

Designing a Library Environment That Promotes Learning

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Introduction

Designers of educational spaces have always instinctively known that the built environment has a profound effect on its occupants. Yet little research has been available regarding this gut feeling.¹

Dowling College Library is greatly underutilized. The two-story library facility is housed within the main four-storied classroom building of the college, along with the bookstore, computer lab, and cafeteria. Thus hemmed in, physical restraints create constant competition for space between collections and the approximately 6,400 non-traditional undergraduate and graduate users. Despite attempts to “humanize” the warehouse-appearing space by adding plants, some lounge seating, and attractive book displays, even the limited existing seating often goes unused.

Since the student body consists primarily of a commuter population and few alternative campus study areas exist, one would expect the library to be frequented between classes. However, this is not the case. Therefore, the library staff were concerned that the library was not fulfilling its mission.

Statement of the Problem

In looking for ways to draw more students into the library and retain those that entered for longer lengths of stay, the researchers sought environmental design insights. They wished for proven design principles that might lead to increased student use of the library. It was further hoped that a correlation theory might be identified between environmental design and student study success allowing experimentation leading to future planning of library renovations and maximization of the existing space.

In this pilot study, the researchers wanted to know what environments students perceive as helping them to achieve success at studying and conducting research. In a future study, the researchers plan to experiment with creating library environments using this data.

Review of the Literature

The approach to this endeavor began with a literature search to determine if any correlations already exist in any field. The researchers began with an examination of intrinsic and extrinsic motivation for learning as discussed in museum literature and flow theory as described by Mihaly Csikszentmihaly.² They wanted

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to learn what museums do environmentally to entice visitors to stay and learn, with the intent of duplicating such environmental characteristics in libraries. They reviewed learning theory and looked for documentation in library literature, architectural, and environmental design writings, and psychology publications. And in a final attempt to pinpoint the effects of environment on occupant behavior, the researchers consulted merchandising theory and the principles of Feng Shui.

Intrinsic and Extrinsic Motivation Theory

Csikszentmihalyi and Hermanson offered reassurance that "... natural motivation to learn can be rekindled by supportive environments, meaningful activities, by being freed of anxiety, fear, and other negative mental states, and when the challenges of the task meet the person's skills."³ They explain that intrinsic motivation leads a student to learn for the sake of learning; extrinsic motivation pertains to meeting performance goals such as obtaining certain grades or a degree. Learning is assisted by a level of familiarity or acquaintance with the topic and an absence of distractions allowing the mind to become immersed in the learning activity. Total spontaneous concentration and abandonment to the subject is referred to as reaching a state of flow where learning is optimized. The question is, "What does the optimally supportive environment look like?"

Museums and Learning Design

For the purposes of this research, it was considered reasonable to compare academic library environments to museum environments, to the extent that learning must be intrinsically rewarding and motivational—thus bringing museum patrons back for repeat visits, or, in this case, students back for repeat studying and research. The researchers were curious how museums achieve this self-rewarding experience. Wouldn't this be a desirable attribute for a library as well? Caban echoes much of what is known from learning theory that "...educators who deal with learning styles [they] will tell you the most deeply effected learning, the most remembered learning, is learning that employs the senses and particularly the emotions, and that's what design does particularly well."⁴ Lackney alludes to the connecting path between environment and learning by stating, "Preference for an environment leads to motivation to interact with the environment, which leads to learning."⁵ One may surmise that libraries, like museums, must engage many senses and create a somewhat emotional response in the user.

Learning Theory and Learning Environments

Prakash Nair advocates that new learning environments are the single most important innovation needed to improve education in the United States. He reasserts that deep learning comes from interaction with a subject, experimentation, and emotional involvement. For classrooms, he recommends learning studios, open areas instead of corridors for social interaction, rooms for project-based learning, teacher workrooms, multi-age groupings, and places to think. He emphasizes the importance of a learning model of education as the driving principle of designing a space, instead of a schooling model.⁶ For academic libraries, Nair identifies three trends for facility designers which are especially relevant: emphasis on informal learning spaces, de-emphasis on the classroom, and imaginative furniture design to support active learning.⁷

Library Literature

Within the last several years, a rich volume of work has erupted on the academic library design scene under the auspices of the Council on Library and Information Resources (CLIR) and Educause. Notably among these publications is Scott Bennett's 2003 CLIR report, *Libraries Designed for Learning*,⁸ Diana Oblinger's *Learning Design*,⁹ and another CLIR compilation of articles from Freeman, Bennett, Demas, Frischer, Peterson and Oliver entitled *Library as Place: Rethinking Roles, Rethinking Space*.¹⁰ Each of these works catapulted librarians forward toward an understanding of the design needs of academic libraries by understanding the learning needs of library users.

Bennett introduced the radical idea of designing library spaces around users' activities rather than librarians' service functions. In order to understand students' needs, Bennett not only focused on changing technologies and shrinking spaces due to expanding collections, but he also took a good look at the changing nature of teaching and learning practices surfacing in education at all levels. He noted pedagogy's recognition of the social aspects of learning and different learning styles of students. Bennett invited librarians to look at academic libraries in much the same way as educational technologists have looked at classrooms and computer labs. He questions how to link teaching, learning, and space requirements; the most obvious being the need for group study/work spaces to accommodate the proliferation of group project assignments. He went further, however, to advocate for flexible learning commons spaces where students could arrange the furniture to their needs,

where everything would change after a project was completed “an academic playground of sorts.”^k

Diana Oblinger’s e-book, *Learning Designs*, presented fascinating scenarios about compelling learning spaces based on an understanding of how learners learn. Much of the quoted learning theory is based on Donovan, Bransford, and Pellegrino’s 1999 classic, *How People Learn: Brain, Mind, Experience, and School*.¹² In addition to the breakthroughs in understanding of how the brain learns from association and knowledge scaffolding and how one can effectively enter knowledge into long-term memory, Oblinger includes insights about the learning styles and expectations of net generation students. Similarly, the studies of Gardner and Eng report that Generation Y or Net Gen students have high expectations of quality academic facilities, customization of technology and research, have a need for technology being integrated into learning, and use totally new modes of communication.¹³ The importance of these new learning styles and their relevance to academic libraries was further emphasized by McDonald and Thomas in *Disconnects Between Library Culture and Millennial Generation Values*.¹⁴

Of particular interest in *Library as Place*, was Sam Demas’ chapter, “From the Ashes of Alexandria: What’s Happening in the College Library?”¹⁵ Demas reminds his readers that the earliest library in Alexandria was both a storehouse of writings and a stimulating cultural center. He further reports what students at Carleton College actually do in libraries, which includes reading and relaxing in a safe and quiet environment, browsing, and engaging in other non-library, academic support services, meeting friends and socializing, eating and drinking, participating in cultural events and civic discourse, having fun, viewing exhibitions, and appreciating art, design and nature!¹⁶ Echoing the essential social aspect of learning, Boone promoted the idea of learning cafes where sophisticated technologies intersect sociable environments enhancing the possibilities for interactive learning.¹⁷

However, while all of these approaches to academic library design were groundbreaking, none truly answered the initial puzzle as to the measurable connection between environment and behavior—in this case, student study or research success. Questions still remained. Could a space be designed which would have a predictable influence on its occupants? Could a link between the physical environment in an academic library and the user’s study habits be established? Could the environment be manipulated to elicit positive opin-

ions about the library and, hence, boost library use? How could that influence be measured? Can success of a space supporting learning only be measured by usage statistics or can deep learning be measured?

Merchandising Theory

The researchers decided to take two more leaps outside library literature to be sure they had not overlooked clearly demonstrated connections between building space and behavior by first looking into merchandising theory. Certainly marketing experts have learned how to finesse space to entice customers to buy products, and they are even known to *create* the desire, not just meet existing interest, by appealing to our senses. Rippe demonstrated valuable lessons in his “What Libraries Can Learn from Bookstores: Applying Bookstore Design to Public Libraries.”¹⁸ A clear lack of involvement of the senses separates libraries from their stiff competition. How do libraries compare to the smells of coffee and pastries, the sounds of music, the level of awareness stimulated by bright lighting, the attractiveness of mounded displays, comfortable seating areas, power aisles, clear signage, and the invitation to participate provided by best seller and topical reading lists? The success of merchandising in libraries suggests that patrons can be affected to boost circulation, but can they be influenced to learn more effectively?

Feng Shui

The next step was an examination of the ancient Chinese art of Feng Shui. According to Hale, “...everything in our lives affects us on a vibrational level for good or ill and, in turn, we react in various yet predictable ways, depending on our individual traits.”¹⁹ According to Barrett, following the rules of placement “...helps you to arrange your ...environments so that your life is harmonious and your dreams are realized to their fullest.”²⁰ It would appear that the Chinese have solved our problem! A practice taken very seriously in China is becoming widely applied in the United States. Many public and private institutions seek Feng Shui consultations before construction or renovation or to remedy unfavorable environmental conditions. For example, New York’s Queens Borough Public Library is using Feng Shui consultants in their branch redesigns.

A final stop on the environmental design research path was an outstanding mélange of space theories presented in Winifred Gallagher’s *Power of Place*.²¹ Gallagher successfully addresses the psychological aspects of architecture and interior design from the principles of

Feng Shui to links with Csikszentmihalyi's flow theory! Here the researchers found the first explicit link between space design and behavior. The difficult message to absorb from her writings is that different people react to the same environment in different ways depending on their previous experience and personalities. For the first time the researchers had to consider that one size will not fit all; thus a variety of spaces will have to be designed into academic libraries to accommodate the diverse user preferences. It was the opinion of the researchers that these preferences could be mined and the behavioral links to library space design could be further proven with the use of user surveys and experimentation.

Research Methodology

A 50-question²² instrument was developed for a pilot study to explore the Dowling College student population's study experience and preferences. The instrument contains five sections:

- Respondent profile (six questions)—basic census information,
- Studying success (ten questions)—preferred location of study; What is needed in surroundings to assure success; Frequency of group assignments and influence on student needs,
- First floor Oakdale Library (fifteen questions)—overall physical conditions,
- Second floor Oakdale Library (fifteen questions)—overall physical conditions (identical to first floor questions)
- Environment and behavior (four questions)—to ascertain the degree to which students are aware of environments effect on their study habits

Because the end of the spring semester was fast approaching, an expedient method was sought to implement the survey to obtain the greatest number of respondents in the shortest period of time. A sample of convenience was established by targeting courses based on course number and designator to obtain students in all four undergraduate levels and graduate students in a variety of course disciplines. By doing so, the researchers hoped to reach a representative sample of ages, genders, and majors. This approach required a great deal of cooperation from twenty-one faculty members who were asked for time during their classes so that the researchers could reach ten to twenty students at a time. Before participating, each student signed an informed consent form. The form indicated that the survey concerned their preferred study space environment. It was indicat-

ed that their anonymous participation would help the library to design study and work spaces more conducive to studying/working success and benefit the entire college community. Students were asked voluntarily not to participate if they had already done so in another class. After collecting the signed consent forms, the researchers distributed paper surveys to 279 students.

The quantitative data from the paper surveys was analyzed using SPSS. Qualitative data, those responses hand written by students, were collected into Microsoft Excel reports and analyzed by category to reveal emerging trends.

Using a sample of convenience led to flaws in the study. The 279 responses represent 4 percent of the total student body of 6,435; of these, 256 were undergraduates or 8 percent of the undergraduate population of 3,145. While this sample size gives a confidence interval of 5.9 points, it is felt that a reasonable balance was achieved between the number of respondents and the researchers' time constraints. Furthermore, the researchers were successful in getting a representative sample of the student population based on age, gender and major as discussed below in the respondent profile.

The researchers' intent was to obtain a representative sample of the entire student body. A low number of graduate student survey responses were obtained. Thus, the survey results primarily reflect undergraduate opinions. Furthermore, the researchers had originally intended interviewing library users in the library as well as attempting to survey non-library users, thus allowing results to be identified by their library usage. The sample of convenience included both types of students, but the researchers failed to include this census question, so responses could not be distinguished by this factor.

Respondent Profile

The majority of respondents were undergraduates. The distribution, ranked in order of student status, was as follows: seniors (30%), juniors (27%), freshman (19%) and sophomores (15%). There were only a few graduate students (8%) included in the survey results. These statistics are not representative of the student body at Dowling, where the majority of students are freshman (34%). The age distribution of the respondents forms a bell curve centered on the twenty-one to twenty-five year old age range (46%). The next largest age grouping was eighteen to twenty year olds (35%). This statistic is aligned with the average age of a full-time undergraduate student at Dowling, which is 23.6 years old. While more females (65%) than males (35%) completed the

survey, this closely reflects the gender distribution of the total student population at Dowling (61% female, 39% male). There were thirty-one majors represented by the respondents. The top three majors of the respondents mirrored the top three majors at the college: elementary education (25%), management (17%), and psychology (8%).

Information about the respondents living arrangements and work hours were also gathered. The majority (52%) of respondents lived at home with their parents. The next largest group of respondents lived in their own homes (33%); the smallest group of respondents lived in student housing (16%). The majority (34%) of respondents worked twenty-one to thirty-five hours per week, followed by respondents who worked thirteen to twenty hours per week (25%). Sixteen percent of respondents did not work at all. Thirteen percent of respondents worked thirty-six or more hours per week.

Discussion of Selected Survey Results by Question
Survey questions 2, 8, 9, 11-40, and 44 are omitted for brevity. Question 2 was poorly constructed resulting in no meaningful data; Questions 8 and 9 dealt with group assignments at Dowling; and Questions 11-40 and 44 dealt directly with user satisfaction of the physical conditions of the Dowling College library, which will provide a baseline for future comparisons but are not germane to the hypothesis of this paper.

Question 1: In what location(s) do you most often study/do research?

Respondents were given twenty-two possible choices, in five broad categories of places, along with the ability to write in a response not already offered. Respondents were asked to rank their five top choices by how often they use the place to study. Most respondents did not

**Table 1: Locations Ranked by Response Frequency—
Where do you most often study/do research?**

Rank	Location Studied in Most Often	Response Frequency	Category
1	At My Desk at Home	176	Home
2	On My Bed at Home	151	Home
3	At a Table in the Library at Dowling	116	Library Dowling
4	On My Couch at Home	101	Home
5	At a Kitchen/Dining Table at Home	86	Home
6	In My Chair at Home	55	Home
7	At a Table in the Café at Dowling	54	Dowling Campus
8	Public Library	51	3rd Space
9	On the Floor at Home	41	Home
10	At My Desk at Work	31	Work
11	In An Empty Classroom	26	Dowling Campus
12	In My Car	23	3rd Space
13	Sofa or Chair in Library at Dowling	22	Library Dowling
14	Other	19	Other
15	Sofa in Cafeteria at Dowling	17	Dowling Campus
16	Coffee House	16	3rd Space
16	Bookstore	16	3rd Space
16	Student Lounge	16	Dowling Campus
19	In the Conservatory at Dowling	10	Dowling Campus
20	In a Library at Work	9	Work
21	In a Lunchroom at Work	8	Work
22	In a Conference Room at Work	5	Work
22	Diner	5	3rd Space

rank but merely checked off five places they studied. To analyze the data, the researchers relied on a straight count of how many times a place was checked off and ranked them accordingly. Of the top five locations, four of them were places in the respondents' homes and one was in the Dowling College library (see table 1).

The researchers then analyzed the data by broad category to look for response trends. It was found that the respondents preferred to study in locations in the home, followed by the Dowling College library, and the Dowling campus. The researchers were surprised to find third-space locations (locations falling outside the home, the college, and work—coffee houses, public libraries, bookstores, diners, etc.) with an average rank in fourth place, work spaces in fifth place, and "other" locations in sixth place (see table 2).

Locations written into "other" include outdoor locations (four times), friend's house (five times), or a specific item needed to study such as index cards or a bean bag chair (five times).

The researchers examined the data for this question by both age grouping and gender and found little difference from the above stated results.

Overwhelmingly, students prefer to study where they live. Surprising to the researchers, was the apparent lack of use of third spaces by Dowling students. Based on readings, the researchers predicted a much greater response here. Generally speaking, students are not using work-related spaces to study.

Question 3: Where do you most prefer to study/do research?

Written answers were analyzed and categorized into the same five categories used in Question 1 of the survey (home, Dowling College library, Dowling campus, third places, and work). A total of 303 written responses were given by the 279 respondents. (Some respondents indicated multiple places.) Locations in the home were most often written in, followed by third places, Dowling College library locations, Dowling campus locations, and work places. “Home Places” as the most written in response correlates well with the data in Question 1. There was an apparent flip in number of responses for Dowling campus places and third spaces between Question 1 and Question 3. Perhaps respondents thought of more third space locations here after being prompted to consider them in Question 1.

Question 4: If the Dowling College Library is NOT included in your top five responses in Question 1, please explain why.

One hundred fifty comments were analyzed and categorized into eleven separate areas and then ranked by frequency (see table 3).

Dowling College Library came in third place for a number of responses in Question 1. Nearly two-thirds of the written responses in Question 4 dealt with personal reasons for not coming to the Dowling College Library, such as: the respondent’s long commute or convenience to get to the college, their preference for home, their personal time constraints, or their preference for another library. Only one-third of respondents cited reasons pertaining to the Dowling College library itself, which included: lack of space and comfortable surroundings, too much or too little sound, and too many distractions.

Table 2: Locations Ranked by Response Frequency by Category—Where do you most often study/do research?

Location Studied in Most Often	Response Frequency	Percentage of Total
Home Locations		
At My Desk at Home	176	
On My Bed at Home	151	
On My Couch at Home	101	
At a Kitchen/Dining Table at Home	86	
In My Chair at Home	55	
On the Floor at Home	41	
Sub-total	610	57.9%
Library Dowling Locations		
At a Table in the Library at Dowling	116	
Sofa or Chair in Library at Dowling	22	
Sub-total	138	13.1%
Dowling Campus Locations		
At a Table in the Café at Dowling	54	
In An Empty Classroom	26	
Sofa in Cafeteria at Dowling	17	
Student Lounge	16	
In the Conservatory at Dowling	10	
Sub-total	123	11.7%
3rd Space Locations		
Public Library	51	
In My Car	23	
Coffee House	16	
Bookstore	16	
Diner	5	
Sub-total	111	10.5%
Work Locations		
At My Desk at Work	31	
In a Library at Work	9	
In a Lunchroom at Work	8	
In a Conference Room at Work	5	
Sub-total	53	5.0%
“Other” Locations		
	19	1.8%
Total	1,054	100%

Category	Response Frequency	Percentage of Total
Personal Reasons		
Prefer Home	28	
Long Commute	27	
Personal Time Constraints	15	
Not Convenient	12	
Other Library Preferred	4	
Sub-total	86	57%
Dowling College Library Reasons		
Lack of Space at DCL	17	
Comfort Lacking at DCL	11	
Sound – too much/not enough	11	
Too Many Distractions	9	
Not Relevant	4	
Sub-total	52	38%
Miscellaneous Reasons	12	8%
Total	150	100%

Question 5: What do you need to be comfortable while studying? Check all that apply.

Respondents were offered fifteen possible choices, in five broad categories of sources of comfort, along with the ability to write in a response not already offered. A straight count of how many times a comfort item was checked off determined its rank (see table 4).

When the researchers examined the same data by age grouping, an interesting distinction was found. Student respondents aged eighteen to thirty-nine ranked “computer access” as their top response for what is needed to be comfortable studying, while students aged 40 and over rank “quiet” as their top response (see table 5).

However, when examining data by broad category to reveal response patterns, it was found that “body” comfort conditions are most needed, followed by “technology items,” “light,” and then “auditory” conditions. “Surroundings” and finally “other” conditions in their surroundings were last in the respondents consideration of what is needed to be

comfortable while studying. Based on their readings on intrinsic motivation in museums, the researchers were surprised that items in the respondent’s surroundings came in last. This contradiction of the literature may reflect an unconscious recognition of what a person can control in an environment. The items in the “body” category can be controlled by the respondents, while the items in other categories, such as surroundings, are out of an individual’s control.

Question 6: What equipment do you need in order to study effectively?

Three possible choices were offered, along with the ability to write in a response. To analyze the data, the researchers used a straight count of how many times an item was checked off. The data was examined by the respondent’s school or division affiliation within the College.

Overwhelmingly, access to a computer (92%) was needed by students in order to study. Access to a copy machine came in at a distant second place, with “other” responses in third place, and access to a scanner in fourth place.

Analysis of the written responses to “other” revealed twenty-seven respondents made forty-two comments related to the question. Most respondents wrote in technologic equipment that was not

Rank	Comfort Item	Response Frequency	Category
1	Computer Access	210	Technology
2	Space to Spread Out	175	Body
3	Quiet	174	Auditory
4	Physical Comfort	162	Body
5	Proper Room Temperature	144	Body
6	Natural Light	135	Light
7	Artificial Light	118	Light
8	Food	103	Body
9	Music	67	Auditory
10	View of Nature	47	Surroundings
11	Phone Access	33	Technology
12	TV	28	Technology
13	Colorful Surroundings	27	Surroundings
14	Neutral Surroundings	20	Surroundings
15	Art on Walls	17	Surroundings
16	Other	9	Other

Table 5: Comfort Items Ranked by Response Frequency within Each Category—What do you need to be comfortable while studying

Comfort Items by Category	Response Frequency	Percentage of Total
Body Comfort Items		
Space to Spread Out	175	
Physical Comfort	162	
Proper Room Temperature	144	
Food	103	
Sub-total	584	39.8%
Technology Comfort Items		
Computer Access	210	
Phone Access	33	
TV	28	
Sub-total	271	18.4%
Lighting Comfort Items		
Natural Light	135	
Artificial Light	118	
Sub-total	253	17.2%
Auditory Comfort Items		
Quiet	174	
Music	67	
Sub-total	241	16.4%
Surrounding Comfort Items		
View of Nature	47	
Colorful Surroundings	27	
Neutral Surroundings	20	
Art on Walls	17	
Sub-total	111	7.6%
“Other” Comfort Items		
	9	0.6%
Total	1,469	100%

already suggested, such as printers, internet, and phone access. The second most frequent response was books, which included textbooks, notebooks, and reference books. The third most frequent response was supplies, such as highlighters, pens, and index cards. It is interesting to note there were three responses about the need for quiet or noise here.

Question 7: What do you find distracting when you are studying?

Respondents were offered five possible choices and the

ability to write in a response. To analyze the data, the researchers used a straight count of how many times a comfort item was checked off and ranked them accordingly. “Others talking” was ranked first followed by “interruptions,” “noise,” “hunger,” “silence,” and “other” written-in responses. Among the responses written in for “other,” specific noises were listed most often, followed by responses indicating a lack of self control (such as boredom, insecurity, and mind wandering), and then finally, other people’s behavior.

The data was analyzed by respondents’ gender and age range. Remarkably there was no difference in responses by gender and very little difference by age range. Under the “other” category, the researchers were intrigued by responses that indicated a lack of self-control, as these possibilities were not distractions the researchers had considered. One wonders how many responses would have been indicated if the researchers had included it or one or more of the student’s terms on the list from which to select.

Question 10: If you could change anything about the Library’s physical surroundings, what would it be?

Respondents wrote in 250 comments. These were analyzed and categorized into fourteen separate areas. Of the 250 comments, 189 contained actionable responses. An actionable response is a constructive comment that the researchers can act upon.

Based on these comments, respondents would increase the space of the library or make the existing space appear larger (24%). Second in frequency was a need to increase the number of student-use computers, printers, and plug-in places (both electrical and network access) for laptops (22%). The third most frequent response was comfort (13%). Students asked for more couches, pillows, and comfortable spaces to work in. Responses about the aesthetics of the library ranked sixth (6%) and included comments such as: “it reminds me too much of a high school library, very plain and unattractive” and “make it look nicer.” Respondents also mentioned the need for better lighting (5%) and increased accessibility between the first and second floors of the library (4%).

Questions 41–43: Do you agree with the statements below? Please use the following scale: 1=Agree Strongly, 5=Disagree Strongly

Question 41: I am affected by my surroundings. Eighty-one percent of the respondents to Question 41 agreed that they are affected by their surroundings. In Question 5, “surroundings” ranked dead last of five possible

categories offered. While this may appear contradictory, these questions are related but separate. In Question 5, students were asked to rank multiple conditions. In this question, they are simply indicating their surroundings have some influence on them.

Question 42: A physical environment can facilitate my ability to study. Eighty percent of the respondents agree that physical environment can facilitate their ability to study.

Question 43: A physical environment can impair my ability to study. Sixty-eight percent of the respondents agree that the physical environment can impair their ability to study in contrast to the 80 percent in Question 42 who believe a physical environment can facilitate their ability to study. Respondents appear willing to credit the surroundings for their success but are less willing to admit a negative influence on their behavior.

Conclusions

In this pilot study, the researchers wanted to know what environments work for students for their perceived success at studying and conducting research.

- Respondents overwhelmingly prefer to study in locations in the home, followed by the college library and other locations on campus. There was no noticeable difference due to age or gender.

- Contrary to the researchers' expectations, there was a surprising lack of use of third spaces—coffee houses, public libraries, bookstores, diners, etc.

- Nearly two-thirds of the reasons why the college library was not a priority location for studying had to do with personal reasons: length of commute, preference for personal space, or another library, etc.

- Only one-third of the responses for why the college library was not chosen as a place to work pertained to deficiencies in the college library, such as lack of space and comfortable surroundings, too much or too little sound, and too many distractions.

- Computer access, space to spread out, and quiet are the most important aspect of a space necessary for comfort while studying. However, looking at this data categorically, body comfort items were most needed followed by technology items, and then light and auditory conditions, and finally items in library users' surroundings.

- Respondents under thirty-nine years of age picked "computer access" as their number one comfort need, while respondents forty and over picked "quiet" as their number one comfort need.

- Overwhelmingly, students report a need for computer access in order to study effectively.

- Distracters to studying in order of importance are: others talking, interruptions, noise, hunger, silence, and other distracters. There was no difference in responses by gender and very little difference by age range.

- If respondents could change anything about the Dowling College library, they would increase the space of the library or make the existing space appear larger (24%). Then, they would increase the number of student-use computers, printers, and plug-in places (both electrical and network access) for laptops (22%). Rounding out the top three responses is comfort (13%); students asked for more couches, pillows and comfortable spaces in which to work.

- Students are clearly pressed for time; 84 percent of them report they are working while going to school. As a result, they may not stop and take stock of their environment.

- Over eighty percent of students agree that they are affected by their surroundings and the physical environment can facilitate their ability to study. While still a majority, only sixty-eight percent admitted that their surroundings can impair their study success.

Future Research

The data collected from Dowling College students provide clear suggestions as to how the library might experiment with the physical environment to further entice students to use the facility.

The researchers would still like to identify a clear, predictable relationship between environment and student research/study success. They would like to establish links between formal classroom learning spaces/environments on campus and informal learning spaces/environments. The challenge remains to create spaces that inspire as well as fulfill specific activity needs and include accommodation of contemplation as well as conversation, computing, and reading.

But, do the survey results simply indicate that "home," whether dorm room or personal home, is just plain superior for personalization of accommodations, privacy, and time convenience? And how does this clear preference align with the respondents' reported belief that their surroundings are not important in their choice of study space? Future experimentation will help clarify this apparent contradiction. The question also arises as to whether or not there are other spaces on campus where library services could be more successfully delivered in informal ways.

For further study, the researchers will also need to develop assessment tools or rubrics to help determine

what qualifies as “student study success.” To date, success in libraries is often simply equated to library occupancy and duration of visit. Are there not more sophisticated methods to track student study success, or learning, with library attendance other than applying information instruction outcomes theory and testing?

Notes

1. William Dittoe, “Innovative Models of Learning Environments.” In Nancy V. Chism and Deborah J. Bickford, eds., “The Importance of Physical Space in Learning Environments,” *New Directions for Teaching and Learning* 92, winter (2002): 81.

2. Mihaly Csikszentmihalyi and Kim Hermanson, “Intrinsic motivation in museums: What makes visitors want to learn?” *Museum News* 35, no.7 (1995): 34–61.

3. *Ibid*, 35.

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