Can a Library Building’s Design Cue New Behaviors? A Case Study

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abstract: This study explores the relationship between architecture and interior space on student engagement at a newly constructed academic library. Using an action, mixed-methods approach with a convenience sample, researchers evaluated 744 photographs, 125 behavioral observations, and six group interviews. Analysis revealed four key attributes of engaging library design: engagement culture, core connectedness, environmental messages, thus affirming that spatial designs can influence behaviors.

Introduction

This paper reports the final results of a study measuring the impact of architectural design and interior space on student engagement in a new academic library. Academic libraries have historically functioned as places to retrieve warehoused materials, with expert staff ready to assist in the complex of finding these materials. These more traditional purposes led to designs intended primarily to support a single individual’s scholarly quest in quiet areas. However, contemporary curricular needs require more than individual quiet study; faculty and students expect places to support small groups and team projects. The modern library must be multifunctional, flexible, and supportive of an array of scholarly activities.

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Therefore, the following research questions guided our study:

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1. What roles does the library assume in student success on a higher education campus?
2. Does the design of the library:
   (a) empower students to manage their own learning process,
   (b) function as an extension of the formal classroom, and, if so, how,
   (c) support engagement of individuals and groups of students in their learning process, and
   (d) align spaces to support varying functional needs?

Evidence suggests that student engagement is a high predictor of overall student success. Well-designed library spaces, intended to support scholarly behavior, can reflect an institution’s intrinsic values by highlighting the critical link between the library and student engagement. However, engagement as a student success factor has most often been measured in a formal learning place: the classroom. This case study instead looked at the library as an informal learning place, broadly situated within the academic community, to see how specific architectural elements (for example, windows and lighting) and space solutions (for example, multiple styles of chairs) influenced scholarly and social behaviors. This study used a diagnostic research design for the case study using a convenience sample and incorporating ethnographic techniques: photo traces, behavioral observation, and focused interviews. Triangulation of the qualitative analysis confirmed four key attributes: engagement culture, environmental messages, core connectedness, and transformation challenges.

Environment behavior theory argues that space impacts behaviors. This paper attempts to address the academic library’s expanding role as a learning partner in a spatial context by applying that theory to the relationship between spatial design and environmental messages at both the micro- and macro-levels. Student success is predicated on a high level of engagement, and user behaviors indicate engagement, hence this exploration of user behaviors in an informal learning environment.

**Review of the Literature**

For most of the history of libraries, the buildings were designed to house the collection and accommodate the personnel needed to make that collection available. In the experience of the authors, even well-loved libraries focused more on how to store and share the physical collection and less on the people who needed to use the collection. This study focuses on a newly constructed, $65-million facility with 150,000 square feet. The previous library was one-third the size and 50 years old and, as was the tradition, served the staff better than the community. As the architect Geoffrey Freeman observes:

Given this longstanding practice, it is no surprise that the traditional library we inherit today is not the library of the future. To meet today’s academic needs as well as those in the future, the library must reflect the values, mission, and goals of the institution of which it is a part, while also accommodating myriad new information and learning technologies and the ways we access and use them. As an extension of the classroom, library space needs to embody new pedagogies, including collaborative and interactive learning modalities. Significantly, the library must serve as the principal building on campus where one can truly experience and benefit from the centrality of an institution’s intellectual community.
This new conception of a modern library, one of flexibility and user-centered design, has an ever-evolving vocabulary paralleling the evolution in philosophy. Over time, two alternative names for library spaces have emerged: (1) information commons, reflecting the impact and integration of services that improve access to information technologies, such as digital library resources and multimedia displays, and increased student and faculty use of those technologies; and (2) learning commons, which support learning in collaboration with other campus educational initiatives, such as tutoring, writing centers, and information technology help desks.

The idea of an information commons, as reported by Charles Forrest and Lisa Hinchcliffe, appeared widely in the first decade of the twenty-first century. The concept reflected a shift from using the card catalog and book stacks to define library space to using a service model to organize and deliver library resources and programs. Ruth Mirtz observed:

Now that it has become de rigueur to have an information commons in academic libraries, the idea of a commons has sometimes devolved into what one librarian has defined as a “cool, hip space with computers.” In these cool spaces, rather than searching for a musty corner in the library, students can now gather to socialize while they study, sit in a comfy chair with a wireless laptop, get help from technologists and librarians, and work with completely digitized sources and assignments.

Soon the information commons movement transitioned to the learning commons. Scott Bennett shared Donald Beagle’s way of distinguishing an information commons from a learning commons:

The purpose of the information commons was to support learning—a service mission. By contrast Beagle defines the learning commons as what happens when the resources of the information commons are organized in collaboration with learning initiatives sponsored by other academic units, or aligned with learning outcomes defined through a cooperative process.

The intention is to develop meaningful partnerships with academic units and campus support offices to inform a library design that facilitates learning outside the classroom, in support of curricular programs and faculty research agendas. The design should enable students to have more control over their own learning environment and learning behaviors.

The word common means:

- Belonging to or shared by two or more people or groups
- Done by many people
- Occurring or appearing frequently: not rare.

For the development of this library, the planners intended to blend the two types of commons, in recognition of the strengths of having an open, shared, curriculum-integrated, learning-focused environment that also provides ample technology resources. Hence, the library was named the Mary Idema Pew Library Learning and Information Commons.
Improving a student’s sense of belonging, interacting, and sharing with others “positively affects generic learning outcomes such as levels of engagement and the decision to continue studying.” Students who feel they belong and are connected will more likely stay engaged with their studies. Marybeth Hoffman, Jayne Richmond, Jennifer Morrow, and Kandice Salomone identified a positive relationship between supportive faculty interactions in both academic and social environments and students’ subsequent sense of belonging. Active learning environments seem to promote a sense of belonging as well as improve student retention. If a learning commons is one place where supportive relationships between faculty, librarians, and students develop, how might the environment provide cues and messages to encourage those interactive behaviors? We assert that architecture and design can provide these cues or “environmental messaging.”

Messages in a Building
Edward T. White in his 1996 text *Building Meaning* continually asks his readers to recognize that the building’s design produces images or environmental messages. He argues, “Building image analysis can help us . . . to communicate better with our clients about the nature of the design problem to be solved and the reasons for design decisions.” He shares a procedure to analyze a building’s image, called building image analysis, which includes the following guiding questions:

- What messages should be conveyed to building occupants by the new facility?
- What building ambience or atmosphere does our client want to create?
- What feelings, attitudes, or moods should the facility evoke for the building occupants?
- How can messages, ambience, atmosphere, feelings, and themes be effectively communicated by architecture?
- How can we plan environments in a way that increases the likelihood that intended environmental messages are, in fact, read correctly by building occupants?

As various stakeholders weighed in on what the library building priorities should be, each of these questions was addressed. Support systems and active research should be visible, with low barriers to participation. Not all those elements are tested here, but they did inform the designers and give the library staff a baseline to later gauge how well we met those initial goals.

Influential Concepts
In this new academic library, the planners intentionally developed the “environmental message”—the architecture and interior design solutions, or the macro- and micro-spaces, respectively—to address some of the questions White asks. We wondered: Did observed
behaviors align with the desired stakeholder goal of fostering student engagement?

Student engagement is defined here as students making academic and social connections in the spaces and using the services offered in the library. Specifically, could observations and interviews reveal if students:

- Spend time on academic tasks when they are in the library?
- Feel less academic anxiety when studying or engaging in other learning activities in the library? (In other words, is the library an affirming environment?)
- Gain broader exposure to academic opportunities that enrich their learning experience (for example, by seeking out grant research opportunities or engaging with a research, writing, or speech consultant) while in the building?
- Experience greater confidence and higher expectations of themselves when studying in the library or engaging with library services?

Although not research questions per se, those guiding inquiries influenced the development of this library’s design.

**Zones of Behavior**

Early in building planning, furniture prototypes were installed in the existing library and evaluated to determine their impact on students and on use patterns. A wide selection of both well-tested and newly developed furniture was chosen to accommodate different postures and groupings of the students and researchers who might use the building. As space planning progressed, designers identified four distinct types of space called **zones of behavior** to support different behavioral functions and needs.\(^{15}\) These zones were (1) private/alone, (2) private/together, (3) public/alone, and (4) public/together (see Figure 1). The four zones of behavior have specific designed aspects that are integral to each and act as behavioral cues. Both the architectural design and the interior design were based on the following four zones.

1. **Private/alone:** The behavioral function of the private/alone zone is to support an individual’s focused work. These spaces need to support multiple postural changes, meet electronic needs, and provide a sense of privacy and security because students “camp out” in these spaces, sometimes for hours at a time.
2. **Public/alone:** In this behavioral zone, individuals still work alone but do so intentionally in the presence of others. These students do not wish to be isolated and, in fact, want to see others and hear the noise associated with having others close by. For these students, background noise, like the quiet conversation and other ambient sounds at a coffee shop, helps them to concentrate.\(^{16}\) The space might have a residential-style decor with multiple seating types and homelike amenities.
3. **Private/together:** Private/together space types focus on group learning. Such spaces should have an abundance of tools, both analog, such as whiteboards and paper, and digital, such as laptops, to encourage creative, social collaboration among students. Vertical surfaces such as whiteboards for sketching and recording ideas are a must. Group sizes might range from small (for example, 4 to 6 members) to large (for example, 6 to 10). These groups prefer to work in private, isolated from other activities in the building. Such support for team projects and group projects is one of the new roles for library design.
Zones of Behavior

| Public/Together | Private/Together | Public/Alone | Private/Alone |

Figure 1. In space planning, designers created four distinct types of space to support different behavioral functions and needs: (1) private/alone, (2) private/together, (3) public/alone, and (4) public/together.

4. Public/together: These types of settings support a broad range of activities. The functions may include impromptu meetings, tutoring, and scheduled events. Users are publicly visible and purposefully interact with one another.

Using these zones as both a pragmatic design tool and a conceptual framework helped the designers and stakeholders better visualize the continuum of the learning process. By connecting specific design decisions to intended learning behaviors, the building and its contents were set up for a deliberate, ongoing study of engagement.

Methodology

This study used a diagnostic research design. Quoting from the polling expert Herbert Hyman, John Zeisel explains that such a research study helps deepen the understanding of a setting; provides suggestive evidence on a broad realm rather than “rigorous safeguards on the trustworthiness and specifiability of findings.” For trustworthiness of findings, diagnostic studies rely on the consistency, clarity, and coherence of the insights they develop in the situation being studied.

The study employed ethnographic qualitative research techniques. The techniques included fieldwork, observation of the activities of library users (both by behavioral observation mapping and through photographic traces), and semi-structured interviewing of library users, staff, and others. Qualitative techniques help social scientists view the “interactions of individuals with and within their social systems, with and within the physical environments that [they] occupy . . . [and observe] patterns of individual
and group human needs fulfillment.” This type of research design is “used to obtain information concerning the current status of the phenomena and to describe ‘what exists’ with respect to variables or conditions in a situation . . . The subject is being observed in a completely natural and unchanged natural environment.”

Method Components

Sample

For this study, the researchers observed a convenience sample of users of a new academic library at a comprehensive university in the Upper Midwest.

Instrument Structure

The research design incorporated the following three environment-behavior research techniques: (1) ethnographic observation through photographic traces, which captured images of library users’ activities; (2) behavioral observation mapping, which tracked users’ behavior over space and time; and (3) focused (semi-structured) interviews with staff and students. Research support members (that is, observers) were trained to take the required photographs and to map observed behaviors. Research activities were conducted in the fall term of 2014, one year after the building opened.

Ethnographic Traces through Observation Photos

Four types of spaces, referred to as design zones, were of interest—private/alone, private/together, public/alone, and public/together—on five floors. Research support members took a baseline photograph for each design zone location on day one of the fall semester (see Figure 2). Eight photos were taken per day, from 7:00 a.m. until 12:00 midnight, in 33 zone locations, on 93 days, resulting in a collection of 744 photos. The investigators developed a statistically randomized time frame for each photo area. They used floor plan drawings to generate a color-coded map of the design zones: private/alone zones were colored red, private/together zones were yellow, public/alone were blue, and public/together green. A photo position point was added to the drawing, and the research support members were trained how and where to take photographs. The investigators sorted the photos by zone, location, and time of day, and assigned a unique code number to each photo. They then analyzed each photo for behavioral patterns and gave each pattern a behavioral code. This information was then put into an Excel spreadsheet for further analysis. Where possible, the investigators aggregated the behavioral patterns and identified pattern themes (see Figure 3).

Behavioral Observation Mapping

Behavioral observations gathered user behavior in a spatial context. The researchers studied seven observation areas over a three-week time frame (N = 125). The areas observed varied in size and scope. There were seven identified observable locations: (1) atrium living room, (2) atrium classroom lobby, (3) Knowledge Market, (4) quiet area, (5) Reading Room, (6) Innovation Zone, and (7) group study area (see Figure 4).
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Ethnographic Photo Traces Technique - Example

Figure 2. A baseline photograph was taken for each design zone location on day one of the study.

Figure 3. Each photo was analyzed for behavioral patterns, and each pattern given a behavioral code. The information was then put into an Excel spreadsheet for further analysis.
The investigators mapped behaviors according to the Users Environmental Interaction Framework, a model that divided the behaviors into four categories: (1) S/S = student-to-student, (2) S/C = student-to-content, (3) S/E = student-to-environment, and (4) S/I = student-to-instructor (that is, librarians and staff).22 The researchers coded and aggregated patterns where possible, and identified pattern themes (see Figure 5).

Focused Interviews

The researchers held focused interviews with two groups each of students, library staff (the support staff and assistants), and library partners, who consisted of the dean of libraries, her staff, and the “official” librarians. The groups involved three to six participants of each participant type. Guided questions kept the interview on task and consistent across groups, though some exploratory discussions were allowed. The questions were

- What words would you use to describe libraries in general?
- What words would you use to describe this library?
- Why do you come to the library? What factors make you choose the library over other locations? What do you do while you’re there?
- Has the library affected your experience as a student? How so?
- How do you choose where to sit? What are the factors—light, noise, temperature, seating, whiteboards?
- How long do you stay and why?
- If you could change something in the library, what would it be?

A third-party service transcribed the recorded tapes to minimize bias. Three analysts, who separately looked for patterns and themes, evaluated transcriptions of interviews. The researchers then compared the results, coded them according to the patterns of language that emerged, and identified pattern themes.

To reiterate, the research questions were: (1) What role or roles does the library assume in student success on a higher education campus? (2) Does the design of the library empower students to manage their own learning process; function as an extension of the formal classroom, and, if so, how; support the engagement of individuals and groups of students in their learning process; and align spaces to support varying functional needs? Work progressed to answer two questions: (1) What did these behaviors look like in the photographic traces and behavior maps? (2) What did these behaviors sound like in the transcripts and observation notes? After synthesizing the results from all photographs, maps, and interviews, evidence revealed four distinct attributes, answering the research questions.

Findings

The behavioral analysis used the photographic traces and other behavioral observation methods. Across all five building levels and six time frames, 867 observations were noted in the photographic traces. Analyzing the people-to-people interactions (N = 464), there were 157 interactions in which users engaged with content, approximately 34 percent of the interactions. In 294 interactions, or approximately 63 percent, users engaged with one
Figure 4. Seven observation areas were studied: (1) atrium living room, (2) atrium classroom lobby, (3) Knowledge Market, (4) quiet area, (5) Reading Room, (6) Innovation Zone, and (7) group study area.

Figure 5. Behaviors were divided into four categories: (1) S/S = student-to-student, (2) S/C = student-to-content, (3) S/E = student-to-environment, and (4) S/I = student-to-instructor.
Another. Fewer than 2 percent of interactions involved users connecting with a librarian. Of interactions where users connected to tools within the environment (N = 403), 114 involved an analog tool and 289 a digital tool. Thus, analog interactions accounted for 28 percent, and digital interactions 72 percent (see Figure 6).

The behavioral observations by week were: week one n = 519, week two n = 338, and week three n = 545, for an overall N = 1,402 of observation notations across all room types, zones, and time frames. Times of day with over 100 individuals in the building were 2–3 p.m., 4:30–5:30 p.m., 7 p.m., and 9:30–10:30 p.m. (see Figure 7).

Analysis of thematic patterns exposed four key attributes of library space design that appeared to influence user behavior: (1) engagement culture, (2) core connectedness, (3) environmental messages, and (4) transformational challenges (see Figure 8). These findings are explained by pattern in the next section, and research insights are provided for future planning ideas.

Four Attributes Defined

Attribute One: Engagement Culture

As noted earlier, the higher the level of student engagement, the higher the probability that students will succeed in a myriad of academic and social functions. The vision and ultimate design of this library reflect a student-centric approach to allow students to fully engage in their learning processes. Policies, procedures, and maintenance issues aligned to support that vision. This refined organizational culture embraced the notion that students should have choice and control over where and how they meet and the sizes of those gatherings. Students can adopt a range of postures and conditions, make private places and stake claims to them, and physically move furnishings (sometimes from one floor to another). Library policies and staff behaviors allowed students to shift spaces and furniture across time frames (by day, week, or time in the term) and across spaces. The result is an active culture of student engagement. One student commented that, in this dynamic learning environment, “Scholarship was made visible.”

Analysis of observed behaviors revealed that students used a variety of means to claim temporary ownership of a space to fit immediate study needs or visual privacy needs. For example, students would move the mobile whiteboards around a set of tables to create walls for privacy—not to write on the boards, which was their intended purpose. At times, this behavior conflicted with the designated functions of the areas, particularly during midterms when student teams camped out and claimed long-term ownership of a space. Students
Figure 6. Photographic traces were classified into people-to-people interactions and interactions with analog or digital tools.

Figure 7. Observation notations for three weeks across all room types, zones, and time frames.
marked some movable whiteboards with written instructions such as “Leave in Place” or “In Use—Don’t Move.” This engagement culture encouraged students to physically group and regroup furnishings and to claim space but also to make the environment more comfortable:

They (students) will adapt spaces for their needs. Whether that’s really the optimal use for the space or whether it’s what the space was designed for, if this room was open and available to the students, they would be in here. It’s just whatever space they can find, they use.

[library partner]

**Attribute Two: Environmental Messages**

The building designers employed various types of windows to allow specific natural lighting arrangements to cue different behavioral functions. At the macro-scale, one side of the building has narrow vertical fenestrations (windows). At the micro-scale, small niches and quiet reading nooks cue expectations that this area is the “quiet side.” On a different side of the building, at the macro-scale, full-height windows provide maximum access to natural light. The micro-scale design solutions have open seating in these wide-open spaces, encouraging more social and vocal behaviors. Thus, there is access to natural light—an important feature for learning—and a range of macro- and micro-solutions supporting functional services for different social, scholarly, and administrative needs.

Patterns from the respondent interviews suggest that, at the macro-level, the environmental message is “symbolic and inspiring.” Students and staff see the library as a destination place, or a place to see and be seen. Comments include:
The architecture inspires students to come, gather, connect and engage in their learning activities. It is a place of pride for students, librarians, and staff.

[library staff]

Gorgeous. I love it . . . I think the variety of like, not only furniture, but also just the kind of spaces that we have here. This has a lot of different uses, and it appeals to a lot of different people.

[student]

It’s all “thumbs up” for me . . . I just think the beauty of it; the wonderful lighting . . . I am in awe.

[library staff]

Attribute Three: Core Connectedness

The students and faculty responded to this building as a learning commons, feeling a sense of belonging and connectedness to learning and scholarship. Within the building, at the micro-level, the planners incorporated four interior design zones—private / alone, private / together, public / alone, and public / together—into the interior design solutions to support the behavioral and functional needs for these zones. This library design allows students to connect, concentrate, and collaborate with whomever they need to on whatever they are working on. It provides the people, services, and activities needed to finish work started in the classroom. At a core level, it provides students with a sense of belonging to their cohort, their class, and the academic community at large.

Students are seekers who find appropriate resources or fellow students to help them with their problems or concerns.

I always study in the atrium because I need people around me and talking, so I’m like in a different room. Like I can’t study when it’s quiet. I need people moving.

[student]

I love those little individual desks by the windows, right behind the stacks. That’s my favorite place. And they are like always taken, but whenever I can get one, I take it . . . I like the couches by the window, too . . . It’s by a window, the desk size is nice, because you can put your laptop on it and also have a notebook if you need it. And it feels private but without feeling like you’re in a study room.

[student]

Comments such as the following indicate looking for respite:
I like the reading room a lot, because its super quiet, and I like the view . . . I like it quiet, and then I’ve also taken a nap in there, which is great. There’s like those benches, they are padded all around, so you can just like cuddle up there. It’s great.

[student]
I think the quiet space is a big thing. Even if you are someone who doesn’t need distractions, and second or third (floor) are this way, too, a transition to a quiet space has all those seats, but visually it’s very distracting. So, for students who are used to quiet study, that’s why their wedge boards are being used so much to block line of sight. [library partner]

This study also showed that design zones can provide behavioral cues, but at times the scale and fit between the macro ideas and the micro needs did not align as closely as they might have. For example:

There is a lot of barricading going on. I mean, there really is. They want their own little space. Especially since, unless you reserve it the two days before, you can’t get one of those study rooms. [library staff]

Spatial cuing was used at both the macro- and the micro-levels of design. Zonal-specific appropriations steered students to academic support, services, and activity. The open, semi-open, and closed segments allowed students to appropriate the type of spaces needed for particular learning tasks, whether as individuals or in small groups. The furnishings provided access to analog and digital tools and equipment. Mobile furnishings supported the engagement culture by allowing students to move pieces around to suit their needs.

Attribute Four: Transformational Challenges

There are consequences when changing cultural norms. It took two years of planning from the library’s leadership to prepare librarians, library staff, and partners for what this new vision might entail and the new work expectations. Deliberate change management was an important leadership success strategy to ensure that those working in the building could support a completely new approach to service and library operations.

Even with the best intentions for creating a user-centered space, at times librarians and other staff were uncomfortable with some of the behaviors they witnessed when the building opened. Riding on an elevator with a student pushing a large, upholstered armchair took some getting used to. A small space next to the central staircase had been designed as a quiet cell phone zone, yet students immediately pulled movable whiteboards, tables, and chairs into those cubbies to create private study rooms (and subsequently pushed cell phone calls into side stairwells). Staff needed to adjust their own expectations and allow the transformation of library use.

The open, semi-open, and closed segments allowed students to appropriate the type of spaces needed for particular learning tasks, whether as individuals or in small groups. Most interesting was a culture of silence that the students carried with them from the old library to the new building.
Most interesting was a culture of silence that the students carried with them from the old library to the new building. In the old library, the fourth floor was the quiet floor. The new library did not have a quiet floor; rather, the building was designed on an east-west axis with the east side designed to encourage quiet study with softer furnishings, smaller windows, and darker materials. The west side has large windows, bright lights, group study tables, and minimal privacy. At no time did the library staff convey an expectation of quiet on the new fourth floor, yet students continually asked why people were “allowed” to talk on the “quiet floor.” The transformational challenge reached our staff and our student community, requiring reflective examination of building policies and mindful development of staff who could support these transformational changes.

Finally, some results revealed conflicting opinions, elements of what the authors characterize as “push and pull.” The same building features and cultural components that some students and staff praised, others criticized. For example, many students indicated that the buzz of excited conversation throughout the library was motivating, while others felt it was sometimes distracting. While students clearly appreciated furniture mobility, it created operational challenges for staff. These instances of “push and pull” illustrate a wide range of user preferences, reinforce the importance of space flexibility, and serve as a reminder that transformational challenge is an expected effect of institutional culture change.

**Insights and Recommendations**

Engagement cultures allow for modification of places to fit specific purposes. Flexible space divisions support temporary ownership of space and desires for privacy. The engagement culture empowers students to seek out tools and resources to manage their own learning processes. Built interior places should provide furnishings and other affordances that accommodate and support flexible learning needs that change over time. Architects and interior design teams should work closely together ensuring that the design and the building’s cuing and messaging are aligned and consistent throughout.

When designing the macro-space, the overall architecture of the building should realize that the orientation, size, shapes, and differences in access to natural light acts as cues for behaviors and thus impact the activities within the place, intentionally or unintentionally. Do not assume that buildings will be designed to support these new intentional behaviors and learning modes. Recognize that intentional learning behaviors must be identified, articulated, and then designed. Recognize, too, that the design hand-off from the architectural practice to the interior design needs to be carefully managed to avoid losing the building’s meaning or cuing tactics, or vice versa if the building is designed from the inside out.

The zonal approach for the interior design had pluses and minuses. The zones allowed for interiors to support specific behaviors and meet their functional needs, yet
uses did not always align with environmental cues. The architectural and interior design teams must come together to more effectively align the macro to the micro environmental goals, ensuring consistent messaging and behavioral cuing. Design cannot be handed off without a full understanding of how the overall building should support identified behaviors.

Planning and foresight help to mitigate cultural change with library staff, align expectations, and provide for smoother transitions. It takes leadership and vision. It also requires a willing team of librarians and an inspirational leader to change an ingrained culture and move to a culture of an activity permissible learning place. Know and support all the appropriate tools and learning methods that current students need, provide for twenty-first century learning skills, allow students to change the way they approach their own learning processes, and have the library enrich that experience. In other words, as Lee Van Orsdel says, “(a) Align the design with the type of spaces students like to be in, (b) give them tools to manage their own learning, and (c) inspire, energize and engage them.”

Limitations

A case study is limited in its ability to provide for broader generalizability. However, due to the length and breadth of this study at this academic library, research insights may provide decision-makers and design teams alike with grounded information that may prove helpful when designing a new learning and information commons in a future academic library.

Other limitations of this study include a lack of consistency among the large number of people involved in photography, observations, and interviews. For example, not all volunteer photographers took photos from the same position. Different observers picked up on different behavioral cues, introducing observer bias into the process. Some of the observed areas were large and had sections obscured by movable whiteboards or large groups, hindering accurate behavioral observation.

Conclusion

A longitudinal, three-month study was conducted in a fall term at an Upper Midwest university’s one-year-old academic library. This study used an environment-behavior approach with ethnographic research techniques. Four major attributes were revealed from the large set of data compiled over the three-month time frame: (1) engagement culture, (2) core connectedness, (3) environmental messages, and (4) transformational challenges. The data expressed in these four attributes suggest that, in fact, the design of this library did foster student engagement.
Many of the formally observed behaviors and comments during the interviews validated anecdotal evidence library staff had gathered in the year between the opening of the building and the conclusion of the study. We had specific design intentions, and this study confirmed the efficacy of that design, with a few surprises. Such a study also documents broad patterns of user and staff behavior, which can be used later as a benchmark for continual improvement practices. The fourth attribute, transformational challenges, pushes for ongoing reflection and discussion on strategic questions, such as, how much of engagement is due to design and how much is attitude? These insights and recommendations can and should influence the thinking, planning, and design of new or renovated learning and information commons.

This project’s methodology can also be used as a model for post-occupancy assessment for new or newly renovated academic libraries. This combination of techniques gave us a rich understanding of what was happening in the space and has also been useful in later assessment projects. For example, a year after data collection, the library’s user experience team reviewed the photographic traces to inform furniture rearrangement and some new furniture purchases. The team has also modified the techniques to implement additional, smaller-scale observational and photographic projects aimed at answering specific space use questions. The team took daily photographs to understand how the library’s Multipurpose Room was used during peak times. Similarly, when student tutors started using a new location in the library, the team modified the original tool and conducted observations. Libraries unable to implement a comprehensive post-occupancy assessment can tweak these individual techniques to fit their own institutional needs and resources.

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Notes

4. Scott-Webber, *In Sync*.


