	**Satisfied**
3	**Overall vibration and movement**	**5.00**	**1.40**	**65**	**Satisfied**
4	**Overall furnishings**	**4.89**	**1.62**	**65**	**Satisfied**
5	Amount of electric light	4.85	1.67	65	Satisfied
6	Function of furnishings	4.81	1.72	65	Satisfied
7	Adjustability of furnishings	4.81	1.66	65	Satisfied
8	**Overall electric lighting conditions**	**4.69**	**1.70**	**65**	**Satisfied**
9	Air velocity (drafty or stagnant)	4.67	1.39	65	Satisfied
10	Humidity (dry or moist)	4.65	1.53	65	Satisfied
11	**Overall indoor air quality**	**4.63**	**1.73**	**65**	**Satisfied**
12	Ability to hear desired sounds	4.55	1.74	65	Satisfied
13	**Overall appearance (aesthetics)**	**4.50**	**1.91**	**65**	**Neither D nor S**
14	**Overall view conditions**	**4.37**	**2.19**	**65**	**Neither D nor S**
15	**Overall daylighting conditions**	**4.22**	**2.13**	**65**	**Neither D nor S**
16	Amount of daylighting	4.19	2.26	65	Neither D nor S
17	Adjustability of electric lighting	4.17	1.93	65	Neither D nor S
18	**Overall thermal conditions**	**4.00**	**1.75**	**65**	**Neither D nor S**
19	Adjustability of task lighting	3.93	1.88	65	Neither D nor S
20	Adjustability of daylighting	3.86	2.20	65	Neither D nor S
21	Temperature (hot or cold)	3.86	1.75	65	Neither D nor S
22	**Overall acoustic quality**	**3.05**	**1.92**	**65**	**Dissatisfied**
23	**Overall privacy (sound/visual privacy)**	**3.02**	**1.65**	**65**	**Dissatisfied**
24	Ability to limit undesired sounds	2.89	1.83	65	Dissatisfied
25	Adjustability of thermal conditions	2.86	1.75	65	Dissatisfied

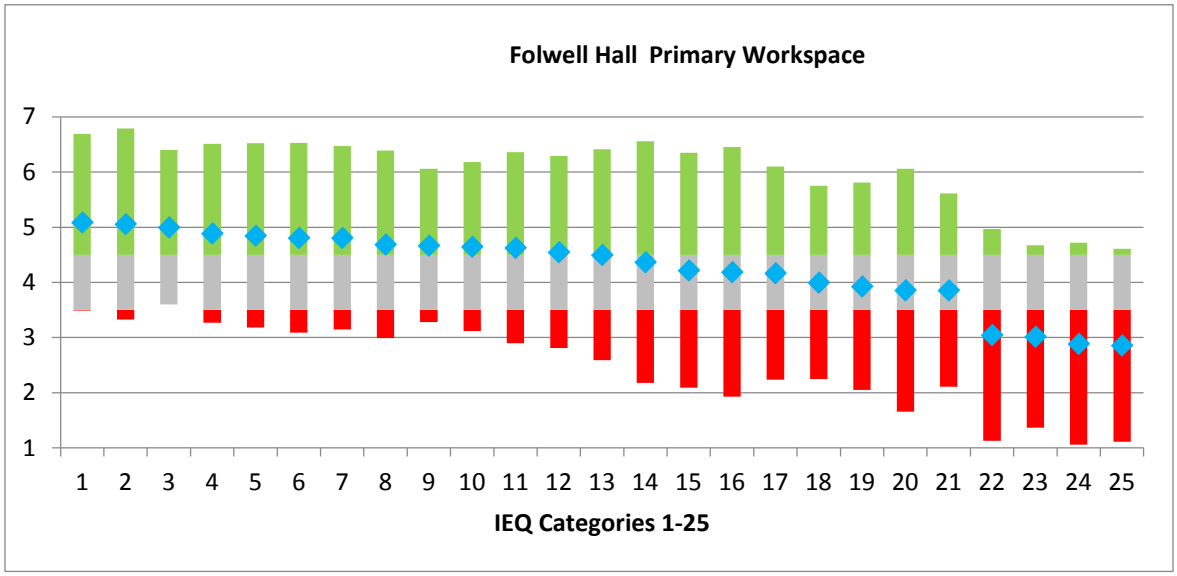

Figure 4. Primary workspace - satisfaction with IEQ categories (IEQ 1-25 are listed in Table 3 above)

Results indicate that employees were **moderately satisfied** with 12 of the IEQ criteria in their primary workspaces, i.e., means above 4.50. They were **neither dissatisfied nor satisfied** with nine IEQ criteria, and **dissatisfied** with four criteria. It is appropriate to discuss the standard deviation as well as the mean because in the findings from these data, the SD is almost always greater than 1, which means the responses were spread out over a wide range of values. The responses were not closely grouped around the mean so responses covered the range of possible scores, i.e., from 1-7. This simply means that the respondents were likely more positive or less positive than the mean indicates.

Although all criteria could use some attention, there are 13 criteria (neither/nor and dissatisfied) that are ripe for change to improve employees' satisfaction with their primary workspaces and will be addressed in Section 6.2 Recommendations. Further explanation of these scores also 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 overall category level IEQ criteria. At this time, all variables are weighted equally in this calculation as little evidence exists that provides rationale for weighting some variables heavier than others. The IEQ mean is representative of a fair overall IEQ score and can serve as a benchmark of employees' satisfaction with the physical environment of their primary workspace. As shown in Figure 5, the **IEQ Satisfaction Score for FH is 4.01.**

Figure 5. Primary Workspace - IEQ Satisfaction Score

Overall, the employees showed a neutral level of satisfaction with IEQ as indicated by the weighted mean score of **4.01**. In other words, respondents were n**either dissatisfied nor satisfied**. As shown in Table 3, there were only three category level criteria that had a mean of 5.0 or higher: Overall technology, Overall cleaning and maintenance, and Overall vibration and movement. These helped to pull the IEQ Satisfaction Score into a neutral direction considering there were three category-level criteria rated in the neither dissatisfied nor satisfied level and two category-level criteria at the dissatisfied level, which pulled the IEQ Score down. These issues can be addressed by building management to increase employees' satisfaction. Note that the IEQ Satisfaction Score only uses the category level criteria (those labeled 'Overall'; see section 2.1, paragraph 3 for explanation). These will be discussed in Section 6.2 Recommendations.

5.0 Physical Activity Engagement and Commuting Practices

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

5.1 Physical Activity Engagement

Providing employees with opportunities for alternative paths of travel around the workplace, 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 work environment can be associated with healthier lifestyles.

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

FH facility (site, building, and interior)	Mean (1-7)	SD	N	Interpretation
Overall physical activity (walking, stair use, etc.)	5.17	1.36	64	Enhances

Results indicated that employees felt that FH moderately **enhanced** (**M = 5.17**) their physical activities (walking, stair use, etc.). Further, of the 64 respondents to this set of questions, 58% said FH enhanced their overall physical activity. (Note: does not equal 100% due to rounding.)

5.2 Commuting Practices

FH is located on the northeastern side of the East Bank of the University of Minnesota. The east bank campus is located north of metropolitan hub providing bus and light rail transit service through the campus environment. The University provides several parking facilities, bike paths, and sidewalks throughout the campus and adjacent to the FH facility.

Table 5 provides results on employees' primary mode of transportation; Table 6 summarizes commuting distances between home and the FH facility; and Table 7 summarizes employees' 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 employees' commuting behaviors and opinions. These data can provide important information about commuting practices that can reduce transportation energy consumption.

Table 5. Commuting Practices – FH Primary mode of transportation

FH – Primary Mode of Transportation					
Drive alone (or w/children <16)	**Carpool**	**Public Transit**	**Bicycle**	**Walk**	**Other**
53%	6%	25%	9%	2%	5%

Related to primary modes of transportation, 53% of employees drive alone (or with children under 16), 25% use public transit, 6% carpool, 9% use a bicycle, 2% walk, and 5% use another form of transportation.

Table 6. Commuting Practices – FH Commuting distance traveled

Commuting Distance – Home to FH – One Way				
Miles Travelled	**0-5**	**6-15**	**16-30**	**31-45**
Percentage of respondents	42%	49%	8%	1%

Results indicated that the large majority of employees (91%) commute less than 16 miles between home and FH and 8% commute 16-45 miles; only 1% commute over 30 miles. All of these are one-way miles.

Table 7. Commuting practices – FH location and alternative commuting behaviors

FH – Ability to commute in alternative ways				
F (SBI) Location	**Mean**	**SD**	**N**	**Interpretation**
Alternative commuting options	5.08	1.61	63	Enhances

Results indicated that the location of the FH **enhanced** (M = 5.08) employees' ability to commute to class in alternative ways, e.g., walk, bicycle, public transit, van or carpool, etc. Further, of the 63 respondents to this question, 60% said the location **enhanced** their commuting options.

6.0 Conclusions

6.1 Summary

A post-occupancy evaluation was conducted of employees of FH at approximately two years after it was first occupied. About 26% of the employees responded to the survey. The survey included questions related to employees' overall satisfaction with the facility (site, building, and interior) and influence of the facility on their overall work performance and health. Employees were **neither dissatisfied nor satisfied** with the facility (**M = 4.24**); they found the facility **neither hinders nor enhances** their overall work performance (**M = 4.09)** and **neither hinders nor enhances** their overall health (**M = 4.27**). Slightly higher results were reported when employees were asked these same questions about their primary workspaces (private office, shared office, etc.). They reported a low level of **satisfaction** (**M = 4.90**) with their primary workspaces; that their overall work performance was **enhanced** (**M = 4.64**); and their overall health was **enhanced** (**M = 4.53**) by their primary workspace. As the range of scores was from 1-7, scores that showed satisfaction are in a low level range, although still positive.

Most of the survey questions related to employees' satisfaction with the IEQ categories in their primary workspaces. Employees' responses showed they were **satisfied** with the 12 of the IEQ criteria. The mean satisfaction scores ranged from **4.55** (Ability to hear desired sounds) to **5.09** (Overall technology). Again, this shows a positive but moderate level of **satisfaction**. Employees responded **neither dissatisfied nor satisfied** to nine IEQ criteria with mean satisfaction scores ranging from **3.86** (temperature) to **4.50** (Overall appearance). Lastly employees were **dissatisfied** with the Overall acoustic quality **(3.05)**, Overall privacy **(3.02)**, Ability to limit undesired sounds **(2.89)**, and Adjustability of thermal conditions **(2.86)**.

From the employees' responses, an IEQ Score was developed and shows respondents' satisfaction with the IEQ of all category level criteria. For FH, the IEQ Satisfaction Score was **4.01.** This score reflects lack of **dissatisfaction or satisfactio**n with the IEQ category-level criteria, and its low level is cause for concern. Finally, employees reported that FH **enhances** their physical activity, which is one of the sustainable design criteria that influences occupant behavior.

6.2 Recommendations

The satisfaction scores are mixed. There is room for improvement in all criteria. For IEQ categories that have physical measurement possible, e.g., thermal, acoustic, and lighting, it is recommended that these measurements be taken in both overall workspaces and primary, individual workspaces. Recommendations follow:

Acoustic Conditions

- Identify acoustic criteria for overall requirements.
- Determine if any task areas differ now from original intent including collaborative work spaces now being located adjacent to focus work areas (individual workstations).
- Develop any additional special acoustical performance requirements to support functional programming employees' 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. Investigate and choose appropriate acoustics modeling software for the project.
- Measure acoustic performance onsite with full systems running.
- Identify employees' privacy concerns via focus groups or log complaints.
- Consider employees' tasks within shared spaces to determine if change can be made for increased acoustic control.

Privacy Conditions

- Identify employees' privacy concerns via focus groups or log complaints to determine if visual or audio privacy is most affected.
- Determine if any task areas or responsibilities differ from ordinal intent.
- Consider adding noise masking equipment and/or visual screening depending on nature of complaints.
- Compare acoustic privacy problem areas with acoustic measurements to pinpoint specific problem areas.

Thermal Conditions

- Determine special thermal comfort requirements or problems that may be encountered in the building due to work activities or sitting or design considerations. Focus groups can be useful in identifying problem locations.
- Determine if any employees' task areas differ now from original intent to be sure air flow is the same as originally designed.
- Review conditions that affect thermal comfort using ASHRAE Standard 55-2004 or Human Factors Design Handbook.
- Measure performance variables on site.
- Log complaints related to thermal conditions.

Lighting Conditions

- Identify employees' performance criteria that are to be met to achieve goals.
- Determine if any task areas differ now from original intent t to be sure light patterns, quantity, and quality are not impeded by changing walls, ceilings, or fixtures.
- Develop additional quality lighting criteria as needed for special facility issues such as employees' ages, duration of task, influence of daylight quality or quantity.

- Conduct onsite measurements using Illuminating Engineering Society standards for employees' tasks.
- Log complaints related to lighting conditions.
- Identify problem locations that may be affected most by lack of control over daylighting, which can cause glare and eyestrain.

Personal Adjustability

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

It seems obvious that employees' satisfaction can be improved by addressing the categories that had 'dissatisfied' or 'neither dissatisfied nor satisfied' scores. The above recommendations can help address improving satisfaction. However, as the mean satisfaction scores hovered just above 'neutral,' it is reasonable to begin addressing some of these criteria to further improve employees' satisfaction. Exploring these areas in more detail and making adjustments may increase overall satisfaction at the primary workspace. It must be noted that employee expense is second only to the cost of the actual facility in most business operations. It is a good investment to improve employees' satisfaction, which, in turn affects their performance and their health.

This study investigated employees' satisfaction with the facility and primary workspaces. IEQ satisfaction is individual, but the results of the survey show a central tendency of neutral to moderate satisfaction with the facility and most of the IEQ categories. The results can be used as a diagnostic tool to aid in improving IEQ conditions for employees and to set the benchmarks from which improvement can be measured in the future.

Appendix A. Open-Ended Responses

Employees had the opportunity to raise specific concerns on the overall facility and their primary workspaces. Important information can be gleaned from the open-ended responses. FH employees raised specific concerns about the overall facility, acoustics, spatial layout, and thermal conditions at their primary workspaces. Though these qualitative responses overall appear as the employees are dissatisfied; it does not mean they represent the overall sentiment from employees. However, with the large number of qualitative responses, and the relatively moderate satisfaction level of the respondents, these comments bear further attention. Following are qualitative responses to the criteria. Generally, the comments are shown as written.

Overall Facility

- The first floor and ground floor renovations were beautiful. My office was on the first floor in pre-renovation Folwell, and I was very happy to see that it got transformed into a study-meeting space for students. When I pass by it, I always see students using it.
- The ground floor and first floor of the building are beautiful and simply perfect. The classrooms are spacious and bright, with great furnishings. The desks with wheels in classrooms are especially great for teaching. So a big "thank you" to whoever worked on the first two floors!
- The classrooms and student spaces are great; the offices leave a lot to be desired (aren't sound proof, aren't even very secure).
- I like it a lot better now than 10 years ago when I first starting working for the U of M.
- The classrooms are a wonderful improvement. Great to have an extra elevator, and the bathroom upgrades are a welcome change.
- The classrooms are vastly improved. Office areas have many unsatisfactory aspects.
- I depend on the elevators, and they are exceptionally slow.
- I'm also not a fan of how we are so restricted in hanging or displaying things in our offices. There never seem to be enough magnets to go around, and they usually don't hold anything up anyway. I had much higher hopes for the outcome of the costly and time-consuming remodel.
- Overall, I am puzzled how badly thought out the whole renovation was: the culture of complacency is here at its worse, since the building is neither 'student-centric' nor faculty friendly. So I'm really dumbfounded who it was supposed to serve.
- Do all renovations on campus resist the research trends and best practices that higher education has determined recently?
- The library on the first floor is used in the worst possible way. Instructors may lock themselves out of their offices at night if they forget their card.
- No doors, no walls, and cheap furniture. This is not the way an academic building should look like. An interior design that goes against the tradition of solidity of the liberal arts and the humanities.
- The floors with the department offices were not well done. They have a corporate feel that does not go along with the rest of the building. The bathrooms have no heat. Tenured faculty members who are never on campus have windows, while the people who are on campus every day (P&A instructors, staff) have no access to windows at all. This was a big mistake by the interior designers, and very disappointing when you consider all the money that was spent. They should have figured out a way to ensure access to windows for EVERYONE, even if it were via a shared space. Finally, my department has twice or three times the staff of other departments, yet we have the same space allocation. This makes no sense whatsoever. We are packed in like sardines, 3-6 to one office, while other departments have space that isn't even used (open desks and extra offices). This is a very inefficient use of resources and one that could be easily remedied. So, overall, I think that the

redesign was good from the perspective of restoring an iconic campus building for classroom space, and was a good use of taxpayer money. However, the interior designers who made decisions on how the space should be divided received taxpayer money for doing a very, very poor job. If they had done their job well, there's no reason why we should have ended up with things organized like they are on the upper floors.

- Since the remodeling, there have been more break-ins into our space. The design and the construction materials seem to have made it easier to break in. There has been some effort to install hardware to improve the security of some of the doors recently.
- Safety is a big issue. The flimsy construction of doors is egregious. The French and Italian department where I work was twice broken into. It would take one kick to break the plastic sheeting on my office door: I can't keep anything valuable in my office, and in case of emergency I would not feel like it could be a safe shelter. This should be corrected.
- Security system seems to have multiplied break-ins and hindered office access.
- Current security measures may well be necessary, but to those used to former times they represent a continuing irritant, especially the locking of individual building pass-throughs in the tunnel system.
- Provide locks that can't be jammed with toilet paper and cause security issues for the building.
- Get some cats!
- Also, just a note in terms of the functionality of the building, the bathroom doors are nearly *always* broken, usually with the frame leaning to one side or another which makes the doors stick or makes them difficult to close. And the elevators are so slow I nearly always give up and just take the stairs.
- Stuff breaks (i.e., doors).
- Most of the interior doors have been found to be woefully inadequate/flimsy. The design is more for corporate America rather than for an educational institution.

Acoustics

- One other complaint based on my hearing disability: the acoustics of the Rm. 113 conference room are terrible. I really cannot participate in faculty meeting discussions in that room, but we are obliged at times to use that space due to limited space in 3rd floor rooms or competing space requests.
- There are major sound-proofing issues in the new interior. Faculty are having difficulty holding private conversations with people they supervise/mentor due to very thin walls.
- The new design of faculty offices is appalling. It is noisy and impossible to do any work because the doors and walls are paper thin. Interiors were in my opinion badly designed.
- The walls between offices are way too thin and sometimes we can hear each other talking even though our doors are closed.
- Soundproofing is inadequate (because of the decision to use demountable walls)
- Offices are not set up to allow conversations with students that include private student information and concerns.
- The walls are very thin, so we can often hear what is happening in our neighbors' offices. The temperature control also leaves a lot to be desired.
- Too noisy (hollow floor, thin walls, and bad layout).
- There is NO privacy--I can hear very sensitive issues being discussed through the walls and I realize others can also hear what is being discussed in my office.
- Noise travels through the walls.
- Able to hear everyone's conversations in our office corridor
- My office doors and walls are so flimsy that I cannot have private conversations with students about

their work progress or any other issues they bring up.

- The office spaces are terrible. Many are small, and the walls are paper thin, which has created a distractingly noisy work environment. I have several times had to leave the office and finish work at home (luckily I have that option) because the noise level is unacceptable.
- There are very few quiet spaces to meet individually with students, making office hours a chore.
- Noise. The flimsy construction of walls means that there is no privacy across offices.
- The screen walls are not sound proof.

Spatial Layout

- What is most unfortunate is the hierarchical segregation of building users: undergrads on ground and first floor, faculty and staff on 2 and 3, and grad students on 4. This, in addition to the layout of faculty offices, results in considerable isolation, not only from students, but also from one's own colleagues.
- The fact that instructors of different ranks are clustered on different floors hinders collaboration between faculty, P&As and graduate instructors. We have lost a sense of departmental community because of the new interior layout.
- The lack of any space in which to hold lectures by visiting scholars is also terrible. We end up needing to use other buildings when we host a visiting scholar.
- The design of hallways and offices has created an environment where colleagues don't see each other and casual conversation is minimal. It has hurt our sense of community.
- Many aspects of the renovation are wonderful - the smart classrooms and office spaces are great. However, the design of the building --with faculty offices behind a door--does not facilitate communication across departments. Also, having the graduate student office on a different floor from faculty and P&As has not been good.
- Tends to isolate people, don't see people as much as used to.
- The classrooms are quite good but as someone who has an office in the building it is woefully inadequate. We have also been separated from our professional staff, which has had a dramatic impact on the quality of our teaching.
- I really dislike the layout of the faculty office spaces, and the numbering system is not helpful. Students and visitors often get lost trying to find my office.
- I have no idea how disabled students are supposed to access faculty offices, since the office blocks are separated from the elevator by non-handicapped-accessible doors.
- The office floor levels have also lost their previous charm, having become rather cookie-cutter.
- The renovation made the building very uncommunicative. The way the office spaces are laid out, I can go weeks without seeing some of my colleagues.
- Putting all graduate students in one office was a bad idea, it is really noisy and no one can work properly there. The use of cubicles instead of open desks really hindered the sense of community that existed before the remodeling.
- Interior layouts hinders collaboration for teaching, research and administration.
- Layout. The floor plan would be fine for a law firm, but it isolates colleagues and graduate students, and it is unwelcoming to undergraduate students who shy away from the 'maze' of offices.
- I am a graduate student and have my desk in the graduate student office. The open office plan itself is extremely distracting, as there is no barrier between myself and other students, and I usually have to go elsewhere if I want to be able to complete my work.

Thermal

- I find it unbelievable that the heating issues have persisted. The building used to be too hot. It is

now too cold.
- My office is always too cold. It was checked several times but nothing has changed. As a person with arthritis I can say I often feel uncomfortable in the cold.
- Rooms are too cold in the winter. The air conditioner makes the rooms too cold in the summer, too.
- Heating is uneven.
- The offices are frigid, and so is the kitchen/break room on the third floor.
- It is sometimes cold in my office due to air vents.
- Heat and A/C never seem to work properly. There is too much dust and it's way too dry in this building.
- We had extensive and continuous issues related to inappropriate temperatures and those temperatures truly affected job performance, because the extreme temperatures were distracting to getting our work done.
- One of the issues to fix in Folwell was heating. But after the renovations, it has the worst heating controls. It has been largely cold through most of this building.
- HVAC system is poorly regulated, resulting in bad air circulation and very cold offices.
- The air conditioning is badly conceived. One of my colleague had to have a heater in her office for months. It is noisy and uneven.

Furnishings
- The furniture, overall atmosphere throughout the building is designed to appeal to undergraduates. The offices could have been spared that aesthetic.
- There are not enough book shelves in my office and little substantial wall space to handle temporary shelves.
- My desk is lower than my desk at home. It affects my posture terribly. I also have too much desk space. I'd love to get rid of some of that to have space for a small sofa or armchair. It would be nice to be able to sit more comfortably while reading.
- Seating. There needs to be seats for students on all floors not just the basement. This is a huge problem. We're trying to attract students to our departments, but again the lack of seating makes it most unwelcoming, and all the departments of Folwell suffer from this. Narrow benches, preferably padded, would add a warm feel that I'm sure would greatly enhance the overall experience of students in Folwell Hall.

View
- Yes I am within 15 feet of a window but I can't see the window as it is in someone else's office!
- I hope something is done to address a) the issue of access to windows and b) more equitable allocation of space for instructor offices between departments.
- Even though my workspace is located with 15 of a primary window, very little natural light gets into my workspace. This is a huge disappointment for me regarding the renovation of F. Hall. In my old office, I shared with 10 other people but was surrounded by windows. Now, I share with 2 other people and no windows...unless you count the sliver of window I can see IF the person across the hall has his door open. I work on the 2nd floor on the south side; there is plenty of space to work out a way for everyone, not just tenured faculty (who I can't help but notice are almost never in their offices).
- It's unfortunate that many of the colleagues who spend the most time in Folwell (P&As, etc.) have the least access to exterior windows.
- Offices without windows are unacceptable.

Daylighting

- Natural light shouldn't be an option in a work environment.
- I don't like the third floor interior offices, which have no natural light.
- More plants and natural light for the north-oriented graduate offices on the last floor.
- Students cannot see the screen because the shades do NOT keep out light.
- The classrooms do not have black out screens

Lighting

- Too much overhead light (including that which comes through the transoms).
- The automatic lights are impossible to turn on or off manually, so if I am in the office alone on evenings or on weekends, I can't turn off the lights in the office and use my own lamp at my desk to improve focus and minimize distractions.

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).