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Designing library learning space: an evaluation of the student experience

Alexia Maddox, Bernadette Lingham and Colin Bates

Abstract

This paper presents the methodology for a post-occupancy evaluation of how Deakin University Library space supports student learning goals. The case study provides a critical discussion of the mixed-methods research approach that included ethnographic data collection, an interactive exhibition of student experiences, and an observational survey of library space use. A key contribution of the paper is the organizational value of, and resourcing considerations for, the methods used. We anticipate our approach and findings will be of relevance to academic libraries and their universities to assist informed decision making on evaluation methods, as well as organizational commitments for post-occupancy space evaluation designed to deliver student-centered learning outcomes.

Keywords: Library space evaluation, learning space evaluation, student-centered learning, academic libraries, research methods, Post-Occupancy Evaluation (POE)

Introduction

Evaluating how library space support students to achieve their learning goals is a unique and timely conversation within the research literature and within the higher education context. In this paper, we consider the post-occupancy evaluation of recently redesigned spaces within Deakin University Library. From this research based case study, we present selected findings and our methodological learnings. The research is situated within the broader context of institutional drivers for learning space development and evaluation. We relate this to how a university library can respond to, and lead, the discussion for what makes a quality library learning space from the student perspective. We discuss the organizational value of the research, and the conduct of the evaluation to contribute evidence-based learning to the design of new and remodeled student learning space. The evaluation methodology is presented with the aim of assisting other university libraries that are planning or undertaking space development and post occupancy evaluations, to deploy an evaluation approach that yields informative and student-focused findings.

The university library: agendas for space evaluation

Deakin University is Australia's eighth largest university, spread across five campuses (including an online Cloud Campus). In Deakin's context, teaching in the Cloud, and our Cloud Campus, refers to the extensive use of online teaching and the cohort of students who traditionally enroll either fully or partially in a distance education mode, and includes those on campus students electing to study online units. At the time of the study, more than 50,000 Deakin students were located over four physical campuses, one in Melbourne's eastern suburbs, two in the port city of Geelong, and one in Warrnambool on the southwest coast of Victoria. In addition the Cloud Campus is accessed by all students, a fifth of whom may only be enrolled in online study. The University Library contributes to a vibrant campus life by providing students and staff with creative physical and cloud learning environments, complemented by a pervasive range of online resources and services. Deakin University's strategic plan places a strong emphasis on delivering a "brilliant education" and "delightful student experience" (Deakin University 2015 p. 4) that supports learning anywhere and anytime, and empowers students for the jobs and skills of the future.

A comprehensive strategy to improve and renew Deakin University Library space was planned and implemented over several stages, commencing in 2008. Such library redevelopments are now familiar within the Australian (Bailin, 2011; McNamara, 2012) and global higher education environment (Bryant, Matthews, & Walton 2009; Dewe, 2009). Increasingly academic libraries are characterized less as collection repositories, and more as a

student-centered active learning and collaboration space (Jaggars & Wolven 2014) created with significant financial investment.

The development of quality Deakin University Library learning space responded to a strategic approach negotiated by the library within the wider teaching and learning environment of the University. At Deakin University there exists strategic commitment to providing students with an excellent learning experience that engages them with the university. Within the literature, the pedagogical approach informing this agenda is referred to as student-centred learning and gave rise to our focus upon how library space supported student learning goals (Lee & Hannafin 2016; Zhu, Au, & Yates 2016).

Library learning space developments were informed by collaborative Deakin research which documented a suite of key Criteria of Quality in Academic Library Spaces (Abbasi et. al. 2012; Horn, Lingham, & Owen 2014). Key design principles included: space design responding to student-centric needs; integration of high-end technology throughout; contribution to student learning experiences, engagement, and sense of place on campus; enabling students to connect, collaborate, and learn in person and online. The completion of our most recent re-development project at the Geelong Waterfront Campus Library in 2013 provided an ideal opportunity for us to build on our previous research and develop an enhanced space evaluation framework. The revised framework would illuminate the values associated with learning space through an examination of user behaviors and use patterns, coupled with an exploration of the impact of space on students' learning experiences. Consequently, research data offering evidence that library space has a positive impact on student learning goals, experiences, and engagement would provide a strong argument for the value of major building projects or space redevelopments within the library.

The evaluation methodology and its contributions

As noted by Susan Roberts and Margaret Weaver (2006) the key to an evaluation is clarity around its objectives. Similar to the mixed-methods evaluation approach reported by Michael J. Khoo et al. (2016) the evaluation aimed at understanding how the library supported its clients to accomplish their goals. The evaluation was conducted through a research paradigm, with research ethics clearance [HAE-14-066], and the research questions were aligned with organizational objectives. The questions directed the development of the research methodology which comprised two stages. The first aimed to set the parameters for success for the evaluation (behavioral markers), and the second to establish the most effective methods to provide insights into how students were using library space and whether this space supported their learning goals. Deakin's academic year comprises three 11 week teaching periods (trimesters). The study aimed to view library space early in the commencement of teaching (week 3), during the first round of assessments (week 6) and leading towards the examination period at the end of the trimester (week 10). Student learning goals respond to the changing requirements of the curriculum over this teaching period and are constituted by short term, mid-term and long term student ambitions.

Stage one of the research aimed to translate the architectural indicators for quality library learning space developed previously by the library (Horn et. al. 2013) into success criteria – in this case observable indicators of user behaviors (behavioral markers). Stage two was designed to apply these quality indicators to illustrate how library space, post occupancy, was performing in supporting student learning goals. The research questions focused initially upon understanding how library managers anticipated their space design to perform post implementation. For this, stakeholder interviews were conducted prior to the start of the trimester to establish how to compare the anticipated performance and expected engagement practices within library space, with actual student experiences and use patterns. To establish an observational baseline for how library space is used by clients, the first research question asked how use patterns indicated quality learning space in the student experience. The second research question aimed at illustrating the link between students' experiences and engagement patterns with library space and how this related to their learning goals. This question sought to make the connection between how library space was being used and the impact of this space upon the student experience. Consequently, the question was broken down into two sub questions for the evaluation. These were:

Sub Q1: How are library spaces perceived to assist students achieve their learning goals?
Sub Q2: How can student use patterns of the library indicate a quality learning space in which students can achieve these goals?

With the overarching research question highlighting a focus on use patterns, student experience and quality learning space, the sub questions directed the evaluation design towards two approaches. The first and more qualitative sub question focused on identifying how library space may assist students in achieving their learning goals. The second, a more quantitative sub question focused upon documenting the use patterns within the library space. Consequently, the research questions directed the development of the evaluation methodology to produce both qualitative insights of the student experience and quantitative insights into engagement patterns within library space.

The evaluation design incorporated a mixed-methods and multi-sited approach to create both depth and representative insights into how library space was being used. See Susan E. Montgomery (2011) for further discussion of the value and contributions of qualitative and quantitative methods in providing insights into library users and their space needs. Whilst a multi-sited study of library space is not unusual for distributed university campuses it does bring its own methodological challenges and requires data sets for each site to be distinct from each other. For an example of ways that multi-sited library space studies have been approached, see the work of Francine May and Alice Swabey (2015). In this paper, we will focus on discussing the applications of these techniques within the evaluation approach and consider the organizational value that they provided.

For qualitative insights, we followed common practice within library space studies and incorporated an ethnographic observational approach which we refer to here as participant observation. This approach is sympathetic to data collection techniques that actively engage students through play. It complements more passive techniques based upon structured observational surveys of space and students (see the following section for a discussion of this). Techniques selected responded to a longitudinal approach. This approach aimed to document changes in library space use over the trimester cycle alongside prioritizing the study of people who were active within the library space at the time of study. Other techniques that engaged the wider student population, such as a regular biennial Library Client Survey [1], provided complementary insights to those gained by observing the space directly.

Figure 1 on page 4 depicts the evaluation methodology used for the case study and articulates the relationships between the selected methods. The following section discusses the stakeholder interviews, participant observation and structured observation, and highlights how the other sources of data (the Library Client Survey and secondary data) acted to support these findings.

Stakeholder interviews

Stakeholder interviews were conducted prior to the trimester and sought the perspective from Library managers on how the space design was intended to support the student experience. The interviews were planned to translate the design approach into behavioral markers for user experience that supported a post-occupancy evaluation. Through these interviews key indicators were developed for the observation of library space. These indicators included student-centric indicators such as ownership of space and the library as an inclusive, inspiring, safe and welcoming space. In additional there were indicators for functional aesthetics such as flexible and comfortable furnishings, access to appropriate technologies and readability of space (wayfinding). A final set of indicators included the capacity for space to cater to student learning goals, for example through monitoring engagement with different types of space across the trimester cycle (social space, group space and individual study space) alongside monitoring distractions to study.

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[1] The Library Client Survey is a standardised survey conducted across university libraries in Australia and internationally.
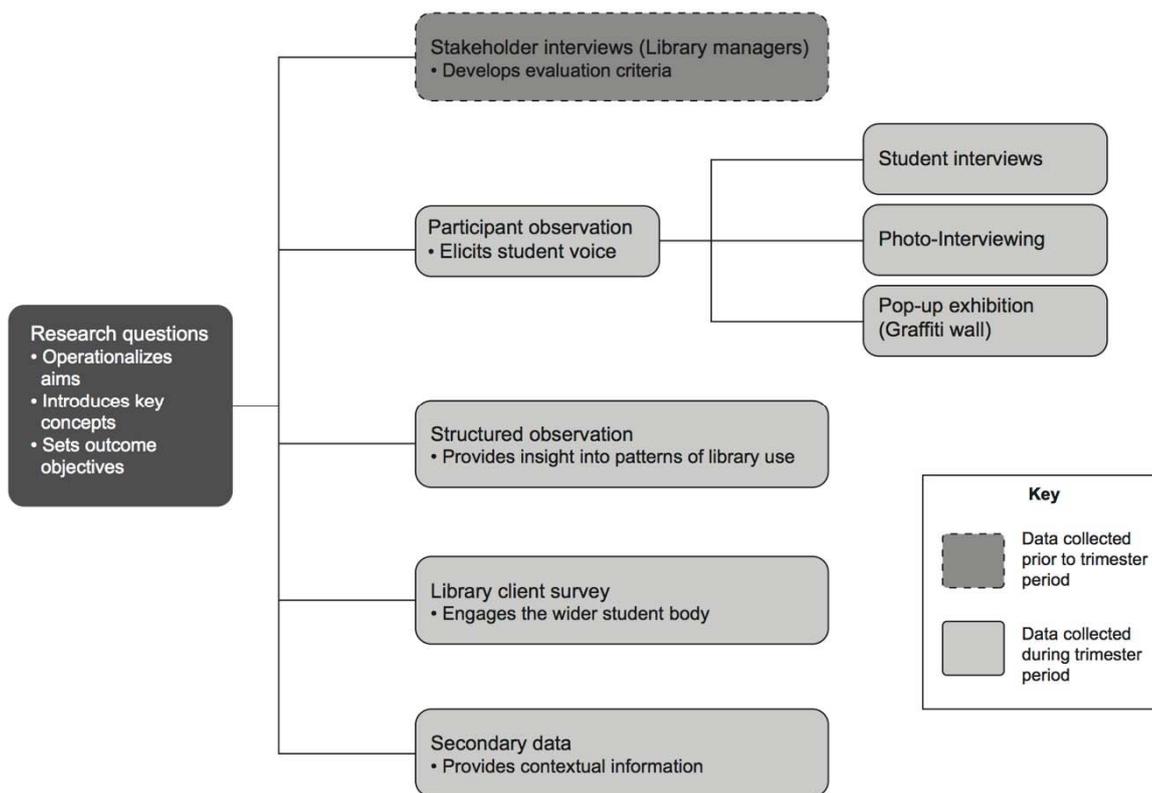
Figure 1: A visual representation of the research methodology

The second stage of the evaluation was conducted across a trimester cycle and focused on data collection within the library space under observation. Data collection across the 11 week trimester period involved collecting a mix of qualitative and quantitative data. Data comprised participant observation (including student interviews), an observational survey, a library client survey and analysis of secondary data. A question set was included in the biennial Library Client Survey which was conducted towards the end of the trimester (week 10). Also secondary data, including existing data collected by the library on facilities and resource use during the observation period, as well as university student enrolment information for that trimester, was analyzed for contextual information. Each method used made a unique contribution to the overall evaluation findings, whether delivering an insight captured specifically by that technique, or contributing to the reliability of the findings through providing complementary or contradictory insights to those provided by other methods. Within mixed-methods research this approach is commonly referred to as triangulation (Maddox 2015, pp. 65-68). Findings were analyzed by how they articulated the built environment with a focus on physical space, social layer (social configurations and dynamics) and mediating culture of library space (see Alexia Maddox 2015 for a discussion of the conceptual model used to integrate the findings).

Participant observation eliciting the student voice

As argued by Joanna Bryant et al. (2009) whilst most university libraries engage in some kind of evaluation, such as user surveys, head counts, loan statistics analysis and web metric analyses, these tools do not provide richness or depth of insight. In this study, participant observation was conducted to elicit the student voice and provide narrative insights into the student experience, particularly in their articulation of how library space may support their learning goals. Library staff (one at each campus library under observation) conducted participant observation by observing how students were using library space. Staff moved through the space in order to experience it as a user, and engage students in short interviews, which we referred to as "pit-stop conversations". Through this approach we aimed to gain insight into student experiences of using the library, to provide a sense of the student voice in the evaluation findings and develop possible explanations for observed behaviors. Participant observation periods were conducted during week 3, week 6 and week 10 of the trimester. During the

observation periods (one hour sessions) a library staff member would move through library space on different days and times across the week (Monday, Wednesday, Friday and Saturday). Using predetermined observation periods to structure insights and record patterns is an established approach within academic library space studies (Young 2003). Participant observers spent a combined total of eighteen hours observing library space and engaged sixty-eight students in the interviews.

The student interviews provided insights such as how students punctuated their study with time out and stress relief practices. They did this either by changing the tasks they were doing on their computers from writing or researching essays to gaming, or by switching between physical spaces within the library. However student use of library space was not limited to course work, relaxation and social reasons. The findings suggested that they also came to the library to learn and enact their professions, particularly through group work. For example, occupational therapy students explained during the interview how they used group rooms to discuss their course work in the manner of their chosen profession.

> Group rooms are good for privacy – sometimes group work conversations deal with contentious/controversial issues, and if snippets are heard out of context by other students they might get the wrong idea or be offended. (Participant 18, Geelong Waterfront Campus Library)

In addition to the interviews, an interactive and creative component of the data collection was developed from photographs taken during the student interviews. This practice is referred to in the research methods literature as within the suite of techniques associated with photo-interviewing (Hurworth, 2004).The observer collaborated to take a photo of students showing how they were using library space at the time of the interview, whether that be in group work, shared study or relaxing in comfortable seating. The inclusion of photographic data collection during student interviews generated visual case studies of how space was being used. In an illustrative finding demonstrating the link between insights from the interviews to the visual case studies; from the interviews, it was clear that students came to the library as an individual to get some work done, however they also came in pairs to provide each other with moral support in their studies. But student peer support went further than just ambient encouragement, as was evident from resulting images. Most of the photos taken were of students either working together or working individually but with their peers.

The images taken during the interviews were then anonymized and displayed in a pop-up exhibition which invited students to add comments through sticky notes attached onto a display board. The use of photographs to engage and invite commentary is referred to in the methods literature as photo-elicitation and can be used to provoke a response from a community (Hurworth, 2004). Through the pop-up exhibition, students were invited to share their experience of using the library and to comment on the photos. This informal approach was intended to encourage a more playful and less structured form of student engagement with the evaluation. The combination of images produced by, and of, students using library space with unstructured commentary produced a diverse range of data formats that were characterized by their location on the board and their expressive format. For example students posted up drawings, messages in languages other than English and engaged in dialogue with each other, transforming the pop-up exhibition into a graffiti wall. In response to this more playful approach to data collection, students shared how they used the library (sometimes to meet a potential boyfriend or girlfriend), what they found frustrating (people leaving their belongings to reserve library provided computers) and chatted with each other using arrows and overlapping notes to link a conversation together. Despite the more playful and unstructured nature of this method of data collection, the graffiti wall contributed the most insights into a youth culture mediating library space; alongside illustrating the creativity and sociality of students; and in providing the most insights into student learning goals. Both the student interviews and graffiti wall demonstrated strong student ownership of library space through student narrative accounts of their connection to the library and numerous sticky notes on the graffiti wall illustrating the library was like a "home away from home" during study periods.

Structured observation of library space and the role of data triangulation

Unobtrusive observational techniques contribute to our understanding of how library clients navigate and engage with library space. They can be used in concert with qualitative techniques such as participant observation and client interviews (Aabø & Audunson 2012; Mandel 2010, 2013). The structured observation of library space conducted across the trimester aimed to understand the dynamics of space engagement over the course of the day, week and trimester. The observational survey, also referred to as an observational seating sweep (Given & Leckie 2003; May & Swabey 2015), was conducted by library staff using a pre-determined schedule of sampling times. Unlike the approach of Lisa M. Given and Heather Archibald (2015), we did not aim to visualize space use through traffic tracking, instead the observational survey did aim to capture rudimentary insights into client flows within library space over time. Most effective in contextualizing the observational data gathered however, was the complementary information provided through the participant observation discussed in the previous section. Using library staff, rather than reviewing video footage or gathering sensor information, to conduct the structured observation enables us to address issues of consent and responsiveness to library client needs, alongside producing real-time and socially aware synthesis of data for analysis. Library staff moved through identified zones within the library, including social zones, group zones and individual study zones, and entered quantitative information directly into an online survey form via an iPad. Through this method, the observational survey gathered information on levels of engagement in zones under observation; recorded the number, social configuration and demographic estimates of library clients using space; recorded wayfinding behaviors and levels of engagement with technology and physical collections; Wi-Fi coverage; peer awareness; distractions to study and other spatial features in the library. These observational points resonated with the types of data that have previously been gathered through observational surveys of library space (Given & Archibald 2015; Given & Lecki, 2003). However more importantly they responded to the Criteria of Quality in Academic Library Spaces (Abbasi et al. 2012; Horn et al. 2013) established as part of previous research and redeveloped during the design phase, contributing unique insights through the incorporation of social configuration data (discussed subsequently in this section).

The findings of observational data suggested that the observed library space was most occupied during week 6 (middle of trimester) and week 10 (towards the exam period) at the Melbourne Burwood Campus Library and Week 3 and Week 6 at the Geelong Waterfront Campus Library. Peak attendance occurred at 1.00pm across both campuses during a day cycle. This suggested that the two campus libraries served slightly different purposes for their clients. In terms of cyclical demands of library space, the observation data suggested that at the beginning of trimester the library is more social (with peak use of social space); in the middle it is more used for group work (with peak use of group study space); and towards the end of trimester it is more engaged with for individual study (with peak use of individual study space). Room booking data for group study rooms however indicated room bookings peaked in week 10, at the end of trimester. This contrasted with the space engagement findings and social configuration findings which suggested that group use is more a feature of library space in the middle of trimester. From these findings it appeared likely that while room bookings increase at the end of trimester, fewer people occupy the rooms, instead using them for focused study rather than group engagement.
Findings on the gender composition of library clients was also insightful. From the structured observation, library space was observed to have slightly more women than men attending, with this being more so the case at the Melbourne Burwood Campus Library than at the Geelong Waterfront Campus Library. This finding was then contextualized through reference to university student enrolment data. When university wide population demographics for 2014 was considered there was a similar gender ratio at both Melbourne Burwood and Geelong Waterfront campuses as with the wider university population, with approximately 60% of the student cohort reported as women and 40% as men. These gender percentages translate to a gender ratio of approximately 1.5 women to every man (1M: 1.5F). This finding suggested that whilst more women attended library space than men, more men attended library space than would be expected in context of the wider campus population. The social configuration findings from the structured observation pointed to a possible explanation to this with men being slightly more likely than women to attend in mixed gender groups.

In addition to recording gender composition of library clients, observers also recorded if people came into the library or occupied space as an individual, in pairs (dyads), in groups of three (triads), four or more, which we

refer to as social configurations. The social configuration findings at the Melbourne Burwood Campus Library suggest that individuals are most prevalent in library space, followed by pairs and then groups of three. In general it appears that larger groups of four or more are less prevalent in library space, although if they are observed, they are more likely to be observed in the middle of trimester. The Library Client Survey findings indicated that just under half of the respondents came to the library because they could collaborate with their peers. Just under a fifth of respondents interacted with people from their course, or came to socialize with their friends in library space. These patterns suggest that there is a range of factors, from curriculum-connection to friendship, that influence the observed sociality within library space.

Organizational value of the space evaluation approach

The final section of this paper considers the contribution and considerations of the post-occupancy evaluation approach to the library as an organization and to the wider university context. As observed by Ricard A. Holmgren (2010) in his discussion of renovating an academic library through learning-centered design, the library is responsible for demonstrating the value of this approach to space design to the university. Indeed we would argue that within any university, the value of a library space cannot rest only on the designs, technologies and resources that are put in place. Evidence of student preference for, and value in the way a library supports learning, is a requirement if future library building or redevelopment projects are to gain support.

In terms of the overall organizational value of the evaluation approach to the library, the research findings assisted in demonstrating the value and impact of the redeveloped space on students' learning experiences through providing qualitative and quantitative indicators. Initially, the findings were discussed with key Library stakeholders, including senior managers responsible for campus library and learning space development. These insights were then applied to our understanding of student demographics, sociality, campus culture and context. Also to how space contributes to the student experience, and feeds into the redesign and ongoing development of learning space.

In addition to this long range and strategic impact of the evaluation findings, they also informed immediate adjustments to existing space. For example, we configured campus library furniture to create smaller areas to accommodate two or three people working in groups, rather than larger sized groups. The modifications also give students flexibility to use furniture as needed, and to scale up or down their individual or small group privacy environment to accommodate an expressed need for space which could support different styles of group work, student interaction and dialogue.

In the wider university context, Library managers have also used the insights gained from the research findings and post-occupancy evaluation to make a knowledgeable and evidence based contribution to university wide facilities and buildings committee discussions that influence considerations of new student learning space. We are systematically sharing our findings, experiences and learnings with colleagues who are tasked with the development of space across Deakin's physical and virtual learning environment. The Library is represented across organizational levels, contributing to high level governance and decision making committees, as well as participating in groups working at an operational level.

Our approach to space development has been validated through the report of an extensive external quality review of the provision of Deakin University Library Information Resources during 2015 (Library 2015). The Library's excellence was widely endorsed by the University community and the Review which also commended those involved for outstanding space developments across four campuses through the refurbishment programs.

Library staff contribution to the research

We engaged library staff in, and throughout, the research process. Staff members were involved in carrying out the structured observations at each campus library, and gathering the usage data under the guidance of a research advisor during the three weeks of data collection. An additional group of staff created and monitored the interactive graffiti walls.

All staff engaged in conducting research data collection processes underwent training on research practice and ethical considerations, gaining a more nuanced understanding of consent and the responsibility of an 'observational gaze'. This was most evident when we look at their role as observers. As staff monitored how students used library space, they honed and developed structured observational skills that enabled them to learn more about their clients and to consider library usage in a different way.

The participant observers who engaged in the student interviews gained insights into the student experience and saw library space from the student point of view. Staff who carried out the structured observations demonstrated higher levels of awareness and understanding of who is using space and how, and they now have more ownership of the space. Informed by their experience, they can more actively work towards making the campus libraries a better space for students.

Resourcing considerations

Undertaking a major research project is a significant resource and time commitment. The success of such a project will be influenced by a range of factors, with none more critical than the research design and methodology. An effective research design ensures that the data collected is valid and can address the initial research questions. For this project, Deakin University Library employed a research consultant with depth of knowledge and expertise in research design and evaluation to lead this process. Further, the consultant was involved at each stage of the research, shaping the design and developing sound methodologies that guided the research practice, including data collection, analysis and reporting.

Our mixed-methods research approach required us to consider and allocate resources relevant at each stage of the project. Conducting stakeholder interviews and obtaining digital trace data required lower levels of resourcing in comparison to other methods. In particular, the space observation required a significant contribution by library staff to carry out space observations across collection periods. Detailed data was obtained, analysed, reported back to library stakeholders and applied in ongoing redevelopment of learning space. Other methods, including the participant observation approach, required moderate levels of resourcing. Two staff members interviewed sixty-eight students, recording data and contributing their insights to the analysis of data gathered via this approach.

Conclusion

Overall our methodology was effective in drawing out the student voice, illustrating their learning goals and providing a structured view of how library space operates across the day, week and trimester. While our research findings may be applicable to other academic libraries and educational institutions, local context and needs must be taken into account. Where organizations are interested in undertaking post occupancy evaluation of redeveloped or new space, a structured survey of space occupancy will be most useful. Use patterns and observational data can provide insights into social configuration of library clients, demographics, use of technology, and student or client engagement with the physical space. The contributions of the full evaluation methodology to the library allowed us to provide evidence from the student experience in how and why our redesigned space were able to meet their learning goals. It also built the capacity of library staff to conduct observational studies and hone their insights on library client needs and experiences. Whilst the full evaluation methodology used here was successful in providing evidence and value for library space, each component influenced considerations for resourcing, including staff time and availability. However, to ensure space is designed to optimize and meet student learning goals; to draw out their sense of ownership of library space and their culture, we argue that there is ongoing value in employing a fuller evaluation methodology.

Acknowledgements

Notes

Further information about the research methodology, research instruments and findings is available by contacting the authors. Copies of selected research instruments, including survey and observation questions, are available upon request.

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Burwood Victoria

WARRNAMBOOL CAMPUS
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