Evaluation of University of Queensland Library Spaces: three case studies at St Lucia Campus

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ABSTRACT

Introduction: The paper reports on an evaluation study of spaces in the Social Sciences and Humanities (SSHL), Biological Sciences (BSL) and Walter Harrison Law (WHLL) Libraries of the University of Queensland (UQ). The study was part of an evaluation of the quality and patterns of use of spaces in UQ libraries, which aimed to propose recommendations for future improvements and decision-making. This paper presents a study of areas of weakness in existing SSHL spaces, and impacts of the refurbishment of spaces at BSL and WHLL on students' experiences. The findings evidence a link between students' learning experiences and the quality of library spaces.

Methods: An online survey, "Students' Experiences and Perceptions of Library Physical Spaces", was designed to collect data from students. The survey questions addressed seven topics: (1) overall satisfaction with spaces in the UQ Libraries; (2) welcoming nature of the library entry; (3) lighting; (4) acoustics; (5) furniture; (6) wayfinding; and (7) preferences for different space types in the library.

Results: 1505 students completed the surveys, with 1098 responses recorded to open-ended questions on why students visited the libraries and the physical characteristics of the spaces that influenced their experiences. Quantitative and qualitative analysis of the data elucidated key design challenges and considerations. In particular, the data suggested that the provision of individual quiet study spaces remains an important role of academic libraries, with *Studying Alone* identified as the most important reason for student visits.

Conclusions: The findings highlight the importance of individual study spaces and propose a number of recommendations in relation to physical space design and management.

Relevance: Academic libraries face the challenge to keep pace with change in relation to students' demographics, pedagogy and technology. In doing so, it is important to have an understanding of the evolving patterns of students' learning behaviours, space uses and preferences through ongoing evaluation of library spaces.

1. Background

Following a series of refurbishment and space development projects, UQ library recognised the need to study the impacts of study space characteristics on library use and to determine through evidence-based research the right balance of individual and group study spaces.

Similar recent studies carried out in Australian institutions including: the study of the impacts of refurbishment at the University of New South Wales Library and its success in meeting students' needs in terms of space and place (Bailin 2011); the research to develop a Tool for Evaluation of Academic Library Spaces (TEALS) and evaluation study of transformed academic library spaces at the Melbourne Burwood Campus of Deakin University library (Elkadi and Abbasi 2011, Abbasi, Elkadi et al. 2012a, 2012b) and studies from academic libraries around the world including: the study of interventions through changes in services and spaces to support users' needs at the Ohio State University's John A. Prior Health Sciences Library (Bradigan and Rodman 2007); the experience of redesigned Headingley Library at Leeds Metropolitan University from a traditional library to an innovative, flexible, and student-centred library (Everest and Morris 2008); the ethnographic investigation of the use of a large open learning or social space in Loughborough University library (Bryant, Matthews et al. 2009); the longitudinal assessment of spaces at the Georgia Tech Library to determine the satisfaction of students with the renovation of learning commons (Fox and Doshi 2011) and reflections on four characteristics of a library as a "desirable place": access and linkages; uses and activities; sociability; and comfort and image (Kent and Myrick 2003) in the context of the Gerstein Science Information Centre, University of Toronto (Cunningham and Tabur 2012) also demonstrated the value of post occupancy evaluation of the quality of spaces and users' experiences with these spaces, which further justified the need to perform an assessment of library spaces at UQ library branches.

Moreover, a review of major findings of the University of Queensland Library Client Survey, carried out by insyncsurveys in 2012, reinforced the need for evaluation of library spaces, and analysis of students' patterns of library space, perceptions and experiences in these spaces. For example, "facilities and equipment" was found to be the third highest priority category for library users (after "information resources" and "library staff"). In terms of the relative importance of certain variables for library users, five variables directly related to library spaces ranking 20, 21, 23, 26 and 27 included, respectively: "*Laptop facilities (e.g. Desks, power) in the library meet my need.*"; "*Library signage is clear.*"; "*I can find a place in the library to work in a group when I need to.*"; "*I can find a quiet place in the library to study when I need to.*"; and "*The library is a good place to study.*". Finally, in relation to factors for improvements, among the top ten gaps which should be investigated further for future improvements, three variables were directly related to the provision and design of physical spaces: "*I can find a quiet place in the Library to study when I need to.*" (2nd highest gap); "*I can find a place in the library to work in a group when I need to.*" (3rd highest gap); and "*Laptop facilities (e.g. Desks, power) in the library meet my need.*" (4th highest gap).

It was within this context that in February 2013 UQ library asked two consultants to independently carry out evaluation with three key aims: (1) to determine whether or not the library spaces are effective and responsive to students' and faculty's learning and teaching needs; (2) to identify the area of weakness and strength in relation to library spaces; and (3) to outline a set of evidence-based recommendations. While the study looked at the quality of physical spaces in all UQ Libraries, three libraries at St Lucia campus were selected for in-depth investigation of students' pattern and frequency of space use, satisfaction with the quality of spaces and preference for certain spaces. The evaluation of the Social Sciences and Humanities Library (SSHL) focused on identifying the areas of weakness and potentials for improvements, whereas the studies of the Biological Sciences Library (BSL) and the recently refurbished Walter Harrison Law Library (WHLL) examined the impacts of refurbished spaces on students' experiences and patterns of library use.

This paper presents a summary of the findings of this evaluation of UQ library spaces. It starts with a brief description of the three case studies. An outline of the theoretical framework guiding the evaluation project is then presented followed by a description of the online survey instruments, then a summary of the survey participants' demographic data and patterns of library use. Next, findings are presented on students' major reasons for visits to UQ libraries and their feedback on design-related qualities. Here, four aspects of library spaces are discussed: (1) welcoming nature of a library entry; (2) lighting; (3) acoustics; and (4) frequency of use of different study spaces. Detailed discussions on the library furniture and students' perception of design features are presented elsewhere (For a detailed discussion on the design qualities of library spaces that matter the most for university students see Abbasi, Tucker et al. 2014). The paper concludes with recommendations for the design of academic libraries.

2. Context

UQ Library includes 14 branches with materials and services for different disciplines being located in each. Students are, however, encouraged to make use of any library branch. UQ library has recently carried out a number of refurbishment projects in its branches, including BSL and WHLL. SSHL is due major upgrades and refurbishments in the near future.

2.1 Social Sciences and Humanities Library (SSHL)

SSHL has four levels. Level One, the entry level, houses a large group study space, three medium-sized group spaces (or The Hive (Figure 1)), two small group spaces, computer desks and a Newspapers & New Journal space (Figure 1). The service desk and a Multimedia space (including three multimedia viewing rooms, a photocopy room, High Use collection and multimedia workstations) are located in this level.

Figure 1: The Hive (Top right), Newspaper & New Journal Space (Top & Right)

Level Two includes a Journals and References Collection, an area with group tables, one group study room, a sorting area and study carrels along the perimeter. Levels Three and Four are almost identical; each including books collections, internal study carrels, perimeter study carrels, one group study room and a sorting area. The library is open from 8 am to 8 pm on weekdays. The case study of SSHL also included the adjacent seven-level Duhig Tower building. Level One, the entry level, includes a conference room, two eZone/training rooms and a Carers'/parents' room. On Level Two, there is a café, one eZone/training room, two eZone/computer desk areas, the IT Service Point and printing equipment. Level Three houses SSHL staff. Level Four houses the Fryer Library staff area, Theses and Microforms Collections, the information desk, postgraduate lockable desks, three assistive technology

rooms, computer desks, medium-sized reading tables and printing equipment (Figure 2). Level Five includes postgraduate lockable desks, twelve postgraduate private study rooms, three group study rooms, the library staff area and study carrels. Level Six houses the University Librarian, the Library Corporate Services staff and Scholarly Publishing & Digitisation Services staff work areas. The Fryer stack, storage and the AustLit area are located on Level Seven.

Figure 2: The Fryer library information desk

2.2 Biological Sciences Library (BSL)

BSL has four levels. Level One includes computer desks, three booths and printing equipment (Figure 3).

It has access to an adjacent café and a palm-tree-lined courtyard providing space for students to relax.

Figure 3: Computer desks (left) and Booths (right) at Level One of BSL

Level One was refurbished completely and the other three levels were slightly upgraded. Among the objectives of the refurbishment were: (1) to create spaces for students to work collaboratively in a mix of individual and group study spaces; (2) to provide ambience appealing to 'Generation Y' users using retro furniture and incorporating cutting-edge technologies; and (3) to design spaces meeting students' informal learning needs and enhancing their social experiences.[1] On Level Two, three eZones, a lounge, two booths with LCD screens and a group space with computers are located (Figure 4). Level Three houses the collaborative learning spaces; including group tables of different sizes, two medium-sized group rooms with LCD screens and whiteboards, four small group rooms and printing equipment. Level Four is a dedicated quiet study level including postgraduate and undergraduate study centres, study carrels and computer desks along the perimeter (Figure 4). The library is open 24 hours, 7 days per week.

Figure 4: The group space with computers at Level Two (Top) and Undergraduate Study Centre at Level 4 (Bottom)

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[1] From http://www.uq.edu.au/nextgenerationlearningspace/JordanZiebell.pdf, accessed 22/02/2013

2.3 Walter Harrison Law Library (WHLL)

WHLL has three levels, with Level Two having recently been refurbished to create a number of small booths, computer desks and informal spaces with soft furniture (Figure 5). The service desk and laptop recharge lockers are located in this level. The upper level includes two eZone/training rooms, computer desks, ten small individual study rooms and four medium-sized group study rooms. The top level houses the collection, lockable study desks and study carrels on the east side. On the west side, there are journal collections, two seminar rooms, computer desks, a group study room, a group study area, small individual study rooms and the research lounge. The library is open from 8 am to 9 pm on weekdays, and 24×7 study space is available when the library is closed.
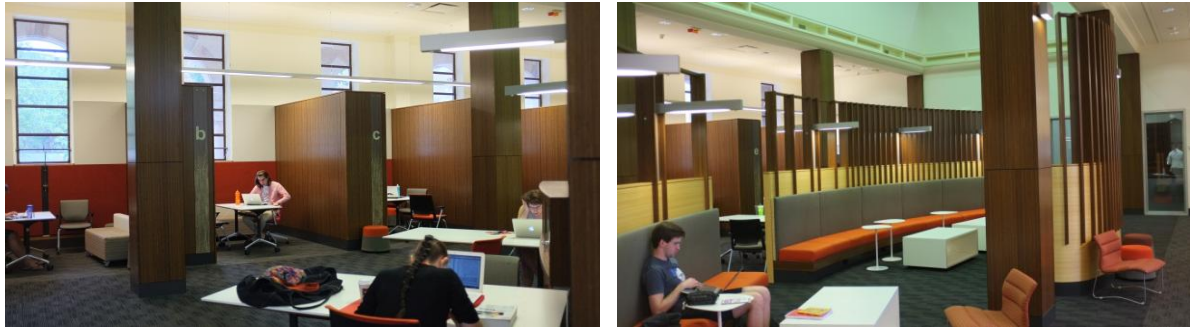

Figure 5: Recently refurbished spaces at Level Two of WHL

3. The Evaluation Study

3.1 Methods

3.1.1 The Library Space Quality Framework

The study was guided by a library space quality framework which includes six criteria for the planning and design of academic library spaces: (1) functionality; (2) being learner-centred; (3) environmental sustainability; (4) being socially inclusive; (5) effective integration of technologies; and (6) fostering inspiration and engagement (Figure 6). Evaluation used data from an online survey instrument, "Students' Experiences and Perceptions of Library Physical Spaces," and an observational study. The focus of the evaluation was on students' perceptions, experiences, needs and preferences.

Figure 6: The Library Space Quality Framework

Library spaces should ...

- foster inspiration & student engagement
- effectively integrate technology
- be socially inclusive
- be environmentally sustainable
- be learner-centred
- be functional

3.1.2 Survey Instrument

The online survey had two sections: (1) questions about all branches of the UQ Library; and (2) questions on one of the three case study branches. Section One included a part on "Library Users' Characteristics and Patterns of Library Use;" including: age, gender, nature and level of study, the UQ library branches that the respondent frequently uses, the number of hours spent in the library during the semester and exam periods, as well as the formal and informal learning and teamwork activities that the respondent is usually engaged in. In addition, in this section students were asked to rate the importance of certain qualities of library spaces: quiet, ambience, access to information, library as a meeting place, and encouragement by seeing other students studying. A series of Likert-scale questions

focused on the "Quality and Function of Library Spaces," asking respondents to rate their satisfaction level with aspects of library design: overall quality of study spaces, welcoming nature of library entries, wayfinding, lighting, acoustics, thermal comfort, and furniture. Respondents were also asked to express their experiences with and preferences for features of spaces and furniture through open-ended questions. Next they were asked about their preferences for and understanding of different learning settings or study spaces in a library.

At the end of Section One, students were asked if they use any of the three case studies: SSHL, BSL and WHLL. Depending on their responses, students were redirected to a set of questions on issues around physical spaces in one of these three libraries. The survey was made available to all students enrolled at the University of Queensland. All UQ students were invited to complete the survey via emails.

3.2 Demographic Data

1505 students completed the survey, with more than three quarters of the respondents aged between 18-24 (Table 1), and more than three quarters studying for an undergraduate degree (Table 2). 714 students completed the section on SSHL, and 420 and 100 completed the sections on BSL and WHLL (respectively).

AGE RANGE			
	SSHL	**BSL**	**WHLL**
18-24	507	339	83
25-31	98	59	14
32-39	51	17	3
Above 40	56	6	1
I'd rather not answer.	2	1	1
Total	**714**	**422**	**102**

Table 1: Age Range of survey participants

NATURE OF STUDY			
	SSHL	**BSL**	**WHLL**
Undergraduate	512	348	90
Postgraduate-Coursework	133	45	9
Postgraduate-Research	17	6	1
PhD/Doctorate	47	21	1
Others	5	3	1
Total	**714**	**423**	**102**

Table 2: Nature of Study of Survey participants

3.3 Patterns of library use

3.3.1 Number of hours spent in the library

In terms of the hours spent in the three libraries, the figures suggest it was just *More than 20 hours* users who increased use during *Exam Periods* and there was a slight drop of 8-15% for the users who spend either *Less than 5 hours* or *Between 5 and 20 hours* in these libraries. For SSHL, there was a three-time increase in the number of students who spend *More than 20 hours* in the library during *Exam Periods*. The equivalent data for BSL and WHLL indicated a four-time and three-time increases, respectively (Figure 7).
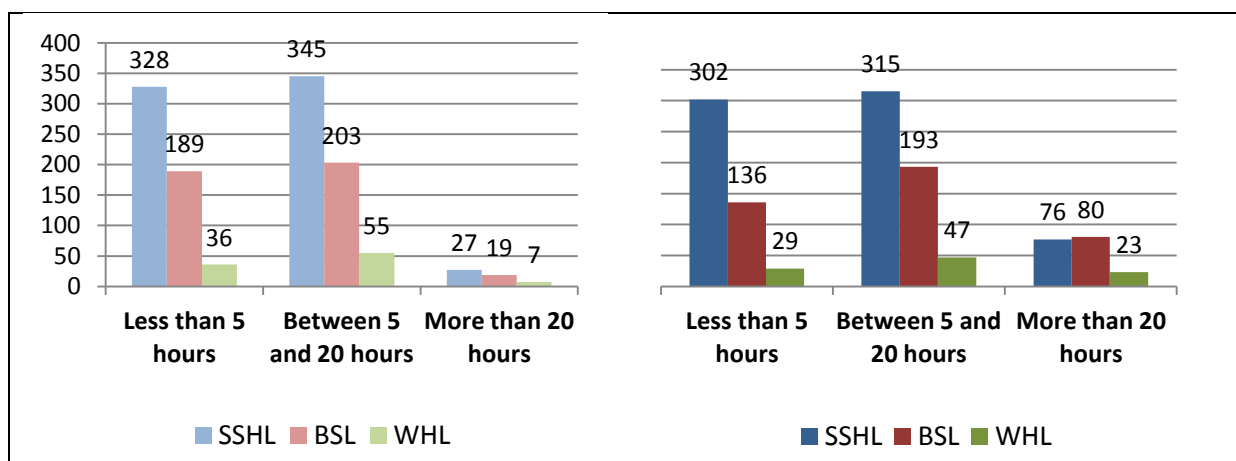

Figure 7: Hours spent in the library during SEMESTER WEEKS (Left) and EXAM PERIODS (Right)

3.3.2 Frequent Activities in the library

In terms of patterns of library use, the top six activities that students are most frequently engaged in were (Table 3):

1. *Studying alone*
2. *Completing an individual assignment or Writing a paper*
3. *Using my own laptop*
4. *Using the library computers*
5. *Collaborating with colleagues/Group study*
6. *Finding/borrowing books and journals*

For SSHL, "finding and borrowing books" was identified as the fourth most important reason for visiting the library, whereas for BSL and WHLL "using my own laptop" and "using the library computers" were rated as fourth, respectively. Qualitative data indicated that the importance of books to students at SSHL is explained by the course-related collections and learning materials available there. In contrast with the findings from SSHL, where "collaborating with colleagues/group study" rated as the seventh most important reason for visits, at BSL and WHLL groupwork was rated at fifth. For BSL, where there is no collection, "finding and borrowing books" was unsurprisingly one of the four least important reasons for visiting . "Using library online resources" is the sixth most important reason for student visits to WHLL, followed by "finding and borrowing books."

Frequent Activities in UQ case study libraries		
	SSHL	**BSL**	**WHLL**
1	Studying alone	Studying alone	Studying alone
2	Completing an individual assignment/Writing a paper	Completing an individual assignment/Writing a paper	Completing an individual assignment/Writing a paper
3	Using my own laptop	Using the library computers	Using my own laptop
4	Finding/borrowing books and journals	Using my own laptop	Using the library computers
5	Using the library computers	Collaborating with colleagues/Group study	Collaborating with colleagues/Group study

Table 3: Top important activities that students are frequently engaged in UQ case study libraries

4. Findings

Findings highlighted the importance of library as a "quiet place" for students. About 75% of students stated that it is *very Important* that the library is a quiet place and more than 532 references were recorded to the word "Quiet" (i.e. related terms and statements) in students' comments. This finding was in line with the 2012 insyncsurveys library client survey, which identified "*I can find a quiet place in the Library to study when I need to*" as the fifth lowest performing need at UQ. Another important finding identified lack of power points as a major student complaint. Similarly, the 2012 insyncsurvey suggested that the third lowest performing need concerned laptop facilities i.e. provision of power points and desks. In addition, the 2013 data suggested that difficulty in finding a space to study in the library, especially during peak times, is a major challenge for students visiting the case study libraries at St Lucia campus.

In terms of library use, "studying alone" and "completing an individual assignment/writing a paper" were identified as the top two most frequently pursued activities at the three case studies. This finding highlights the importance of "individual study spaces", with more than 60% of students coming to the library to study alone either *Always* or *Often*. A more detailed account of the major findings of the evaluation study is included in the following sections.

4.1 Reasons for visit to case study libraries

In addition to the activities listed in the first section of survey, students were asked to identify specifics about physical spaces that influenced their preferences for visiting certain library buildings over others.

4.1.1 Reasons for visit to SSHL

506 students' comments were recorded in relation to reasons for their visits to SSHL and the preferred or distinguishing features of the library's physical spaces. **Location** as a focal point of campus and **access to books and course-related materials** were identified as the top two reasons for students' preferences for SSHL. The centrality of location of SSHL presents it as a good meeting place for peers and teammates. The third most cited category of reason for student visits to SSHL concerned **the design of library spaces** i.e. open plan layout, atmosphere and ambience, welcoming nature of spaces, views and a variety of different spaces to choose from according to specific activities (About 10% of students' comments), followed by **availability of study spaces** (74 ref). Students also mentioned **quiet** environment, good **furniture** and ease of **wayfinding** as influencing their choice of SSHL (Figure 8).
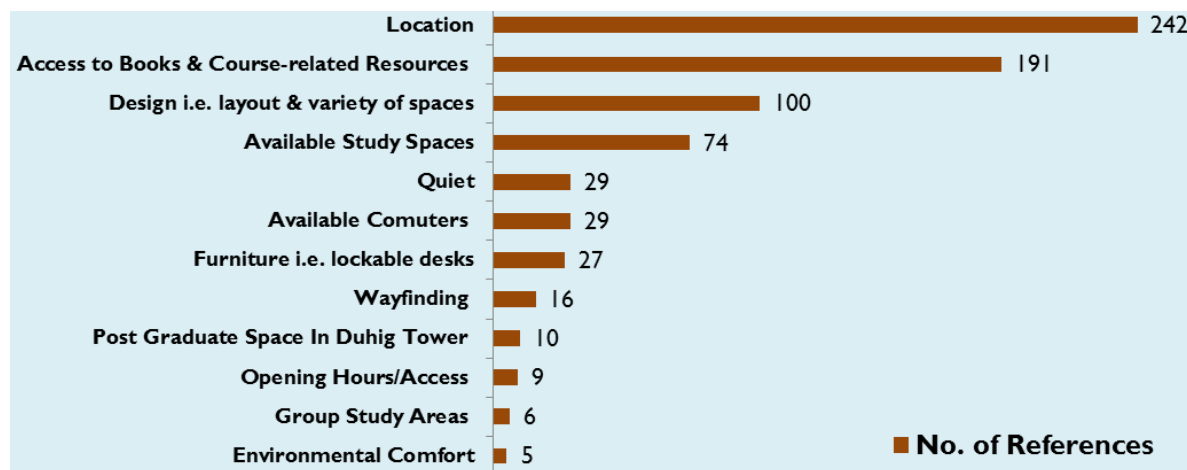
Figure 8: Major reasons which account for students' preference for SSHL

4.1.2 Reasons for Visit to BSL

507 student comments were recorded in relation to reasons for their visits to BSL and the preferred or distinguishing features of the library's physical spaces. Similar to SSHL, **location** was a key factor determining student visits to BSL, followed by aspects of the **design** of library spaces (91 ref) and **24hr access** areas (79 ref) (Figure 9).
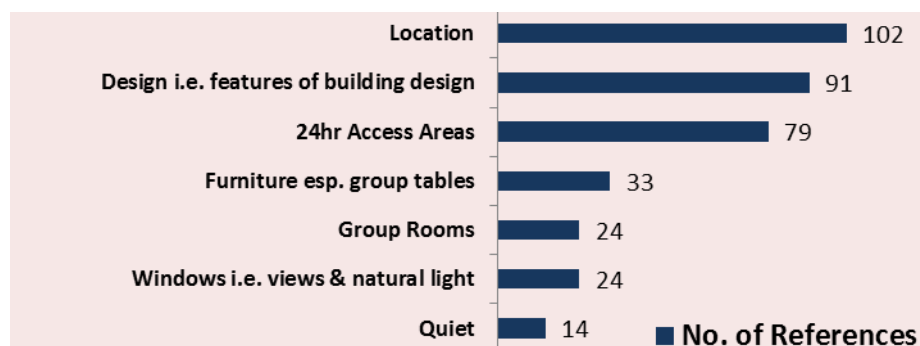

Figure 9: Major reasons which account for students' preference for BSL

4.1.3 Reasons for Visit to WHLL

85 students' comments were recorded for the question asking students explain their reasons for their visits to WHLL. A distinguishing feature of WHLL, compared with BSL and SSHL, is being *quiet* (33 ref), followed by **access to books and course-related materials** (29 Ref), aspects of the library space *design* (24 ref) and *furniture* (21 ref) especially individual study carrels with power points (Figure 10).
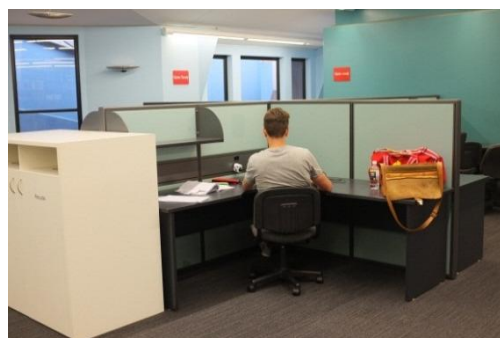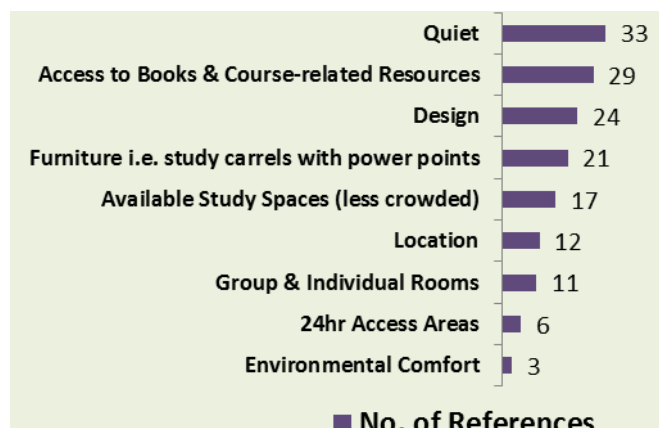

Figure 10: Major reasons which account for students' preference for WHLL (Left), an individual study carrel in WHLL (Top)

4.2 Design-related Qualities

Here, a summary of results of Likert-scale questions rating student satisfaction with aspects of library space design is presented. In addition, student responses to open-ended questions highlighted positive features of the library design i.e. space layout, interior colour themes and furniture. This qualitative data clearly indicates student awareness of how design-related factors impact their library experiences. For example, at BSL transparency and open-plan layout were identified as positive features of the library design (Figure 11):

> *It is a much more pleasant aesthetic, and the **glass** and **open planning** are a much more comfortable place to study. I don't like the feeling of being enclosed in a space and this helps tremendously.*

SSHL was mostly favoured by students because of its prime location, and for its individual study carrels in two upper levels that had views to the outside and to the adjacent group spaces (Figure 11).

> *It is located at a **prime spot** and easily **accessible**, also the most **welcoming** library where I can find places for conducive studying … I also LOVE the open **group discussion space** on Level 2 - it is fantastic for group work and collaboration.*

In relation to all the three case studies, variety of spaces is clearly favoured by students; being referred to explicitly in some comments while implied in others:

Figure 11: Transparency & Open-plan as favoured features of BSL by students (Top), A group space in SSHL (Bottom)

> *It has an awesome **variety in spaces** so whatever I need to do can be done somewhere.*

> *It has nice modern decor and architecture that makes it welcoming and peaceful. It also has **several different zones** which is pleasant … The spaces are **varied** and I like to change places depending on the type of work I am completing.*
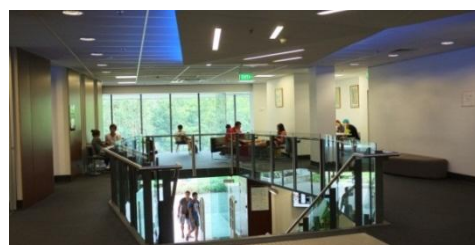
Data from the question on overall satisfaction with library spaces suggests relatively positive students' perceptions, with about 75% of survey respondents either Very or Somewhat Satisfied with SSHL, followed by 74% for BSL and 65% for WHLL (Figure 12).
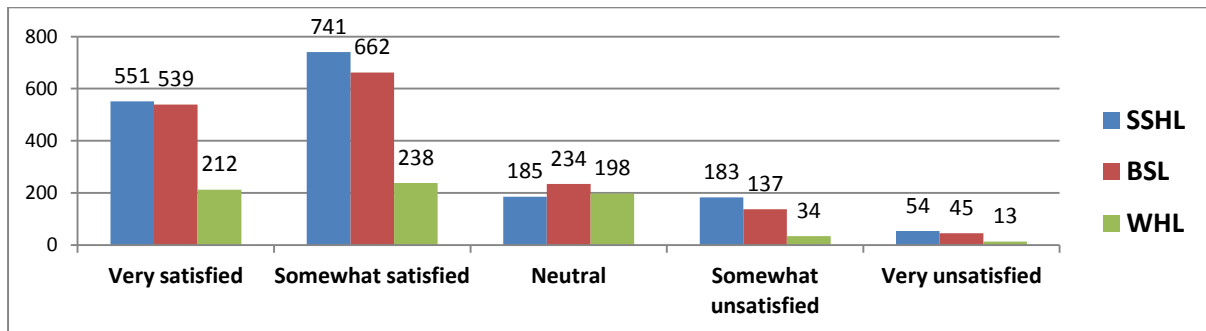

Figure 12: Students' overall satisfaction with spaces in SSHL, BSL and WHLL

4.2.1 A Welcoming Library Entry

In one survey question, students were asked to rate the degree they perceive the case study library entries as welcoming. BSL was found to be perceived as the most welcoming library by students, followed by SSHL and WHLL.

Figure 13: Students' perception of the welcoming nature of library entry in SSHL, BSL and WHLL
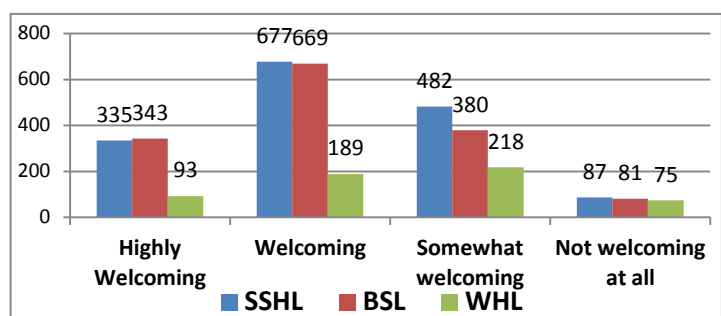
Students were then asked to comment on five factors in relation to library entry. *Lounge areas with comfortable seats* was the most important factor to them, followed by *a café nearby* and *openness* and *transparency*. Both BSL and SSHL include these three features to a varying degree (Figure 14).

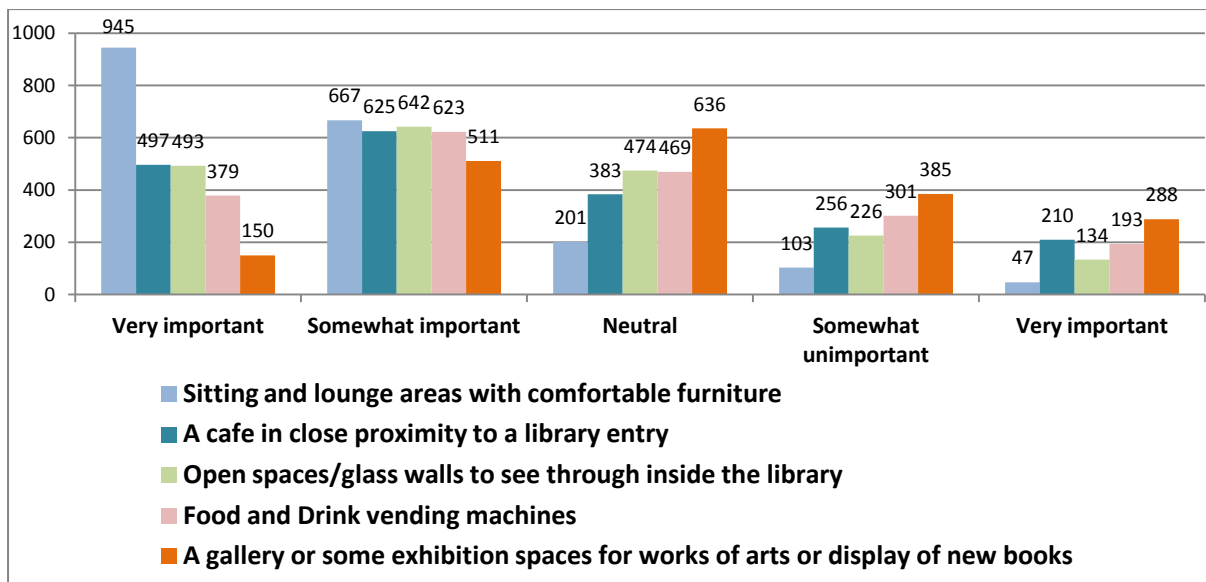**Figure 14: Relative importance of five factors in a library entry as perceived by survey respondents**

4.2.2 Lighting

The quantitative data related to lighting in the three case study libraries suggested a generally positive perception, with about 60% of respondents stating that they are *Very Satisfied* with the quality of lighting in BSL spaces, followed by 53% for SSHL and 47% for

WHLL. However, the qualitative data from the open-ended question on lighting in the first section of the survey highlighted areas for improvements in relation to lighting overall in UQ libraries. Here, 725 students' comments were recorded on lighting in UQ libraries, and highlighted preference for natural light and awareness of the impacts of the colour and feel of lighting on learning experiences. There were also comments addressing the issue of **maintenance**, **glare**, **influence of interior design and space layout** and **users' control** (Figure 15).
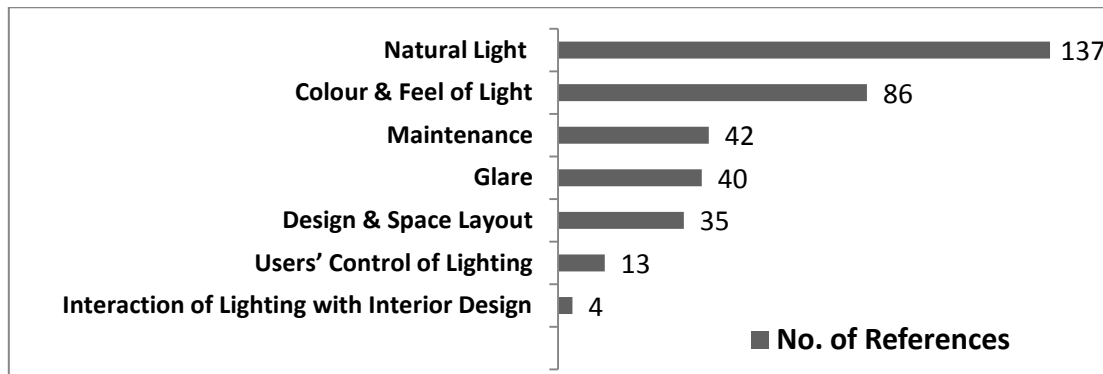

Figure 15: Theme Identified from Comments on the lighting in UQ library spaces

4.2.3 Acoustics

Noise appears to be a major challenge in both BSL and SSHL, with about 25% of respondents finding BSL spaces *Almost Always* noisy and 43% suggesting noise as an issue *Sometimes*. These figures are more or less similar for SSHL, with 20% of respondents finding the library spaces *Almost Always* noisy and difficult to work in and about 47% indicating spaces as *Sometimes* noisy. In comparison with BSL and SSHL, the noise does not appear to be a significant challenge for WHLL, with 50% of the respondents finding the library spaces *Rarely* noisy (Figure 16).
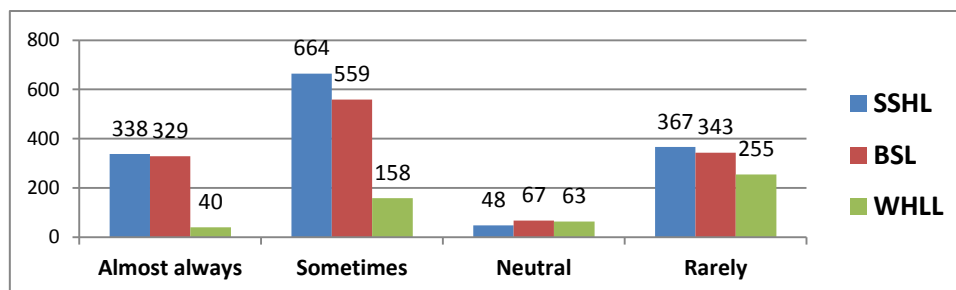

Figure 16: Survey respondents' responses to the question of 'how often do you find library spaces noisy and difficult to work in?'

4.2.4 Frequency of Use of Different Space Types

The survey also included a Likert-scale question asking students to specify their frequencies of use of five different study spaces in UQ libraries:

1. "Individual study spaces" are for quiet study i.e. conducting exam review;
2. "Collaborative spaces" are open-plan environments within which different settings were created and you can perform multiple activities e.g. working on individual assignments, collaborative groupwork, using library computers/your own laptop and etc.;
3. "Dedicated group spaces" accommodate the formal group work with access to certain equipment e.g. data projectors, smart boards and plasma screens e.g. project and study rooms;
4. "Research support spaces" include spaces such as quiet study spaces for postgraduate research students; and
5. "Training spaces" accommodate formal teaching or training sessions.

As it was expected from the findings in relation to the frequency of library use for certain activities (Section 3.3.2), the most frequently used space type in UQ libraries is **Individual Study Spaces**, followed by **Collaborative Spaces** (Figure 17).
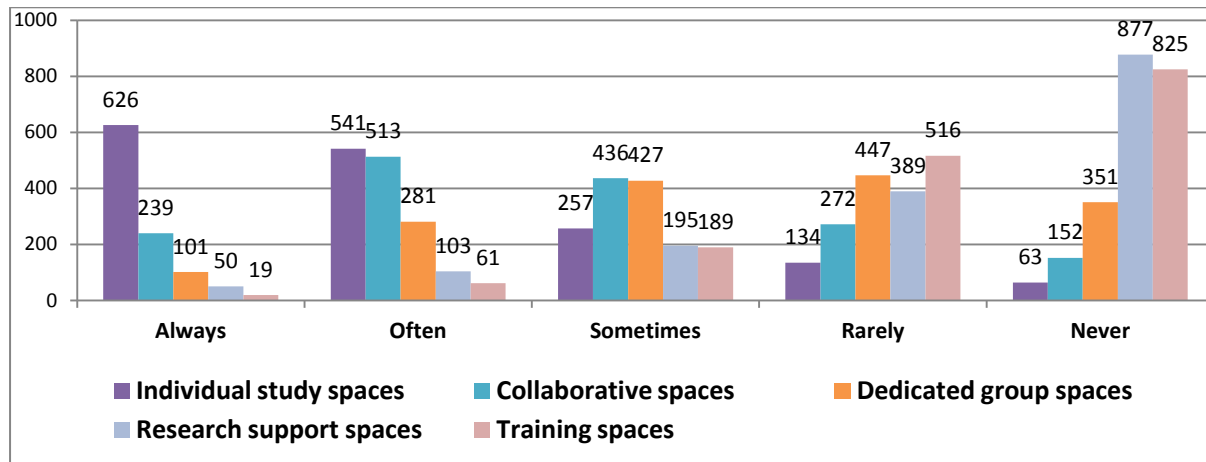

Figure 17: Frequency of Use of Different study Space Types in UQ libraries

In the second section of the survey, images from major study spaces in three case studies were included to further examine students' preferences for certain library spaces.

In SSHL, no significant difference could be identified among the three different types of carrels in levels 2, 3 and 4 (Figure 18). However, the data suggested a slightly higher preference for the study carrels along the walls or Type 2. Drawing upon students' comments in the survey, the higher preference for Type 2 Study Carrels can be linked to the availability of window i.e. views and natural light, access to power points and the relative higher degree of personal space and visual privacy.


Figure 18: Individual study carrel Type 1 (Top), Type 2 (Left), and Type 3 (Bottom)

In BSL, Individual Study Carrels in level 4 are most frequently used (Figure 19). This is followed by four other most frequently used spaces: Group Tables in level 3, Computers area in level 2, eZones in level 2 and Computers area in level 1.

The limited number of the three types of spaces – Group Rooms with LCD in level Three, Booths in level One and LCD Display Screen areas in level Two – may account for their low frequency of use. The very low frequency of use of the Postgraduate Study Centre in level Four can be explained by the lower number of postgraduate students who completed the survey (about 17%).

Figure 19: Individual Study Carrels in level Four of BSL
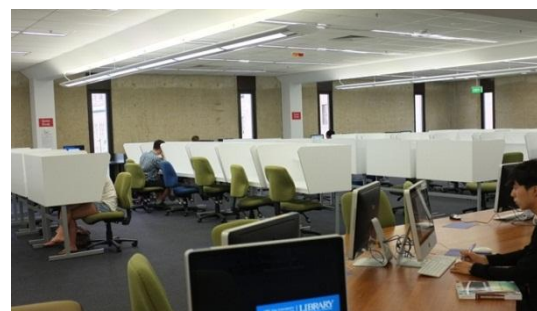
In WHLL, the individual study carrels/cubicles on the fourth level have the highest frequency of use, followed by the individual study rooms on levels Three and Four. This highlights the importance of spaces for quiet study, in the specific context of this library with its particular law students' patterns of use. The redesigned spaces in Level Two of this library appear to be used mainly for short visits:

> *The lowest level has group tables, lounges, area for individual study with a more visually appealing design.*

> *The new study space is good for short visits to the library*

> *The environment/layout of the library is quite nice, especially the lower floor with open space and high ceiling. It makes the library seem a lot less menacing.*

5. Concluding Remarks

This study aimed to examine the impacts of refurbishment in UQ library spaces. In particular, it examined student experiences and use patterns to inform decision-making and planning for: (1) further upgrade to BSL and WHL, especially in relation to furniture and identifying the right balance of individual and group spaces, and (2) future refurbishment of SSHL. 1505 students completed an online survey on their patterns of library use, experiences with and preferences for library spaces. Students demonstrated a great degree of awareness about how the design of library spaces influences their learning experiences. Altogether, in the three libraries, 215 students' comments were recorded which stated aspects of design including layout and variety of spaces as the most important factors determining their choice of one UQ library branch over another. Moreover, specific references were made to furniture (81 ref) and features of design such as views to the outside (24 ref) and ease of access or wayfinding (16 ref).

Our quantitative and qualitative data demonstrates that an important role of academic libraries remains the provision of spaces for individual quiet study, with more than 30% (n=520) of the students completing our survey suggesting that they visit one of the UQ libraries for "Studying Alone" *Almost Always,* and about 75% (n=1130) stating that it is *Very Important* that the library is a quiet place. The importance of quiet individual spaces was further highlighted by the qualitative data that included 532 references to the term "quiet." Drawing upon the lessons learned from this study, we suggest a number of strategies to enhance existing quiet spaces and create new ones in academic libraries:

- Examine appropriate zoning strategies to separate noisy and quiet spaces/zones i.e. allocating different floors to them

- Use clear signage in proper locations to promote students' positive attitudes and better library use behaviours

- Consider creating a less formal space for students to read and reflect, a space that can encourage creativity and reflection (See Figure 1, Top and Right, for a good example in SSHL which is favoured by many students as stated in their comments in our survey)

- Ensure thoughtful and creative design of furniture for study carrels addressing factors such as size and the area provided, provision of power-points, features such as shelves and how these work with lighting (e.g. the shelf provided may block the light on the desk)

- Maximise "choices" of study carrels or individual study desks in terms of furniture types, orientation, location and the degree of openness or visual privacy to suit different students' preferences and activities

- Adopt strategies to introduce to students what is on offer in terms of library spaces

We conclude this paper with making the case for the need to regularly review the provision of study spaces in academic libraries. An ongoing evaluation of library spaces is an important step in identifying the right balance of study spaces and keeping pace with

changes to students' demographics, pedagogy and technology. Adopting such an evidence-based approach, libraries are able to: (1) identify areas of weakness and strength in relation to physical spaces; (2) achieve insights into the evolving patterns of students' learning behaviours, space uses and preferences; and (3) make informed decisions about future improvements and new developments.

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