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Post Occupancy Evaluation of an Academic Building: Lessons to Learn

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Abstract: Post occupancy evaluation (POE) is a tool used to determine the users' satisfaction of a building after its completion. Most educational facilities do not conduct a post occupancy evaluation due to the absence of it in the contract agreement between the institution and architect. The client often chooses to bypass the POE to reduce the cost of the project. The purpose of this research is to conduct a POE of an academic building and identify areas of user dissatisfaction in order to enhance future projects. An academic building on a major, Midwestern university campus was remodeled during the academic year of 2014-15 followed by a POE with end users (students, faculty, and staff). The building houses the Dean's office and two departments with a total of approximately 1400 Students and 65 Full-time faculty and staff. Personal interviews were conducted with the staff of the architectural firm responsible for the project (architect, Interior designer, and construction manager), and the university facility planning director and architect. Interviews and walk-throughs were also conducted with program directors and chairpersons. A questionnaire in three different formats to accommodate different majors was distributed to 750 students and 45 faculty and staff. Specialized areas included a student operated restaurant and kitchen, as well as interior design studios and apparel design labs. Overall, users were satisfied with the remodeled building with the exception of a few minor issues such as navigation through the building and temperature.

Keywords: *POE, building evaluation, assessment, educational institution*

1: Introduction

A post occupancy evaluation (POE) involves methodic evaluation of buildings in use, from the perspective of the users of the space (Mallory-Hill, Preiser, & Watson, 2012). POE is important in today's world where consumer needs are essential and often the focus is on the final product design (Preiser, 2001). In addition there is a documented gap between the planned and actual performance of a building (Menezes, Cripps, Bouchlaghem, & Buswell, 2012). Often decisions are made in the renovation process that may follow arbitrary mandates rules and regulatory practices but overlook informed evidence. This may lead to disenfranchised stakeholders.

Architects frequently fail to learn straightforward lessons from completed projects and end up repeating mistakes that could easily be avoided (Bordass, 2005). A well designed POE can engage the multiple perspectives to ultimately

enhance the building functionality. For this study, a POE was conducted on an academic building located on a major, mid-western university campus. The specific objectives of the study were

1. To highlight the benefits of POE data in the process of assessing an educational facility, and
2. To examine the benefits and drawbacks of POEs for educational buildings.

The building being studied houses two departments of Family and Consumer Sciences (FCS), Industry and Technology (IT), and the college Dean's Office (see Figure 1). The remodeling was done in two parts. The IT remained in half of the building, while the FCS was temporarily housed elsewhere on campus. The Department of FCS consists of eleven undergraduate and seven graduate programs. The IT department has five undergraduate programs and an online master's degree program. The building has many features that encourage students to engage in unique hands-on experiences, such as sewing labs, illustration studios.



Figure 1: Subject Building

Within the building that was studied we focused on the Family and Consumer Sciences Department with specific attention to specialized areas of Interior Design, Fashion Design/Merchandising, and Hospitality/Food Management. Fashion Design and Merchandising facilities has two design labs, a textiles lab, and a computer lab. Interior design areas include three studio rooms, the University Design Center, and a product resource room. The resource room gives students access to literature and products that they need for the process of designing a project. The building is unique in that it has a restaurant that is run and managed by students majoring in Hospitality and Food Management. This provides students the opportunity to work in a restaurant setting as part of their job training. The newly renovated building also has two teaching residential kitchens with eight stations each.

A major architectural office with multiple locations in the country was hired to design the project. This project was the first major remodel of the building since the building was constructed in 1950. No changes were made to the exterior of the building. After the renovation a POE was conducted to assess the level of satisfaction of users of the building.

The POE included an online questionnaire was developed using online software (Qualtrics) and was disseminated to faculty, staff, and students in FCS via e-mail after they had used the remodeled building for four months. The questionnaire had items pertaining to general building areas, such as the restrooms and the break room as well as specialized areas. Participants were directed to questions that specifically pertained to their specialized areas. Other modes of data collection included walking through the specialized spaces with the program directors and personal interviews with program directors, the architect, interior designers and staff of the University Facility Planning.

2: Background & Literature Review

POE is a tool used to determine users' satisfaction of a building after its completion. Riley, Kokkarinen, & Pitt (2010) stated a POE is a "systematic process guided by research covering human needs, building performances and facilities management (FM)." (p.5). The objective of a post occupancy evaluation is to identify any differences between the original design intent and the actual facility delivered, allowing for changes to be made to reduce this difference (Pati & Pati 2013). POEs were created in response to problems associated with buildings in the care industry (Riley et al. 2010). POEs evolved from case-studies to stand alone building projects to structured systems.

Following World War II, POEs were prominent in the housing industry because housing developments were built quickly and did not put much thought into the needs of the users (Riley et al. 2010). In the 1960's the Royal Institute of British Architects (RIBA) acknowledged the lack of exploration of the successes and failures of projects by adding a POE process to their handbook (Riley et al. 2010). The POE processes ranged from technical evaluation to organizational evaluation of an already built structure (Pati & Pati 2013). Shortly following the addition in the RIBA handbook, this section was removed because clients were not ready to pay extra for the POE process (Riley et al. 2010). When it was discovered that architects were no longer going to pursue the POE, academics in the field of environmental psychology jumped at the chance to widen scientific knowledge of the subject. In 2006, the POE was re-added to the RIBA plan but it is still rare that architects become involved in the process (Riley et al. 2010).

2.1: Benefits and Barriers of POE

Post occupancy evaluations are a systematic way to determine the user's satisfaction of a building after they have used it for some time (Cleveland & Fisher, 2014). Most often POEs are conducted on hospitals or educational buildings (Shepley et al., 2009). According to Zimmerman & Martin, the criteria for judgment on most of these projects are functional fulfillment and user's needs being met (2001). POEs can bring forward both positive and negative aspects of the finished project (Zengel & Kaya, 2011), and lessons can be learned to further improve the building or to improve the next project (Zimmerman & Martin, 2001).

POEs can be broken down into three different time horizons: 3 to 6 months after occupying (operational review); 12 to 18 months (performance review); and 3 to 5 years (strategic review). An operational review is done soon after delivery of the completed project is an appropriate time to evaluate the process of delivering the project because events are fresh in people's minds (Barlex, 2006). However, it may be important to leave some time before it is carried out to let the 'dust' settle, particularly where relationships on the project were strained.

Using interviews and walking through the building with users is referred to as a diagnostic evaluation. These evaluations typically expose strengths and weaknesses related to the performance of the building (Zengel & Kaya, 2011). Conducting POEs brings forth many benefits. While very few designers are paid to go back and review the outcomes of their finished products, even though many benefits can come from conducting POEs and POEs can help designers and architects in their future projects. POEs evaluate if the design is appropriately functioning for its intended purposes.

Conducting a POE allows for areas of dissatisfaction to be realized and gives an opportunity for the designers and architects to design solutions to problems that arise. These shortcomings and areas of dissatisfaction can be used to

the designer or architect's advantage when designing their next project. POEs provide the potential to reduce costs to the client and discover where money was spent and did not produce a return (Zimmerman & Martin 2001). Riley et al. (2010) report similar benefits to a POE reporting that they allow for learning how the space could be used better and could enhance future projects that are similar. Overall, conducting a POE can benefit both the client and the designer or architect and can put them ahead of other firms that do not conduct POEs (Zimmerman & Martin 2001).

If there are so many mutual benefits for the client and designer/architect then why are more firms not conducting POEs? Zimmerman & Martin (2001) discuss barriers to the use of POEs. The first barrier discussed is the absence of compensation for conducting a POE. Very few designers are ever paid to go back and review the outcomes of their finished product and therefore, they simply choose not to do it (Zimmerman & Martin 2001). Data collection is expensive and often POEs are limited by resources available (Pati & Pati 2013).

A second barrier to conducting POEs is the number of people involved in any given project. There are different specialists, each with their own incentives and goals. Thus, conducting a POE that includes all specialists is difficult and is not often a high priority. Most stakeholders are more interested in outcomes than the physical look of the building (Pati & Pati 2013). Facilities managers are more interested in the technical performance of the building and not as interested in the outcomes leading to an imbalance in priorities (Pati & Pati 2013).

On top of the difficulty of including all key players in the POE, most commercial building owners do not want to conduct POEs for fear of revealing shortcomings and risking tenants moving out of their buildings (Zimmerman & Martin 2001). Riley et al. echoed Zimmerman & Martin in barriers to POEs. Riley et al. listed cost, defending personal integrity, time, skills, and the fear of unearthing results that could deem the building ineffective as barriers to conducting POEs (2010). Determining who should take ownership of the POE process has been diverted from industry professionals who are not required to complete them and clients do not want to take them because findings could reduce the value of their asset (Riley et al. 2010). Barriers to POEs must be overcome before POEs can be used widely (Riley et al. 2010).

In their article, Shepley et al. (2009) discussed some of the limitations and challenges they ran into when conducting a POE. Future researchers using a POE should find out why the design team chose their specific design intentions. This can help to evaluate if the proximal design intentions were met as well as the owner's primary concerns (Shepley et al. 2009). It is also important to evaluate questions for being too vague. Definitions of words or terms that could be taken differently by different people may be beneficial to reduce bias and make sure all answers are about the same (Shepley et al. 2009).

Designers have not really benefited from POEs because most do not capture data in a meaningful way (Pati & Pati 2013). Most POEs have not been conducted by design firms and, therefore, do not collect data on useful topics for designers, such as physical and functional areas of projects. In POEs data collection is a one-time opportunity and the most one can expect to derive from the data are relationships, not cause and effect data (Pati & Pati 2013). A well designed POE can reap a lot of benefits for all stakeholders involved in the project, but a poorly designed POE does not bring much benefit.

2.2: Suggested Methods for the Post Occupancy Evaluation Process

Conducting a post occupancy evaluation (POE) brings value to many perspectives by evaluating social, political, organizational, and economic forces (Riley et al. 2010). Multiple methods are common in POE including walk through, face-to-face, interviews and questionnaires (Brown, Cole, Robinson, & Dowlatabad, 2010; Gocer, Hua, & Gocer, 2015). Several studies have been conducted with the intention of designing a process for POEs. Some of these studies include PROBE, the building use studies (BUS) occupant survey, and the construction industry council design quality indicators (CIC DQIs). The PROBE study makes use of surveys, interviews, and walk through observations to

obtain quantitative and qualitative data (Riley et al. 2010). The BUS occupant survey has been used for 20 years and makes use of questionnaire surveys and a benchmarking method (Riley et al. 2010). The CIC DQI is a questionnaire designed for use in POE and is made for a wide range of people. This process is relevant to the education sector and measures functionality, build quality, and impact of the building that is being evaluated (Riley et al. 2010). Several other studies have discussed processes for POEs on a case-study basis.

Shepley, Zimmerman, Bogges, & Lee (2009) conducted a post occupancy evaluation of an architectural firm in Boston. They discuss a procedure that may be useful in POE of other buildings. To begin the process, interviews of the design team were conducted to find out about the design process as well as the pros and cons of the completed building. These interviews were used to determine the aims of the designers. Based on the results of the interviews a six page questionnaire was designed to determine effectiveness of designer aims and overall satisfaction of the staff. Likert-type questions, open-ended questions, and questions that required marking a graphic were included (Shepley et al. 2009). Research has shown that response to a new building is generally more positive in the beginning than after a period of time. The research was conducted about one year after completion of the project to wait for the “honeymoon effect” to wear off (Shepley et al. 2009). After a pilot test, the questionnaire was sent to all employees. Elijah-Barnwell also discusses the importance of conducting a POE and gives an easy to follow process (2014).

The process outlined by Elijah-Barnwell includes phases of planning, conducting the study, analyzing results, and reporting and recommending (2014). The planning phase includes designing a questionnaire that collects data on design process, building performance, and client data. After this step is completed the study can be conducted by using focus groups, surveys/questionnaires, collection of building performance data, and, in this case, satisfaction of hospital patients and their outcomes. The next step is analyzing this data to see how it compares to original project goals and performance criteria of the firm or organization. Finally, results should be reported and recommendations made for how to improve certain aspects of the building (Elijah-Barnwell 2014).

According to Federal Facilities Council (2003), for a successful POE, the organizations need to:

- Take the initiative to collect the information that make sense
- Have support from upper administration
- Identify critical points in the process where feedback is needed
- Create an electronic date ret retrieve system to enhance interpretation
- Create a clear goal statement
- To identify the end users and how to communicate the results
- To mix research methods (e. g., qualitative, quantitative, etc.)

3: Methodology

After completion of the remodeling of the part of the building that houses FCS, authors developed a systematic, step by step approach for conducting a POE (see Figures 2).The main goal of this project was to determine if the users of the building were satisfied with remodeling and if it met their needs. To begin, the interviews/walkthroughs were conducted with each department chair and program director that used specialized spaces within the building (N=7). These interviews were conducted four months after occupancy of the completed building space. During the interviews researchers took the time to walk through each of the specialized spaces with the program director or faculty. Participants were asked to discuss functionality and potential issues of each space visited. Researchers also wanted to know if faculty felt their needs were considered and met in the project outcome. Visiting the space evoked the

memories of using each space and prompted discussion. A graduate research assistant accompanied the interviewer and interviewee and took notes.

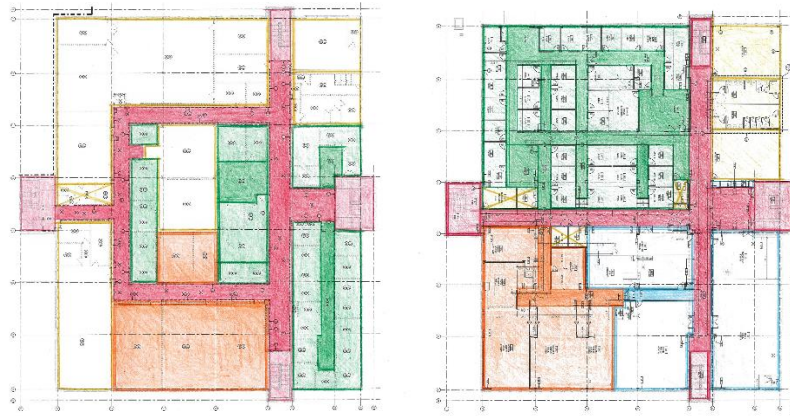


Figure 2. Floor plan of the space assessed, before (left) and after (right) the renovation.

Next, an interview with the University's Facilities Planning Director and a university architect was conducted at their office. A graduate assistant took the notes and also recorded the conversation. The purpose of this interview was to determine what goals the university had for the re-design project and if they felt the project had met those goals. Questions asked included "who is your client?", "How does information get disseminated during the remodel process?", "Who do you check back with once schematic designs are created?", and "Does facilities management have an evaluation process after a job is completed?"

Finally, an interview with the design team from the architectural firm hired by the university was conducted. This interview was held in their office to determine what the main intentions of the designers were. This interview was also used to find out what the design team understood as the university's goals and needs. The design team was also asked about their opinion of the success of the project. All interviews were summarized and typed so information could be used for further research.

Using the information collected during the interviews, a fifteen minute questionnaire was developed for all faculty, staff, and students in Family and Consumer Sciences to complete. An online software program (Qualtrics) was used to create this online questionnaire. The questionnaire was broken into sections that pertained to faculty/staff, graduate assistants, or students. Many of the questions were adopted from Energy Systems Research Unit (University of Strathclyde Engineering, 2010). This survey was part of their commitment in the development of sustainable building design within context of their university policy. This survey was chosen primarily due to its relevance to educational settings and its wide scope assessing variety of issues in an educational building.

Each group had a set of questions that pertained specifically to their majors and were asked questions pertaining to their specialized areas. Interior Design students were asked questions about the design studios, resource room, and University Design Center. Fashion Merchandising and Apparel Design majors were asked questions regarding the textiles lab, sewing labs, computer lab. The Hospitality Management and Nutrition and Dietetics students were asked questions pertaining to the domestic kitchen labs and restaurant kitchen space. The survey included demographic section, time spent in the building, satisfaction with the building layout and areas (e. g., bathrooms, corridors,

classrooms). Other questions were satisfactions with lighting, storage space, interior finishing, color, indoor air quality and perceived sustainability.

Faculty and Staff also had questions that pertained to the spaces they utilized. Questions asked to faculty and staff related to the same specialized spaces that students were asked about. Other faculty and staff questions that were created included the functionality of individual office spaces, storage, and appropriateness of signage throughout the building.

Graduate assistants were asked specific questions about their work area. All participants in the survey were asked about the aspects of the overall building such as noise level, feelings of safety, restroom functionality, and overall satisfaction with the remodel project.

4: Results

Given the multiplicity of the results (interview with stakeholders, walk through the space, and survey) and its nature (qualitative and quantitative methods) the results are summarized into three categories of facility planning and architectural firm staff; faculty; and students. Staff of the University Facility Planning/Management Department and the architectural firm only participated in interviews. The faculty participated in the quantitative survey. Five faculty were interviewed, while walking through the space. Students participated only in the quantitative survey. There were a total of 91 responses collected. Figure 3 illustrates the make-up of respondents.

Faculty and students were asked about the number of hours they spend in the building during the day. Faculty and staff spend the most time in the building with a median number of 6.0 hours per day. Interior design students and graduate assistants each spend 5.0 hours per day. All other respondents spend less time in the building.

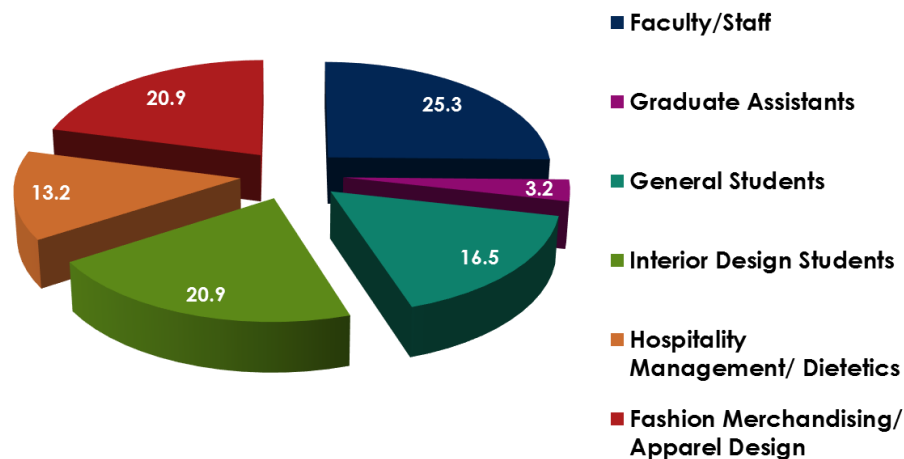


Figure 3: Percentage of the Respondents.

4.1: Building Satisfaction

Satisfaction ratings of the building were fairly consistent throughout. The level of cleanliness of the building received the highest rating while interior temperature received the lowest (30.8% rated it as very unsatisfactory or unsatisfactory). Figure 4 represents the mean satisfaction rating of each aspect of the building or statement about the

building. Respondents (62.8%) indicated that their opinions/needs were not sought prior to the remodeling of the building. Of those respondents whose needs were sought, only 33.3% were incorporated into the final building design.

Twenty-four percent of respondents agreed or strongly agreed with the statement “I am spending more time in the building now than before it was remodeled”. The majority of the respondents (71.9%) agreed or strongly agreed with the statement, “Overall, I am pleased with the redesigned building”. Figure 5 represents mean overall satisfaction with the building.

4.2: Interview with Facilities Planning and Management and Architectural Firm Staff

The researchers spent an hour interviewing the director of the university Facility Planning and Management (FPM) and university architect and an hour and half conversation with three staff of the architectural firm (architect, construction administration and interior designer). The intention of these interviews were to understand how the process worked, if the original goals were met, if anything went wrong and if so, why. These interviews were further helped us in developing our survey questions from the faculty and students.

Facilities Planning and Management's mission is to provide timely, cost-effective quality facilities-related support to the university community. It assists the university in developing construction/ renovation program requirements with in-house and outside consulting staff, develop building programs responsive to the present and future needs of the university, and ascertain that construction/ renovation contract specifications are adhered to and that projects are completed on schedule and within budget.

FPM staff felt the level of importance of users in the project were first administration followed by program directors and faculty and lastly students’ concerns. We asked them about the intention, goals, and expectations from the project. They felt the goals for the remodel were to be able to academically provide

facilities and equipment that are useful and can be used now and in the future; a design that is functional, economic, aesthetic, and accommodates the teaching mission of the university. Budget is always an important part of the process and it was stressed a few times.

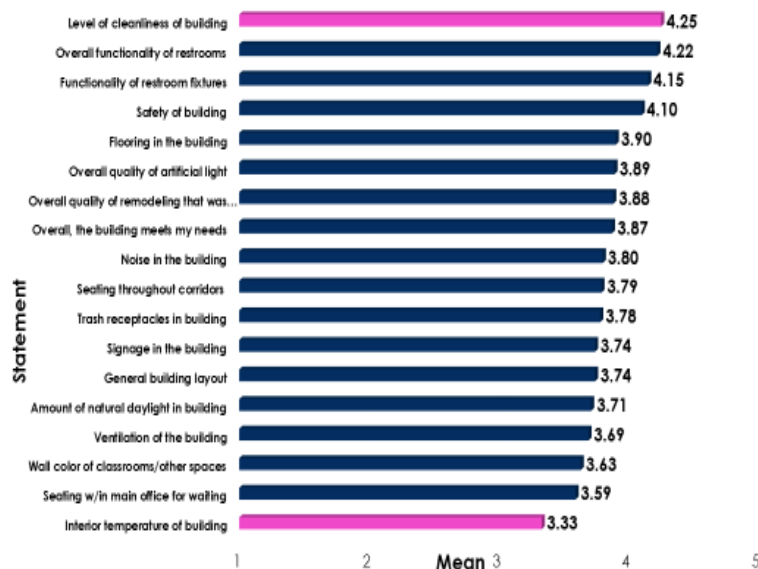


Figure 4: Mean Satisfaction Rating

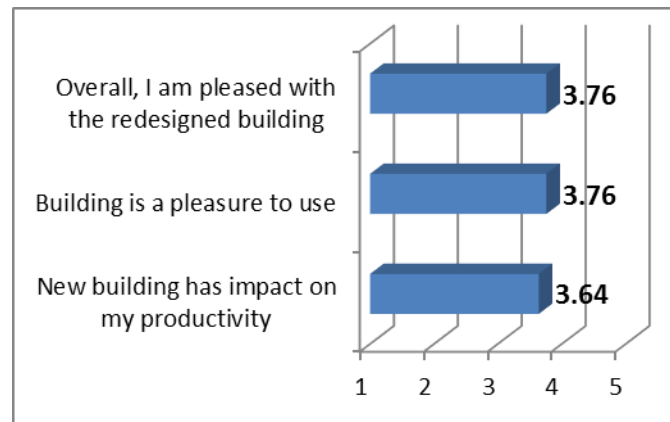


Figure 5: Mean Agreement with the Statement

When FPM staff asked who they perceived as the clients, they felt that their primary clients were administration, faculty, and students (in that order). This order may change, depending on the building type. The example is a recreation center will take student needs into account more than in an academic building. We asked them how information gets disseminated during the remodeling process. The response was, FPM usually creates an overall plan which outlines the goals and identifies needs. For new buildings and major renovations (such as this) they hire an outside company. They will do a program evaluation once the outside companies are hired to determine if interpretation of the needs is correct. This allows users of the building to clarify anything that has been misinterpreted during the creation of the program, before construction starts. This also allows the outside firm to hear from people who actually use the building. Once the schematic design is created, administration, chairs, program directors and occasionally the appropriate faculty are invited to review the plans. Participants sometimes have difficulty understanding what plans are, since they are in 2-D form.

Once the design firm is hired, an architect becomes the lead on the project. Facility management's role is to guide the project during the rest of the project. They manage the budget and makes sure no one depart from the main path. The department chairs play an important role in the planning process. "Every program had a want/need for more space. Faculty and students do not always understand what is feasible and what is not so they must rely on the experts to tell them." Said director of FPM.

We asked if FPM has an evaluation process after a job is completed. They said they do not have a formal evaluation process in place once the construction is completed and building is being used. According to FPM staff, there were two main constraints in the renovation process; keeping within the budget and designing within the existing building. "Projects/remodels are always more difficult when you are working with an existing building." He said. They felt that as they move from schematic to implementation, they begin to learn more from the client but things morph and change but communication is sometimes lost.

In our conversation with the architectural firm staff, they felt the true clients are the students and faculty but all directions came from FPM office and thus their contacts with the end users were somehow limited. The architectural firm set five goals for the project:

- Way-finding: Make it easier to locate certain spaces within the building.
- Connecting the north and south halves of the building.
- Create more flexible classroom space?

- Create a larger lecture hall, as well as several classrooms for lectures to be used by other departments, if needed.
- Create public space, areas for students to meet and mingle.

The staff of the architectural firm reminded us a few times throughout the meeting that the building is not yet finished (although it's been occupied for over four months). That the public areas are not furnished yet and they seem like a waste of space. They also reminded us that all final decisions were made by the director of FPM.

When asked who they perceived was their client, they responded that this was the most difficult part of the project because the true client of the building was the students and faculty but the directions and decisions came from the FPM office. To work with the situation our office met with each individual program director and FCS chairperson to get an idea of what the needs of the students and other faculty members were. In the end they said they had to do what the FPM wanted done and these requests were sometimes different than those of the students and faculty. The project designer said "We tried very hard to determine the priority of needs of the users by working with the FPM director."

The interior designer thought the display spaces/cases were fun to implement because it would allow people using the building to share what they are working on and to see what other departments were working on as well. She said: "We believe the open corridor is helpful because it adds a focal point to the building.

"The fun part was figuring out how to work around the challenges presented by such an old building. Structural flaws and surprises were found throughout the whole project and creative ways had to be implemented to work around many of them. For example, the concrete slabs built into the structure for the pre-existing lockers' bases, were too expensive to remove so we decided to hide them within the structure."

We asked them if you could do this project all over again what they would change. The architect responded that there was a lack of transparency between the FPM staff and department heads, and the faculty. Decisions were often made and then not relayed to the faculty because we were told "they would be handled internally." He added that it (lack of transparency) made it difficult because often it caused miscommunication amongst everyone. They wished that the process could include everyone but that is often too many people to please and therefore important users are left out. He further suggested that developing a specific chain of command could have better served the whole population.

Wayfinding can be defined as spatial problem solving. It is knowing where you are in a building or an environment, knowing where your desired location is, and knowing how to get there from your present location. The authors felt wayfinding

may be an issue in the renovated building thus we asked them what attempts were done to increase a sense of orientation throughout the building. They responded signage is not part of architectural firm's job.

"We selected certain colors to be applied to a small area to help with navigation. The idea was that the color for each department would help people find their way (e. g., blue for fashion, orange for interior design etc.) The more neutral color was chosen for the walls to match the green flooring downstairs that had to remain to save money."

They further explained:

"The project was a renovation of an existing space. There were portions of the building that were constructed before world war 2 and portions built after. Creating a cohesive space was a large challenge. There were needs of a lot of people that needed to be met, but it is difficult because the space was pre-existing and everyone wanted more space. We had to eliminate public spaces as the needs of department grew."

4.3: Faculty and Staff

The authors used SPSS Statistics for Macintosh, Version 22.0 statistical software to calculate the descriptive statistics in frequencies and percents. Responses to open ended questions were analyzed for common themes. The data revealed insights about privacy, wayfinding, building temperature and functionality of the building.

With regard to privacy, 53.8% of respondents said that the provision for privacy when needed was satisfactory or very satisfactory. Of the 23 faculty/staff respondents 12 (52.2%) indicated that they covered their windows in their office doors. Faculty discussed issues with privacy as a result of the window on the office doors. A faculty commented “I generally like having a window [on my office door] of some sort, but the current set up prevents full privacy.” Another faculty felt when she was in her office it was an experience similar to being an animal at a zoo.

“During the summer when we moved in and there was rarely anyone in the building, I didn't even notice it. Then, all of the sudden, people started coming by and starring in the window as if I was an animal in the zoo. Every time I saw a shadow or movement of someone staring at me, I was distracted from my work. It took me about one day of that before I went to the store in search of something to cover that window up.”

Wayfinding or knowing where you are going in a building is defined as spatial problem solving knowing how to get there from your present location. 43.4% (N=10) of faculty/staff respondents stated that it is very difficult for visitors to find their offices in the building. A participants who advises students said: “I advise almost 200 students/semester and they have a difficult time finding my office. Also, students have to wander through faculty space to the back of FCS to find me. Advising should be easy to get to and find.”

In addition, 30.4 percent (N=7) felt the signage in the building was inappropriate. A participant discussed the confusing office signage: “The individual offices and spaces are appropriately labeled but there is no map to get to different spaces. For example, offices 225 to 250 are located down this hallway. I struggle to find my coworkers.”

Overall, participants were satisfied with the temperature of the building with 78.2% (N=18) of respondents said that they were satisfied or very satisfactory with the temperature of the building. Of the 23 faculty/staff respondents 15 (65.2%) indicated that they were very satisfied or satisfied with the ventilation system. Issues identified including lighting and noise. A participants said: “When I am in my office, I am freezing, the lighting is horrible, and I can hear everything from everyone else's office.” Another faculty was critical of the motion sensor control system of the lights. She stated: “The lighting is fine, but it is very annoying to have them turn off while you are using the room (also classrooms).”

Participants were satisfied with the functionality of the building (see Figure 4). The open ended question revealed issues with function of recycling centers: “Also, which hole is the trash and which is the recycling? I understand going green and not putting trash cans in every classroom, but at least make it clear which trash receptacle is which.”

In addition a faculty said there was not enough storage for students:

“Not enough lockers for students to store items during class. There are only 40 lockers and typically there are at least 72 students who need to use one. Cubbies within the classroom itself are too small to fit backpacks. Backpacks on the floor cause a safety issue because students are working with hot foods and could trip on them.”

Another participant noted that the design did not comply with building codes. She stated: “There was not an ADA [Americans with Disability Act] kitchen implemented in the domestic teaching kitchens. There is a sink that is handicap accessible but there is not a heat source that meets the ADA requirements.”

Other faculty noticed the materials used were not appropriate. A participants discussed the problem with vinyl floor. She said: “In one of the fashion labs, subflooring was not placed under the vinyl flooring. Holes were punched in the floor by high heeled shoes. This is not correct and could be dangerous.” Another faculty discussed the wall that was too bulky and inflexible:

“A large bulky wall separates the two studios. A folding wall was requested for the Interior Design studio so that it could be open and encourage interaction among older and younger students, but it could also be closed if lectures were going on. As it is now, the noise can travel between the two rooms sometimes making it difficult to hear the lectures.”

Only one participant thought the renovated design inhibited teaching. She said: “The demonstration areas in the domestic kitchens do not have any way to show students what is happening during the demonstration. There is not a screen to project onto, or a mirror to show the students. For this reason, some faculty members have decided not to do any demonstrations in class.”

In support of the responses from the architects, faculty also noted a lack of communication between users of the building and others involved during planning process. The following are examples of statements made by faculty that support this finding.

“I had no say on color choice or office space.”

“The open concept kitchen in the student-run restaurant was not wanted by the Hospitality and Food Management Chairperson or the faculty members who would teach there. It was still designed and implemented that way.”

“Most decisions for the kitchen(s) layout were made by the administration who did not have an understanding of the functionality of the space. Many mistakes were made that we now have to live with.”

“My opinions were completely ignored.”

4.4: Students

Of the 17 interior design students that responded, 23.5% felt that the University Design Center was poorly remodeled and 23.5% felt that the quality was “good”. The Design Studios were given ratings of “very poor” or “poor” by 38.9% of student respondents. The seating in the Design Studios presents a problem as 55.5% of respondents felt it was “very unsatisfactory” or “unsatisfactory” compared to 33.3% who found it “satisfactory” and 0.0% who found it “very satisfactory”.

Of the 10 student respondents in the Hospitality and Dietetics areas 70.0% felt the quality of the teaching kitchen labs was “good” or “very good”. The restaurant kitchen was also rated as “good” or “very good” by the majority of respondents (57.6%).

Of the 19 fashion merchandising and apparel design students respondents 31.6% of them felt that the computer lab space was “good” or “very good”.

The students had issues with room temperature and air flow in the building. One student felt that it was cold in the studio: “The interior design studio is often very cold when it’s cold outside.” A second student felt it was cold in stairwell: “The room by the side stairs on the second floor is very cold. You can feel the cold air coming in from the window.”

Students who provided feedback during renovation noticed the lack of communication between the users and decision makers: “I participated in a charrette at [the architectural firm] with several upper classmen at the time and there were different ideas and talk about our needs as students and it doesn’t seem any of it was taken into account.”

5: Discussion and Conclusion

The first objective of the study was to highlight the benefits of POE data in the process of assessing an educational facility. More commonly, POEs were conducted by academic researchers with backgrounds in environmental psychology who were interested in the interaction of people and their environment and wished to “‘make building design more rigorous and systematic’ (Cooper 2001, p. 159). Information from POEs can also support the goal of continuous improvement by supporting decisions made during the programming and design stages of building projects. The feedback from this POE could add value to the next building project by reducing the need to make decisions based on assumptions about how organizations are likely to function and how people are likely to use the space. For example future designs could incorporate strategies for better communication among all stake holders. In this case Office of Facility Planning can hold numerous meetings and focus groups with students, faculty, administrators, and architects.

There are valuable lessons to be learned from occupants about space after it has been used which can be utilized to improve existing spaces and inform the programming of future buildings. Without a feedback loop, every building is, to some extent, a prototype spaces and systems put together in new ways, with potentially unpredictable outcomes. For example the architects in this study had a primary goal of making navigation easier through the space. However, after a few months of using the space faculty noted it was difficult to move about and find destinations. Discovering these discrepancies between what was originally intended and the actual final outcome can be used in future planning. In this case other methods of way finding such as symbols, use of color or landmarks.

Interest in Post Occupancy Evaluation (POE) is growing due to the various definitions of this scope of work, and the tools and knowledge required to provide these services. Many are not sure where to find more information, how to evaluate if this service should be provided in their own practice, and how to get started. Therefore the second objective of the study was to examine the benefits and drawbacks of POEs for educational buildings.

Several challenges have been noted in previous literature as to why the architects do not conduct POEs more frequently (Julie Hiromoto 2015). The most common reason was given was the design team time and cost required to produce meaningful results. Other concerns were designer and client liability concerns, client privacy concerns, and lack of client demand or interest. This study confirmed these costs exist in the design process for educational buildings. The architect in this study noted these costs prevented them from conducting POEs.

In his thought provoking 1995 book, *How Buildings Learn*, Stewart Brand illustrates how buildings are constantly evolving within their context. Buildings undergo continuous adjustment and maintenance. The same is true for educational facilities. There is a lot we can learn from them. There is an increasing interest in the use evidence based design (EBD) in making design decisions. Without post occupancy evaluations, there is no “evidence” for evidence based design.

The architectural firm staff responsible for this project felt this project was challenging because of lack of space and lack of money. Creating a cohesive space was a significant challenge. There were a lot of people with needs to meet, but it was difficult because the space was pre-existing and everyone wanted more space. The university is a public

university so once the budget was set there was not a way to increase the budget. According to Facility Planning/Management each program in FCS had a want/need for more space. Faculty and students do not always understand what is feasible and what is not so they must rely on the experts to tell them.

The architectural firm reported that decisions were often made and then the firm did not relay it to the faculty because the University representatives said it would be handled internally. This is an area where the chain of communication was broken. Somewhere along the lines changes were made and were not communicated to the users of the building causing them to feel as if their voice had not been heard.

The need for learning environment evaluation stems from a desire to collect evidence that can inform future decisions. Information gained through building evaluation could be used to inform decisions about both the design and the use of learning environments. For example, the evaluation of new building typologies could inform architects about the effectiveness of new design patterns, while simultaneously informing teachers and students about how they might best utilize new environments to support their pedagogical objectives.

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