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Commuter Campus in Transition

Meeting the Changing Needs of Students
through Mixed-Methods Assessment

Indiana University-Purdue University Indianapolis (IUPUI) is an urban research university with approximately 30,000 commuter and residential students. In 2015, the library administration was successful in gathering campus support for the first large-scale renovation of the University Library (UL) since its construction in 1993. In the years since it opened, the IUPUI campus and its student body have changed dramatically. The number of full-time students has increased by nearly 8,800 (69.9 percent), and the average freshman SAT score has increased by 182 points. The number of students living on campus increased from 350 in 2003 to more than 2,000 in 2014 (IUPUI 2014).

Although IUPUI has historically been a commuter campus, the student body is moving toward more traditionally aged, residential students. This shift is due in part to an IUPUI Strategic Plan initiative called Promote Undergraduate Student Learning and Success that includes increasing retention and grades and decreasing time to graduation (IUPUI 2017). The IUPUI administration has cited national studies which indicate that students who live on campus get better grades and have higher graduation rates (see, e.g., de Araujo and Murray 2010; National Survey of Student Engagement 2017). Under the eleven-year tenure of Chancellor Charles Bantz, IUPUI student life has greatly

expanded as seen in the construction of the Campus Center, new student housing facilities, and the IUPUI Honors College (IUPUI 2014).

For UL, the shift from primarily commuter students to a mix of commuter and residential students poses a challenge when considering space needs. Residential students may move in and out of the library throughout their day or want longer library hours because they live on campus; commuter students may need computer access (rather than carrying around a laptop all day) and a place to study for an extended period of time between classes. While the student body changed, the library was not well positioned to change with it. Student study space is primarily located on the third and fourth floors of the library's four-story building; however, that space was originally designed as open stacks, with little space devoted to study furniture.

Because of the shift in enrollment, increasing student study space became the top priority for UL staff. Library administrators asked for a renovation to increase the quality and amount of student study space, enhance wayfinding, augment access to electric power, and upgrade the quality of library furniture. The IUPUI campus administration responded by funding a project to renovate the third and fourth floors of the library.

Librarians collected data on UL in the hope that it would empower the design team to preserve the functionality and success of existing study spaces, while also expanding on or introducing new features that students found important, useful, and inspiring. Furthermore, library staff would also be able to use the data to establish a benchmark for space usage that could be compared to data gathered after the renovation.

Two studies, started separately but later merged, have provided information about students' use of library space. They have aided librarians in identifying critical features that students value in library and non-library study spaces to include in the renovation planning. The studies combine quantitative and qualitative elements and different methodologies. The first was a smaller ($n = 27$) mapping study using SMS (texting) in combination with one-on-one debriefs to track student movement over the course of an entire day. The second used an in-library assessment to quantify student space use ($n = 10,076$). By combining in-library and out-of-library studies, UL can better plan library space, not only for current users, but also for students who are not in the library (non-users). These studies were intended to help campus architects and designers understand the student experience in the IUPUI University Library, especially as it differed from other libraries in the Indiana University (IU) system. In recent years, IU has renovated several libraries. The Herman B. Wells Library on the Bloomington campus, in Bloomington, Indiana, a traditional residential campus in a rural setting, was the latest library to be renovated. UL staff wanted to ensure that UL was considered in its context, as an urban campus with a mix of commuter and residential students. UL hoped the studies would provide data to help the space meet the needs of both types of students.

INSTITUTIONAL CONTEXT

IUPUI is located near the center of downtown Indianapolis, which is the fifteenth largest city in the United States (Evans 2017). Approximately 70 percent of the university's 30,000 students are undergraduates, with the other 30 percent in graduate or professional programs. Seventy-three percent of students attend IUPUI full-time (IUPUI Institutional Research and Decision Support 2017b). A majority of students come from the county in which IUPUI is located (Marion) or the four counties on each side (Hendricks, Hamilton, Johnson, and Hancock). For example, in Spring 2017, 60 percent of students came from one of these five counties: 33 percent from Marion County, and 27 percent from the four surrounding counties (IUPUI Institutional Research and Decision Support 2017c). As of 2015, 32 percent of undergraduates were the first in their family to attend college, and 14 percent of the student body were international (Dace et al. 2016). Regarding race, IUPUI is a relatively diverse campus, with 68 percent of students identifying as white, 9 percent black, 7 percent international, 6 percent Hispanic/Latino, 5 percent Asian, and 4 percent two or more races (IUPUI Housing and Residence Life 2017b).

In 2007, about 8 percent of first-time, full-time beginner students lived in campus housing, compared with 91 percent who did not. By 2016 that percentage had risen dramatically, and almost 49 percent of first-time students lived on campus (IUPUI Institutional Research and Decision Support 2017a). As the student population shifted to become more residential, new residence halls have been built to accommodate demand. There are now three residence halls and on-campus apartments. North Hall, the newest residence hall, completed in 2016, is the first traditional residence hall constructed at IUPUI since the campus was founded in 1969 (IUPUI Housing and Residential Life 2017b). Of the other two residence halls, Ball Residence Hall was built in 1928 and predates the founding of the university, and University Tower was formerly a university hotel, which was converted to a traditional residence hall in 2013 (IUPUI Housing and Residential Life 2017a). On campus, traditional residence halls feature dorm rooms with a dining hall in the facility, while other near-campus housing includes self-contained apartments. Off-campus housing options located within five miles of campus but not owned by the university have also grown (ForRentUniversity.com 2017).

University Library (UL), built in 1993, is the main campus library at IUPUI. Including UL, there are five campus libraries in total. The remaining libraries are the Ruth Lilly Law Library at the Law School, the Dental Library at the Indiana University School of Dentistry, the Art Library at the Herron School of Art, and finally the Ruth Lilly Medical Library on the medical campus. These other campus libraries primarily serve students in their respective programs. UL is the library for all other IUPUI students and students served by other campus libraries, since it is generally open more hours than the others. UL is centrally located on the IUPUI campus, and the other campus

libraries are all about equidistant from UL. The research projects described here were conducted at UL and with students who would use UL, rather than other campus libraries.

MAPPING STUDY

In Fall 2015 IUPUI participated as one of eight universities in the “A Day in the Life” (ADITL) project, a multi-site ethnographic study of students’ space use practices.¹ The study used a mixed-methods approach to data collection: combining text message (SMS) surveys delivered via students’ cell phones and qualitative debrief interviews. The study examined space use by constructing a detailed map of each student’s day, including tasks and activities, spaces and locations where the student did their work (both academic and day-to-day), and the ways the library and other campus locations fit within the student’s overall educational experience. The use of mapping as a way to better understand the authentic student experience has been used frequently in library research (Cowan 2012; Delcore, Mullooly, and Scroggins 2009; Foster and Gibbons 2007; Khoo et al. 2013; Sharman 2017; Twiss-Brooks et al. 2017).

Methodology

The IUPUI Office of Institutional Research and Decision Support provided a sample of students from all majors and grade levels (except for the School of Medicine, which is technically an Indiana University Bloomington, rather than an IUPUI, program). Recruitment e-mails were sent to students and, from the initial list, $n = 31$ agreed to participate in the study. Of the original participants, $n = 27$ completed the text messages and debrief interview. Each was paid \$20 for their participation in both the survey and the debrief. Participants chose one of two workweek days to receive the text message surveys. They were asked to choose a day of the week that would be most representative of their regular schedule. During the chosen day, each participant received 12 surveys about 75 minutes apart. Survey distribution was automated using the SMS functionality of Qualtrics, the online survey system. The 75-minute interval was chosen so that students would receive texts at different points of the hour, avoiding situations such as having every text arrive during a class period. The survey consisted of three questions: their location; what activity they were participating in; and how they felt at that time. Text message surveys started at 9:10 A.M. and ended at 10:55 P.M. Participants were instructed to wait to answer a text message if it would interrupt a class or be unsafe to answer (for example, while driving). In those cases, students were told to answer when it was feasible to do so and to indicate what they were doing when the original message arrived.

After the survey was completed, researchers used the responses to create a map for each student. The map was used to guide participants through a semi-structured debrief interview that sought to get more depth and nuance about their daily experiences, where and why they did their academic work, and other day-to-day activities. Each debrief interview took approximately one hour. During the debrief, exact locations (e.g., addresses) were elicited for each text event. These locations were entered into Google Maps to get exact latitude and longitude. This allowed for an analysis of the distance traveled and the distance between locations. Interviews were transcribed and coded using Dedoose qualitative data analysis software. The protocol was approved by the Indiana University Institutional Review Board (IRB).

Demographics

As previously stated, twenty-seven participants completed both the text message surveys and the debrief interview. Responses by student status were fairly equally distributed, with slightly lower participation from first-year and senior students. Note that no graduate students were recruited. This was deliberate, since graduate students typically have a much different academic and work schedule than undergraduate students. Only 22 percent of participants lived on campus, and 78 percent lived off campus.

A wide variety of majors were represented, with participants from each of the following: tourism and event management, psychology, mechanical engineering, communications, computer information technology, elementary education, nursing, sports management, biology, business, ceramics/French, dental hygiene, exercise science, geography and environmental science, media arts and science, respiratory therapy, and one undecided. The representation of majors is important, since other UL space use surveys have shown that students in majors whose buildings connect to the library (e.g., business, education) use the library more often. Significant for space planning, this study did a deep-dive into the location and study space preferences of many students whose departmental buildings are not next to UL.

SPACE STUDY

Prior to the renovation of the third and fourth floors of UL, library staff initiated a research plan to record the use of library spaces and evaluate student feedback on their use and students' perceptions of library spaces and services. The full plan included a space study, a library in-use survey, a survey of students who did not use the library, and data collected for public questions posted on whiteboards around the library. This chapter includes the results of the space study. Because the primary purpose of the study was to improve the

service of the library and no identifying student information was recorded, it was deemed exempt by the Indiana University IRB.

The space study only included areas included in the renovation: the third and fourth floors of the library. The first floor of the library houses library administrative offices, technical services, the Center for Digital Scholarship, meeting rooms, and campus partnerships such as the Center for Teaching and Learning and the Office for the Vice Chancellor of Research. The second floor contains the circulation desk, a computer classroom, campus partnerships such as writing and math centers, and computer clusters. Because renovating them would require more costly structural work and negotiation with campus offices, and would not free up much space for additional student seating, it was deferred for a future renovation project. In contrast, the third and fourth floors are large, originally designed to house open stacks, and are easier to renovate. The third and fourth floors are similar in layout, with a mix of book stacks, computer clusters, and seating spaces, and there are few campus partners housed on those floors. Moreover, each floor also has a distinct environment that is controlled to foster different informal learning preferences. The third floor is a quiet floor, and contains seating arrangements intended for individual or paired study. The fourth floor is furnished with large tables and booth seating and is more conducive to group work and collaboration.

Methodology

Observation, when unobtrusive or passive, is a constructive way to collect data when use of a program, facility, or services is not directly connected to systems like a card reader or sign-in log (Biddix 2015). This method has long been a part of ethnographic research, and there is a recent increase in its use in library space assessment literature (Dominguez 2016; Hughes 2011; Linn 2013; Melssen 2014). A “seat sweep” is a method of observation in which the users in a defined area of the library are counted while a number of behavioral variables of those users are recorded (e.g., technology present, furniture in use, etc.) in timed intervals across a set number of days, weeks, or more. Analyzing library spaces to learn about students’ preferred locations, most-used furniture types, and the activities students engage in can inform space-planning decision-making. As a result, library staff determined that this method would be useful in answering questions generated from the renovation research plan.

Working with campus architects and designers, library staff decided it would be most beneficial for the renovation design to observe a number of activities occurring on the third and fourth floors of the library during the peak period of the semester (during finals) and again during a period of more normal use of the building.² The observational intervals occurred every two hours beginning at 10:00 A.M. and ending at 6:00 P.M., a total of five

observations per day, for five days, Monday-Friday. The first observation took place during the fifteenth week of the Fall 2016 semester, and the second observation occurred during the eighth week of the Spring 2017 semester. A team of approximately twenty library staff members volunteered to conduct the observation.

Library staff used Suma, an open-source, mobile, web-based assessment toolkit developed by North Carolina State University Libraries, to collect user counts. The Suma software platform, deployed on iPads, made it easy for staff to move quickly throughout library spaces and record data. The layout and interface were customized to develop a hierarchy named for specific areas on the third and fourth floors, and categories were added including group size, work surface type, and technology type. Inside each category was a list of attributes or activities. As library staff moved throughout the floors, they collected information within each area, choosing all the attributes and activities within each of the three categories that matched their observations.

A sample observation illustrates how this worked. An observer began by choosing the “East Window” area; as they moved through the area, they filled out each category. Two students sitting together (group size: “2”) at a table (surface type: “table-small”) appeared to be studying. The observer noted that one student had a textbook while the other was taking notes on a laptop. They both had snacks, and there were papers and notebooks across the table (technology: “book,” “laptop,” “food/drink,” “printed documents”). Once all of the observations were recorded, the data was saved and stored on a secure library server.

Choosing to record predefined attributes and activities with Suma meant that observers sacrificed a certain degree of nuance because an open response box was not included in the data collection form. For this project, however, recording specific details about the activities and behaviors of library visitors was eschewed in favor of speed and quantity of data collection. By advertising that observation would take no more than one hour to complete, more library staff volunteered to observe and more observation times became possible. Training became easier as well, and saved researchers the need to decipher many separate shorthand note-taking techniques. Using the uniform Suma collection form was simple and straightforward to explain, and made it easy to add a significantly greater number of total observations to the dataset.

RESULTS

Mapping Study

The mapping study gave us a broad picture of how students spent their time.³ Although not originally intended as a space study, this data has helped inform our space planning because it allows us to better understand students’ use of space and their study space preferences. Most importantly, since the participant

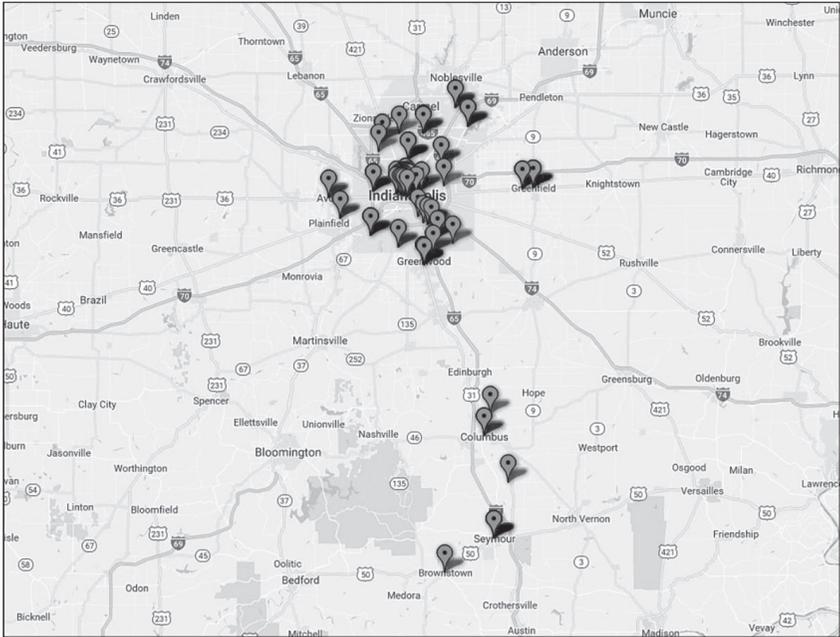


FIGURE 2.1
SMS study participant locations

sample was diverse, we captured data from library and non-library users. Not surprisingly, since a majority of participants commuted, students reported a lot of movement between campus, home, work, and other locations (figure 2.1).

However, although students had high ranges of distances traveled, this did not correlate to extensive commuting time (table 2.1). Parking was frequently mentioned as the worst thing about the campus and, betraying our roots as a commuter campus, lack of campus life was also mentioned as a negative. Overall, in survey responses, on a typical workweek day students reported spending the most time studying or doing other academic work (21 percent), with attending class (20 percent) and family, social, or recreational activities (19 percent) a close second and third. Respondents spent 12 percent of their time eating, 12 percent doing other things, 9 percent working, and 7 percent commuting.

TABLE 2.1
SMS study participant travel distances and times

MEDIAN DISTANCE TRAVELED (M)	MEDIAN REPORTED COMMUTE TIME (MIN)	MEDIAN ESTIMATED TIME (MIN)	AVERAGE DISTANCE BETWEEN LOCATIONS (M)
10,878	25	15	2,820

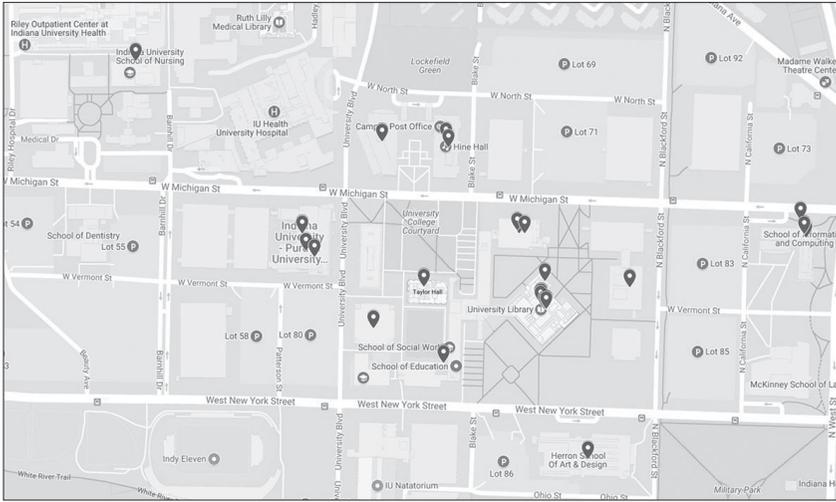


FIGURE 2.2
SMS study participant study locations on campus

When examining the campus locations in which students responded they were studying, classroom buildings, the University Library, and the campus center were the most frequent (figure 2.2; note that the campus center is indicated on the map with the large-print Indiana University-Purdue University).

The qualitative debriefs gave us a more nuanced glimpse into student perceptions of the library, where students usually study, and why they preferred to study there. When students were asked about the day they participated in the surveys and why they studied where they did, convenience was a primary factor when choosing a study location. While they might not prefer to study at a certain location, if it fit into where they were coming from or going to, they would study anywhere. For example, “So I just stayed there [at the Nursing Building] and ate lunch and studied between the class and the test.” Convenience also kept commuter students on campus for extended periods of time, rather than struggling with the overhead of parking. For example, one participant came to campus at 9:30 A.M. for a noon class, “so I sit around on campus for about two hours doing homework because I can’t find parking.” Residential students were more likely to pop in and out of study locations and go back to their dorm rooms.

When asked where they normally studied and why they liked studying there, many respondents indicated the library because it was quiet and the atmosphere facilitated studying.

I like to study more [at the library] though, because I’m more focused than I am at home. I feel like at home all I want to do is lay in my bed. Every time I go home I just get into bed. But whenever I’m here I get everything done before I go home. So normally I’m on campus longer doing homework.

[Studying at the library] takes me out of my environment at home. My environment at home is way too comfortable. So it gets me upright at a desk. And I like it when other people are around but not in my business. So their vibes kind of keep me, keep me focused. And it's quiet.

As mentioned, the third floor of UL is designated as a quiet floor, and multiple respondents specifically mentioned the third floor as the place they preferred to study. Another large segment of respondents indicated they normally studied at their home because they liked being alone and all of their belongings are there. For example, "I just feel more comfortable at my house. And, I can wear whatever I want." While the overwhelming preference was for solo, quiet study space, a couple of respondents indicated they liked getting together with friends to study. Speaking to a continued need for computers, several respondents mentioned access to computers as a study space preference whether in the library or in computer labs across campus. Responses to a question asking about the difficulties of studying at IUPUI mirrored the previous question. Noise, finding study space or a computer, and finding plug-ins were frequently mentioned as difficulties.

Observation

Observation revealed several notable findings regarding student use of the library. The observed floors were busiest between 10:00 A.M. and 4:00 P.M., and each floor had unique occupancy patterns during these periods. The most notable trends in occupancy for both floors were the difference between Friday and the other weekdays, and the fact that more people chose to occupy seats on the fourth floor than the third (figure 2.3). A more detailed examination of the data, however, reveals several other differences between the two floors. The third, or quiet, floor saw greater variation between the times that observed library spaces were most and least occupied throughout the different periods of the day as well as throughout the week. The numbers recorded on Monday and Tuesday were significantly higher than those recorded during the rest of the week. In contrast, the collaborative fourth floor saw occupancy patterns that were much more consistent on a day-to-day basis, with usage following a similar pattern throughout the same periods of time each day. Additionally, the difference between the highest and lowest occupancy counts for the fourth floor was less extreme than the third floor; seating on the fourth floor was used more consistently throughout the hours of observation.

Most frequently, students were observed studying alone rather than in pairs or groups. Of $n = 10,076$, 86 percent of all students observed in the library were sitting alone, regardless of the floor. Students were observed studying in pairs 11 percent of the time, with groups of three to four students observed 3 percent of the time. Less than 0.5 percent studied in groups of five to six students and less than .05 percent of students were in groups of seven or more.

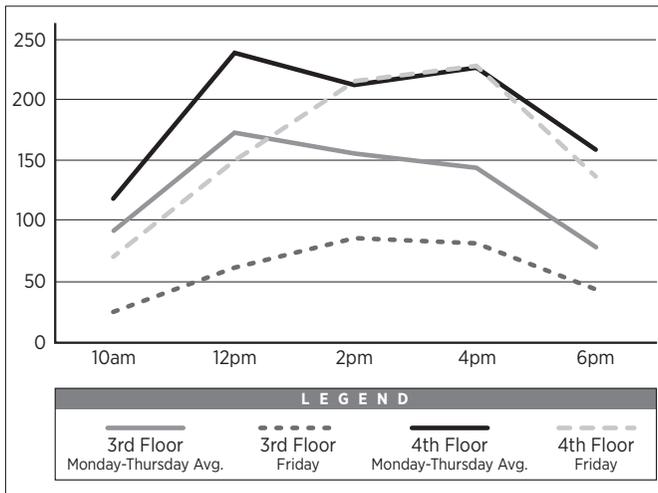


FIGURE 2.3
UL third- and fourth-floor usage patterns

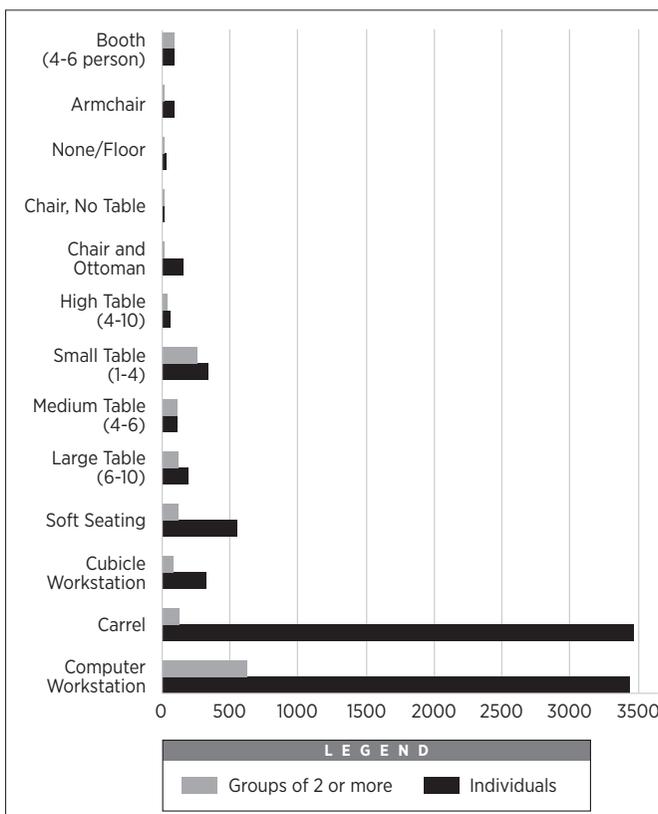


FIGURE 2.4
UL seating choices of individuals vs. groups

For those studying alone ($n = 8,924$), students overwhelmingly chose seating designed for or conducive to individual study such as carrels or computer workstations. However, in some cases individual students were observed using seating types that are most accommodating for groups of users, such as large tables, booth seating, or group cubicle workstations (figure 2.4). Looking proportionally, the seating choices for groups of two or more students ($n = 1,623$) mirrored the seating choices of individuals. In particular, groups of two or more students favored computer workstations. Groups chose to study together in carrels proportionally less than individuals, favoring computer workstations and tables of all sizes instead. Of the groups observed in carrels ($n = 132$), nearly all of them were groups of two.

INTERVENTIONS

The data collected in both the mapping and observational studies proved incredibly helpful to the design team working on the renovation. The findings allowed the group to set an agenda aimed at improving the quality of individual study on the third floor and the quality of collaborative study on the fourth floor. The campus administrators, architects, interior designers, and librarians working on the team all wanted to create spaces that improved the library experience for students. Though all parties did not initially agree on the best ways to accomplish this goal, the data collected by the studies helped the group to identify areas of opportunity.

Originally, campus administrators sought to create more group study space on both floors. However, by using student data that showed both the use and expressed value of the quiet floor, librarians were able to redirect the impulse to create new collaborative study space into improving noise quality and creating better study spaces for individuals and pairs. Students in the mapping study debrief mentioned the quiet floor in particular as an important place to study on campus. Observational data confirmed high usage of the area. Outside of this area, there is relatively little space designed for quiet study on the IUPUI campus. Data from these studies helped inspire designers to expand quiet study space by creating two silent rooms on the quiet floor. These rooms are enclosed in glass, and offer the added benefit of improving noise quality on the floor by deflecting noise upward through the library's atrium to the fourth floor. In addition, the observation revealed that many students on the quiet floor studied in pairs; yet the furniture in place did not easily facilitate this kind of study. Designers created seating on the third floor designed for two students to work side by side in a quiet environment.

The fourth floor was the library's most occupied floor during the periods of observation. The interior designers proposed removing computer workstations on this floor to create more space for collaboration, since many students have their own devices. Again, in this case, data from the studies changed the discussion. Many students in the mapping study indicated a preference for

public computers, and 40 percent of students in the observational study were sitting at a computer workstation. It is possible that with a large population of commuter students, UL needs computers more than libraries on traditional campuses do. Commuter students may not always have technology with them as they travel between work, home, and class. Moreover, many students were observed using both library computers and personal devices, creating the effect of computing with multiple screens. With this information, the designers recommended keeping the existing computer workstations.

An area of the fourth floor renovated in 2013 to facilitate group study and collaboration was easily the most occupied portion of the library. Library staff encouraged the designers to increase collaborative study space on the fourth floor and, as a result, designers created space for open concept study rooms, partitioned with three walls and no doors. The library already has a cadre of forty-two reservable study rooms. The open concept study rooms are designed for serendipitous group study. Similar to some existing study rooms, these spaces will accommodate two to six students. Yet, these rooms differ from study rooms because they are constructed with only three walls, and students will be able to write on them with dry-erase markers. Furthermore, to address the observation results that demonstrate students' preference for sitting alone, the designers will also include a number of new modular seats and single-person study carrels.

CONCLUSIONS AND NEXT STEPS

IUPUI's history as a commuter campus has influenced faculty and staff to be both critical and industrious when it comes to applying best practices or embracing trends. Librarians, especially, understand that conventional practices that were studied and created in residential environments may not yield the intended results on an urban, mixed commuter and residential campus. As a result, research and assessment within the IUPUI context are often required before making significant campus changes.

UL has a strong and thriving culture of assessment. Librarians and library staff regularly engage assessment tools and reflection to ground the library's practice in evidence that is relevant to the unique experience of the IUPUI campus. Librarians frequently collaborate with each other to develop tools to offer insight into the interworking of library processes and service. UL administrators use data to guide the organization in the achievement of its mission and goals, and regularly encourage librarians to share the results of assessment projects.

The melding of these distinct studies has reinforced to librarians the importance of collaboration beyond library units. Strong inter-unit communication allowed these assessments to prove more powerful than if they had been analyzed and implemented separately. Both studies confirmed what library staff already suspected, that students prefer to study alone. This data gave librarians an advantage in articulating student needs in the design of

new library space. Designers and campus administrators were receptive to developing spaces that accommodated students' existing study preferences, while also pushing innovative ideas into the designs.

The main limitation of the space study was its focus on the third and fourth floors of the library. This limit was imposed intentionally, because the campus administration chose to renovate only those floors of the building. However, this focus limits our ability to make generalizations about the patterns of movement and use of the whole library. This limitation is mitigated in part by the nature of public space at UL. The library is composed of five levels including a basement, of which public, student-facing library space is mainly on levels two, three, and four. Library staff effectively observed two-thirds of the public space. The limitations of the mapping study were similar to other studies with small sample sizes (for example, focus groups, usability testing) in that while there is greater opportunity to thoroughly understand the student experience, no statistically significant conclusions can be drawn from the dataset. There is also the issue of volunteer bias in that those who agreed to participate may have more interest in the library than those who didn't participate. There is no guarantee that the students who participated in the mapping study are representative of all IUPUI students.

Solo study space (e.g., carrels) and desktop computers may not be as in vogue as innovative collaborative spaces, but to ignore student preferences would be to not listen to our constituents, the primary users of the space. Additionally, the results of the mapping study raised questions of what (if anything) UL can do to help commuting students, especially since IUPUI has an almost equal mix of commuter (1,848) and residential (1,764) first-time, full-time beginner students (IUPUI Institutional Research and Decision Support 2017a). Though this number is on the rise and more off-campus options near campus are becoming available, the large majority of IUPUI students still qualify as commuter students. UL must recognize that circumstances beyond our control may influence space usage; for example, commuting students might sometimes view parking difficulties as a barrier to coming onto campus. We may do everything right and still not be able to reach some commuter students. Yet, for those students that do use the library, we will continue to work unceasingly to provide a twenty-first-century learning environment that is conducive to quiet study, active learning, collaboration, inspiration, and innovation. UL will adapt to meet the changing needs of our student population even as the campus transitions to its new, more residential identity.

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NOTES

1. The universities that participated in the full study were Indiana University Bloomington, Indiana University-Purdue University Indianapolis, Gustavus Adolphus College, University of Colorado Boulder, University of North Carolina Charlotte, NYC College of Technology CUNY, Borough of Manhattan Community College CUNY, and Brooklyn College CUNY. Protocols are available at the 2015 Library Assessment Conference proceedings, <http://libraryassessment.org/bm~doc/70-asher-2016.pdf>.
2. Protocol is available at IUPUI ScholarWorks, "Suma Space Assessment Protocol," <https://scholarworks.iupui.edu/handle/1805/13879>.
3. For the SMS study, here we only report on the IUPUI part of that collaboration. Full eight-campus results were presented at the 2016 Library Assessment Conference, <http://libraryassessment.org/bm~doc/70-asher-2016.pdf>.