

User Experience in the newly refurbished CUED Library space: Exploring the study needs and habits of library users through ethnographic and UX methods



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April 2016

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Abbreviations

CM = Cognitive mapping study

GN = General notes (*compiled by library staff from informal observations and conversations external to the study*)

I = Interviews

OS = Observation study

P = Participant

PS = Postcard study

TT = Touchstone tour study

UX = User experience

1 Overview of findings

The recently refurbished CUED library re-opened in January 2016 and the library team took the opportunity to study how the space is used to gather feedback and gain a better understanding of the work space needs of the Department moving forward. Here's a brief summary what they learned over the course of their three month study:

- Demand for work spaces in the department is high and there are a range of needs including space for silent work and space for group work.
- The library is used as work space by undergraduates, postgraduates and members of staff.
- Users' needs vary greatly and the same user may prefer different environments for different tasks or for different times of day.
- While touchpoints such as self-issue terminals and members of staff are important parts of the user experience, the comfort, space and suitability of furniture are still of prime importance, as this is the aspect of the library with which many users become most intimately familiar.
- While laptops, tablets and mobile phones are used in the library, around half the users observed were doing paper and pencil work in addition to or in lieu of work on a device.

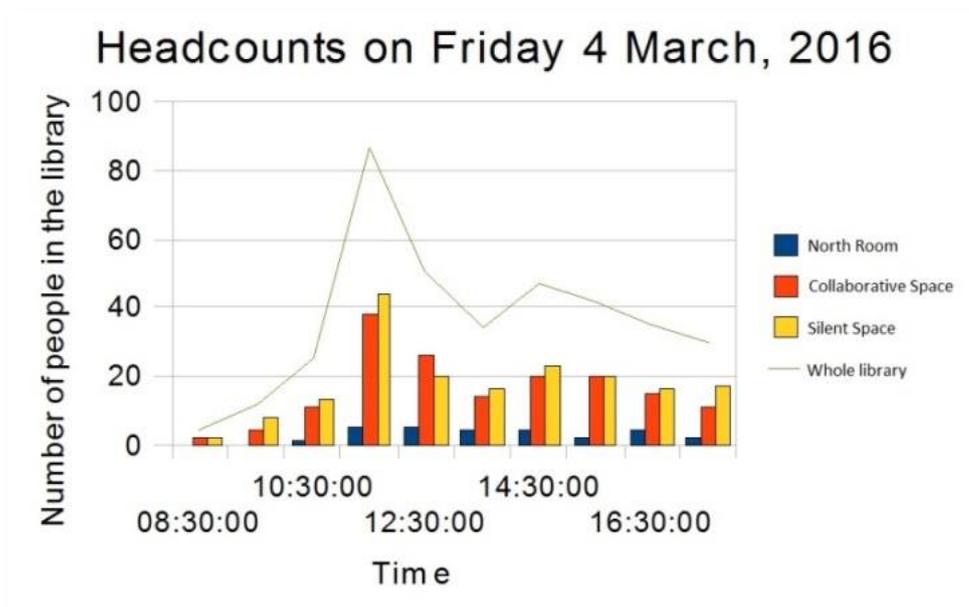


Table 1 - Library headcounts on Friday 4 March, 2016. For most of the spaces a distinctive peak was seen between 11 and 12 AM. The North Room was an exception, with fairly consistent occupation between 11 and 1. On this day the occupancy peaked at 87 at 11 am.



Silent Space

The Silent Space is used for a range of reasons. Some people use the studious atmosphere to motivate themselves to work extra hard, while others use it any time they're in the library, sometimes all day. In addition to the quiet, some users said they especially liked the amount of desk space available.

Of the spaces studied the Silent Space generally had the highest percentage of laptop users.



Collaborative Space

The Collaborative Space is popular with users who like a bit more noise in their working environment and don't want to feel pressure to be absolutely silent. It has also been well used for group work and collaboration and by people wanting a quick snack between lectures.

Many people who use the seats along the edges like the opportunity to look out the window occasionally while they're working.



North Room

The North Room can be used as quiet or group study space and can be booked for student groups outside of term time. Those who like using it enjoy that there's a bit more space at the tables, while other participants in the study wondered what the room was for.

The North Room was the only space not to have a spike in users between 11-12 and tended to be quiet for most of the morning.

2 Introduction

This study came about as a result of the recent refurbishment of the CUED library, which, in addition to updating the furnishings and circulation system, facilitated the division of the library into three distinct spaces designed to meet different needs in the department: the Silent Space, the Collaborative Space and the North Room. The re-opening of the library in January 2016 provided an opportunity to capture initial feedback and study the use of the space in order to continue to improve it for users. The study was conducted with the move to West Cambridge in mind, and the insights gained will help with future planning of work spaces in the department.

Using a mixture of quantitative data gathering and qualitative methods inspired by ethnography and user experience (UX) research, the library staff and a few volunteer researchers have attempted to form a picture of how the library spaces are used. Motivations for use are more complicated to determine and necessitated the employment of qualitative methodologies. The small sample size is not intended to form a complete picture of all of the motivations at work among users, but rather to be a sample of the diversity among library users. The results show a range of needs and habits as well as giving greater insight into the academic landscapes of some members of the Department.

Work space within the department is in high demand and users have responded to the provision of spaces for a more diverse range of study preferences, with each type of space seeing good use. Feedback on the new space was largely positive, with the biggest issues being comfort (e.g. furniture, temperature and air quality) and noise level.

Three different usage patterns were identified: long-term users (spending over an hour at a time), short-term users (staying for under an hour) and non-users or occasional users (who might come in for a resource but otherwise do not interact with the space). However, motivations among these groups varied widely. Therefore it is crucial to understand individual needs and motivations in order to shape positive, productive experiences.

3 Key short-term actionable feedback

As much as possible the library staff have been making changes as they have been suggested. As a result, various new services and improvements came in during the course of the study. These included the addition of jigsaw puzzles in the Collaborative Space, providing bean bag chairs, white boards and scrap paper and putting up signs regarding food and drink guidelines. The remaining issues to solve on a short-term basis fall under the following categories:

- Clarify use of spaces, in particular the North Room
- Provide amenities such as bins, water fountains, staplers, etc.

The majority of the feedback was on relatively minor issues, but ones that would take considerably more time, money or a different building to resolve. Even if they cannot be solved at this point the library staff will keep this feedback in mind as long-term considerations.

4 Long-term considerations

4.1 What users are looking for in the library

There are various motivations driving use of and behaviour within the library. However, a common need among many members of the department is the need for space to work, whatever that work might look like.

“There’s no other common room for people to work in the department so I think the library should provide it.” (TT P4)

“For me at least it’s a very good thing in the department here because often times you’re waiting with other people and so you can sit together and work on stuff.” (CM P4)

For undergraduates the library may be a “third place” (Hunter and Cox 2014, p.37), neither home nor work, between lecture theatres and College, where individual and collaborative learning happen in a less structured setting (e.g. CM P3, 4), or it may simply be a convenient place to pass time between lectures (e.g. I 3/5). For postgraduates and staff, the library may be somewhere they can get work done if their offices are too noisy (e.g. I 2/5) or if they need a change of scenery. It may be a place where staff members who are far from their offices in West Cambridge prepare supervisions or lectures (GN). With such a diverse range of needs across the department the demand for space is clear. Various commenters have already highlighted that even more work space is needed, as it can still be difficult to find room to work at peak times (e.g. PS 20).

Not only is this work space provided by the library, but it is managed by the library staff, who are on hand to answer questions, anticipate needs and assist in navigating the information landscape. While library staff were apparently a given to many participants, a few mentioned that they valued the opportunity to speak to a member of staff and ask questions (TT P8, 13), or appreciated provisions that went above and beyond what was expected, making the library feel like a positive place for students rather than a storehouse for books (TT P2; I 2/6). This indicates that the librarians add value to departmental work space.

4.2 Furniture

Despite other big changes to the CUED library, a common theme among participants was furniture. Indeed, this is the primary touchpoint for those using the library as a work space, so ensuring that furniture is comfortable and suitable for both short-term and long-

term use is an important part of facilitating a productive experience. See Appendix 2 for recommendations based on feedback from participants.

4.3 Windows

The widespread popularity of seats near low windows indicates that this should be a part of future library plans. Many users enjoy the ability to look up from their work to rest their eyes by looking out the window (e.g. TT P12, OS). The windows on the east side of the Silent Space are too high to enable this, whereas those in the Collaborative Space seem to be ideal. Providing blinds on all windows allows users to block out sunlight when it is too bright and direct, letting users further customise their workspace (GN).

5 Library Spaces

5.1 Silent Space

The design of each space in the new library refurbishment communicates something about its function. The Silent Space, for example, with its central spine of tall book cases and its large desks, lends much the same atmosphere as the traditional library reading room. The name “Silent Space” emblazoned over either entrance forms a contract among users of the space so that on entering the space there is a self-policed hush in the room.



However, those expecting the Silent Space to be completely silent have had some disappointments as noisy building works continue on site. Furthermore, the creation of a new path through the Baker Building facilitated by the opening of the exit at the south end of the library, while popular with many members of the Department (GN), does irritate some people who are seeking an environment that is free from distractions (PS 24). A small minority have suggested that the Silent Space be a laptop-free zone to still the noise of keys being pressed and scrolling mice. However, the Silent Space has the greatest proportion of laptop users (at an average of 42%) so it would make little sense to ban them based on a minority opinion (GN; OS).

The large desks are an attraction for people who enjoy working in the Silent Space, both for the sense of camaraderie and the extra space they offer to spread out.

“I like the communal desks. I think it’s really good atmosphere. It’s a nice place to work.” (TT P11)

“I find it, yeah, it’s comfortable. It’s relaxing, but it’s quiet and you have enough space at a particular seat to spread everything out and take up as much space as

you need and you don't feel crowded. You don't have to worry about anything else, what anyone else is doing. You can just get on with it. So I think it's a good space to work in in general." (TT P3)

Among those interviewed, most people who used the Silent Space used it for individual undergraduate work, particularly Examples Papers, or MPhil work, and there was a fairly even mixture of short-stay and long-stay users. Some used the room only when they really wanted to focus and get a lot of work done (e.g. I 2/3), while others were happy to stay all day because they work better in absolute silence (e.g. I 3/3).

For those who do not like the Silent Space, however, the quiet atmosphere can feel too oppressive and some have expressed self-consciousness about making any noise whatsoever (e.g. CM P2).

"Well it's a bit odd, the Silent Space, I think. It's not really silent. People trying to be silent doesn't quite add up so it's a bit too depressing in there." (CM P3)

"I never go to the quiet space myself because I'm not a quiet person and then I have to worry that I annoy other people." (CM P4)

One user liked the Silent Space in the morning but found that as it got busier later in the day the atmosphere became too serious and they moved to the Collaborative Space at that point (I 2/6). This sort of seat selecting behaviour is discussed more in Section 5.

5.2 Collaborative Space

A primary need identified prior to the refurbishment of the library was the need for work spaces in which talking and group work are both allowed and catered for. While the Silent Space maintains the quiet, studious environment that many prefer, others prefer to be surrounded by a bit more noise when they work. The Collaborative Space was created to meet that need.



Users' preference for the Collaborative Space was often framed in terms of what was permitted in relation to the Silent Space, for example that one is allowed to talk and eat food in this space as opposed to that one (e.g. CM P4; TT P12). The permissiveness was not immediately clear to everyone, however.

"I appreciated them putting up notes saying, 'You're fine to eat snacks and stuff in here' because at the start I was sort of like 'Am I allowed to? Am I not?' so I'd eat outside on the bridge and then come in and work." (TT P2)

This quote points to the success of what the Protolib project have termed "positive zoning", whereby spaces make it clear to you what you can do as opposed what you are not allowed

to do. The traditional assumption about libraries has been that prohibition was the default and it was a positive step to make the permissiveness of the Collaborative Space clearer to users.

Several participants alluded to the difference in atmosphere between the Silent Space and the Collaborative Space, indicating that they chose their work spaces based on the noise level in which they like to work.

“I never use the Silent Space because I hate absolute silence. It’s a bit unsettling I think. So I like that there’s a bit of a murmur here and I can talk to my friends as well.” (TT P6)

Even if they were not engaging in group work, several participants valued the ability to sit with friends and ask questions or talk about their work if issues came up (e.g. CM P4), a behaviour that the Futurelib team have dubbed “working alone but together” (Willatt, 2014).

Group work is effectively a new behaviour in the CUED library and the Collaborative Space contains a variety of furniture arrangements to support it. Participants who had done or planned to do group work could immediately see the value of this space. However, demand for larger desks means that the tables best suited for group work are often occupied by people working individually. The tables that are most often vacant are the low round tables, which participants described as good for gathering around a single laptop or large drawing for group work, but uncomfortable for other types of work (TT P3; CM P4). The sofas in particular seemed to attract a behaviour that could be called “perching”, in which users would sit for no more than ten minutes to browse a magazine or look through their bags, for example, before leaving the space (OS).

5.3 North Room

The North Room occupies what was formerly the periodicals room in the old library. The shelves have been removed and replaced with desks, chairs, and a modern AV presentation suite. The space is designed to be flexible, dictated by student needs and to relieve some of the pressure from the other seating areas. Students also have the opportunity to do group work using the technology in this room.



However, since the North Room is a completely new space, the library staff initially refrained from dictating through signage or rules what the North Room was for in order to see what uses and behaviours emerged organically.

Participants expressed a range of reactions to the space. While some saw the potential for more table space and collaborative work and took to using it right away, others did not know whether the room was available for them to use (e.g. TT P4). As with the Silent Space, larger tables were a draw to some.

“The nice thing is that there’s space and the lamps don’t get in your face and there’s quite a bit of table space if you need it.” (TT P1)

However, when asked what the room was for, various other participants admitted that they did not know (e.g. TT P4). Just as TT P2 left the library to consume food because of confusion over what was allowed, people may avoid using the room because they wonder whether they’re allowed to use the North Room and what conventions about noise and behaviour might apply. This plays out in tensions between people using the space for group study and those who expect the room to be silent (see section 4.3). It may also be reflected in the average use of the room, which is frequently under 50% of its total seating capacity. Other reasons for this lower use may be the perceived barrier posed by the door, and the fact that the small room looks fuller at a lower capacity than the other spaces.

A surprising link emerged between the North Room and the North Corridor, a number of participants who prefer the North Room expressing a secondary preference for the corridor outside that room. One stated that they would use the corridor for short visits, with the North Room usually reserved for longer stays (TT P12). The Protolib project has observed that the longer users remain in an area the more they take “ownership” of it, adjusting furniture and otherwise customising it. While the staff of CUED library occasionally observed that the tables and chairs had been moved around in the North Room, this did not happen frequently. This long-term “ownership” in the North Room may be expressed by the spreading of belongings across multiple spaces instead of other forms of customisation.

6 Use of the space

The library as a whole has been heavily used since reopening and peak times coincided with breaks in the Undergraduate lecture timetable (see Appendix 1). At these points the library could be at over 60% seating capacity, making it appear considerably fuller and causing difficulty for users trying to find room to work. The peak numbers are expected to increase greatly in Exam Term, when demand for space is anticipated to outstrip what the library can provide.

The study revealed that the library is used in various different ways. Several undergraduates reported using the space to eliminate ‘dead time’ in their days by revising or talking with friends about the course as a more convenient alternative to returning to College in between lectures (e.g. I 1/4; CM P2). These short-term users may return several times in the same day, but never for a long period of time and as a group show no preference for one of the spaces over the others.

A second usage pattern was identified through the research, whereby users may stay in the library for most of the day. One third year undergraduate reported sometimes spending nearly 12 hours off and on in the library, using it as a base from which they would attend lectures and go for runs (I 1/2). Postgraduates have also been observed matching both of these behaviours (OS). Long-term users will often leave belongings behind as they go for short breaks, showing a sense of security and ownership over their chosen place. As with the short-term users, each area of the library seems to have a percentage of long-term users who stay for multiple hours at a time.

Atmosphere, noise level, food, type of work and furniture were all motivations for users when selecting a place to work and every user seems to have a different priority. PS 34, for example, used the Silent Space but wished that the larger desks were available in the non-silent space as well, indicating that the furniture was the deciding factor rather than the noise level, as was also the case for TT P7. Some users choose different spaces at different times of day because they are happy to work anywhere with spare seats (e.g. I 2/2), while other users varied their location based on the duration of stay (e.g. TT P13). These users determined which areas suit them better for long sessions or sessions during which they need to concentrate particularly hard.

“I guess when I don’t have a lot of time, so like half an hour, then it doesn’t really matter wherever you sit... When I have more time I just sit in [the Silent Space].”
(TT P12)

6.1 Intensity gradient

The Protolib project developed a framework they termed the intensity gradient to describe work spaces. Intensity in this case does not refer to the level of work or focus happening in a space, as users in low intensity spaces were found to have just as much concentration as their counterparts in medium and high intensity spaces. It refers to what some users describe as the atmosphere. The perceived level of intensity varies from user to user and between disciplines, but can generally be expressed through functions such as the level of transience and traffic in a space (higher transience means lower intensity), comfort of furniture, personal space (the less personal space the higher the intensity) and surveillance (the more people you can see the higher the intensity).

On this gradient, the Collaborative Space fits somewhere on the low-medium intensity end of the spectrum, whereas the Silent Space fits somewhere on the medium-high intensity end. From the quotes in Section 4 it is clear that people seek different levels of intensity when they work. For some, the Silent Space is peaceful, quiet and provides enough space to tune out other users and focus. For others, the atmosphere is too strict, oppressive or “depressing”. To those who prefer the intensity level of the Collaborative Space it is a relaxing and social space, with just enough noise to help them focus, while others find the noise and foot traffic too distracting. And some people vary their intensity depending on their mood or the tasks they are doing. Providing this variation is important to ensure that users’ needs are supported, including the need to perform different tasks throughout the

day at differing levels of intensity, all within a convenient radius of their timetabled activities.

6.2 Use of other spaces

Another interesting insight involved use of spaces outside the library. The non-users who participated in the study had offices elsewhere in the Department or in West Cambridge.

“I normally work at the office because I can log into my CUED network through the cable so it is more convenient and it is faster than connecting to WiFi here. That is the main reason I use my office. Other than that I think that this place is better in terms of working because it is quieter... my office is quite noisy and it is annoying.” (TT P4)

On the other hand, CM P1, whose office has a “no talking rule”, finds that it is a productive place to work all day and therefore only uses the library on occasions when they need physical resources. Of those who use the CUED library on a regular basis, many mentioned other places that they work. These included their rooms in College, their college library, their college bar, the DPO and the CUED canteen.

Where participants discussed their reasons for choosing which of these spaces to work in, it most often came down to convenience, based on which one was closest to where they were at a particular time of day. The Protolib project developed the concept of “destination” versus “convenience” spaces to address this, with destination spaces being the ones chosen based on intention and preference and often meaning that users will stay longer. Convenience spaces are often ones used by short-term users to fill short gaps in their time table, allowing them to be more productive throughout the day. Crucially, as with the intensity gradient, these categories are subjective, and one user’s destination space may be another’s convenience space. Located in the heart of the department, where many students have lectures and supervisions throughout the day, CUED library easily fits the profile of a convenience space for many, especially the short-stay users. However, the redesigned library is also a space in which many users actively choose to spend their time. One participant pointed out that they liked the CUED library enough to work there late into the evening after lectures had finished even though their college library was equally convenient.

“These two spaces are actually quite close by so – just at Peterhouse – so it’s really convenient... But given that I still work here means that it’s quite a good space, because normally I would be inclined to just walk back because it’s 5 minutes away.” (CM P2)

What started out as a convenience work space became a destination work space thanks to meeting the needs of this particular user.

6.3 Impressions of the new library

The general impressions people have expressed toward the refurbished library have been overwhelmingly positive (e.g. PS 4, 23; GN). Some former non-users have even become regular users of the library in response to the refurbishment.

“Before it was very much you come in for lectures and then you go home, but now that there’s more space available to work it’s more positive than it was previously. It’s encouraging me to stay between lectures and supervisions. There’s no real need to vanish home immediately after a lecture.” (CM P3)

“Before I wasn’t using it as much, so it’s certainly improved. I think it’s generally with the other people as well. I did come here a few times just to read the magazines, but I think it’s become a more communal area where you can bring your friends. It’s just like... You can speak actually. [Laughs.]” (TT P7)

More space and a place to socialise were frequently mentioned by others as positive changes. Where there have been suggestions for improvements they have mostly been minor, or would need to be solved at a later date, including minor issues with furniture, noise and temperature.

A few participants, however, missed the historical, “Cambridge” feel of the old library:

“I quite liked working in there before the renovation. The tables were always really big and spacious and quite nice wood, nice leather chairs and very comfortable. I really liked the style of it. I do like this as well, but this is kind of a little bit more clinical in comparison to that, which is very much more warmer and old fashioned.” (TT P3)

Some hinted that the library seemed to have fewer books, or that they were less prominent now than in the old library.

“I think that before there were more books exposed to the public, although I’m not sure about that in terms of quantity, but that’s the impression that I have. So it seems that spaces are segregated more according to the function that you are expected to perform in each of the spaces.” (TT P8)

The books themselves perhaps circulate less than at other libraries, but people seem glad that they are there, given the concern expressed about them before the book stock was moved back into the library (GN).

6.4 Use of seating

The motivations behind seat choice included proximity to windows, warmth, noise level, ability to eat food and suitability for the type of work being done (PS). One participant mentioned “the non spoken diagonal seating rule” (PS 5), whereby seats directly opposite existing users are left empty and a seat diagonally to either side is chosen. Another said that they steer clear of seats next to the radiators, which made them uncomfortably hot (I 3/2).

With these varying motivations it makes sense that no clear favourites emerged and that most seats were used at similar rates.

More interesting perhaps was how the spaces were used once chosen. Hunter and Cox observed the creation of what they dubbed the personal zone. “The personal zone is the space which is the students’ own territory. The size of this zone can be made larger by students spreading out belongings such as coats and sitting in sheltered locations.” (2014, p.46) The observations at CUED library revealed a similar tendency. Some people customise the shallow desks by placing bookrests across the gap behind them (Fig. 1) or spreading out over multiple seats, sometimes placing their laptops in the gap between the lamps (OS).

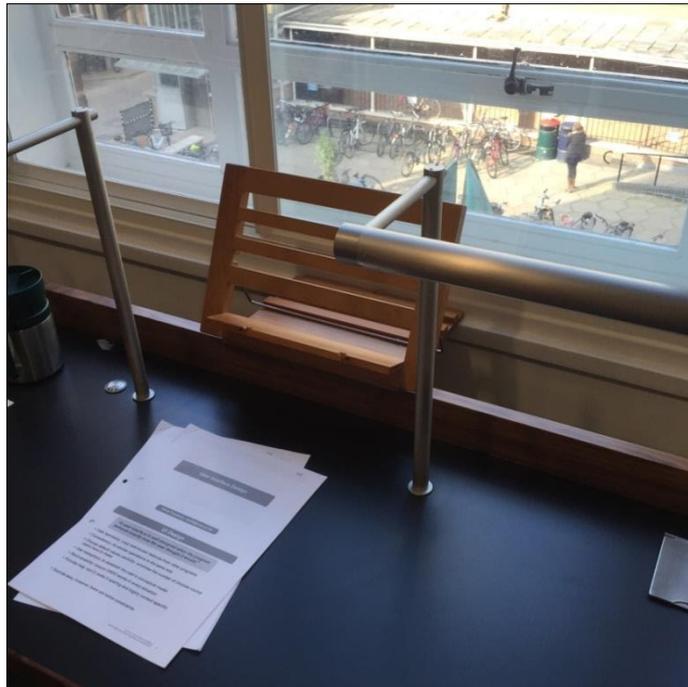


Figure 1 : TT P1 customises the working space to add depth to the desk during long work sessions.

6.5 Technology

A key illustration of the importance of not making assumptions about users can be seen in the use of technology in the library. There is a frequent assumption that most undergraduates bring laptops with them to the library (Foster and Gibbons, 2007) that has been thoroughly refuted in the library user research literature (e.g. Hunter and Cox, 2014). While many CUED library users own laptops or other such devices, a relatively small number are actually bringing them to the library. Various people mentioned that they use the DPO for computer based work (e.g. I 2/3) and others spoke about leaving their laptops in their rooms for the day rather than carrying them around (e.g. CM P4). Instead, many people did pen and paper work in the library, such as examples papers and maths problems, and a small minority read (e.g. I 3/2).

Mobile use was a common occurrence, and while some observers initially recorded this activity as “texting”, it became clear that some people might be doing work on their

mobiles instead, as was corroborated by CM P4. Potentially some were using a calculator function on their phones, as quite a few users had their own calculators as well.

6.6 Policing behaviours

Frequently the Collaborative Space and North Room can be as quiet as the Silent Space and this has allegedly caused some friction.

“I wish more people would move to silent space if that's what they want, rather than glaring at those who talk.” (PS 14)

“They sometimes give you really bad looks if you talk in the North Room and I wish they would stop because it's not a quiet space. They should know it. They can move to the quiet space if they want to.” (CM P4)

Members of Department staff have echoed the above statements, noting that in collaborative areas talking is sometimes met with looks perceived as policing.

It is not clear whether this is the intention behind the looks, however. The library staff agree that people will sometimes look up from their work in reaction to noise but that they have not observed anything they would describe as glaring. Regardless, it is important to the library staff that it is clear to users that talking in the Collaborative Space is not only allowed but actively encouraged. As such, they try to model behaviour by not lowering their voices in this space and communicate as often as possible what the space is for.

The possibility exists that the quiet periods are not a result of misunderstanding the nature of the space but are an example of user behaviour contradicting the intention for the space. One participant observed:

“I don't know come Exam Term whether people are going to appreciate having lost a lot of space that would be silent study area which is going to be in short supply during Exam Term... but it might also be that a kind of collusive behaviour occurs where everyone just works very quietly because everyone wants to work quite quietly in here.” (TT P3)

Even though a more social environment meets a need, there is the possibility that a combination of social pressure and collective need could override design and intention. As it is a requirement for different groups of library users to have access to collaborative space at different times of the year, including while other year groups are preparing for exams, library staff intend to keep a close watch over this issue.

7 Conclusion

It is impossible to draw a single, succinct conclusion from results that paint such a diverse picture of the uses and motivations of the new CUED library and such a conclusion would obfuscate the intrinsic differences in users' needs. However, the lessons learned may be summarised in the four following points:

1. Work space in the department is in high demand.
2. Each space in the refurbished library is used by a variety of people in a variety of ways for a variety of reasons. The diversity of work spaces has lent a greater flexibility to the library and enabled a different user group.
3. While touchpoints such as self-issue terminals and members of staff are important parts of the user experience, the comfort, space and suitability of furniture are still of prime importance, as this is the aspect of the library with which many users become most intimately familiar.
4. It is impossible to predict the way someone will use a space based on demographics. An outsider might assume that STEM students would work primarily in a digital landscape, on laptops, tablets and smart phones, and would be surprised by the prevalence of paper and pencils in the library. Similarly, one might expect Postgraduates who have offices in the department to be absent from the library but this is not true. In order to meet the needs of a user group it is important to get to know them first rather than making assumptions about who they are, what they are doing and why.

In light of these insights it is recommended that user research continues at CUED library in order to further develop understanding between staff and users and to guide future changes to the library.

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Further reading

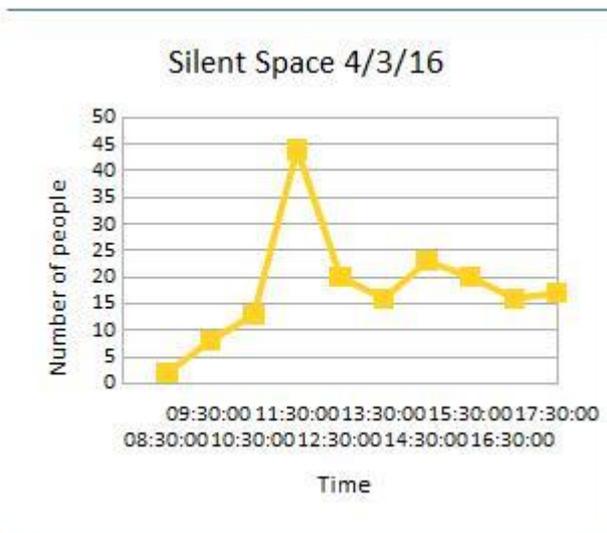
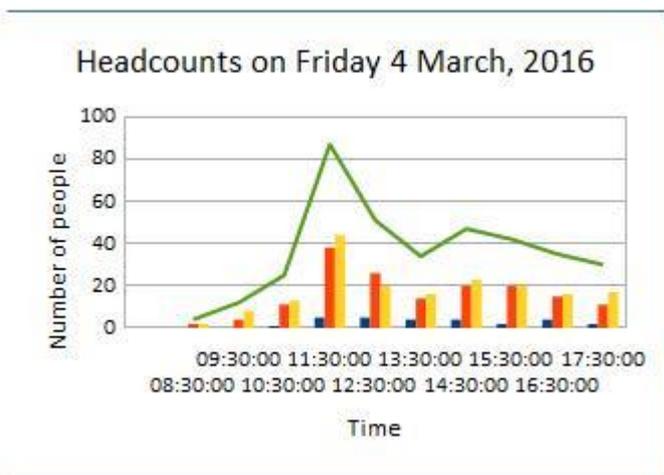
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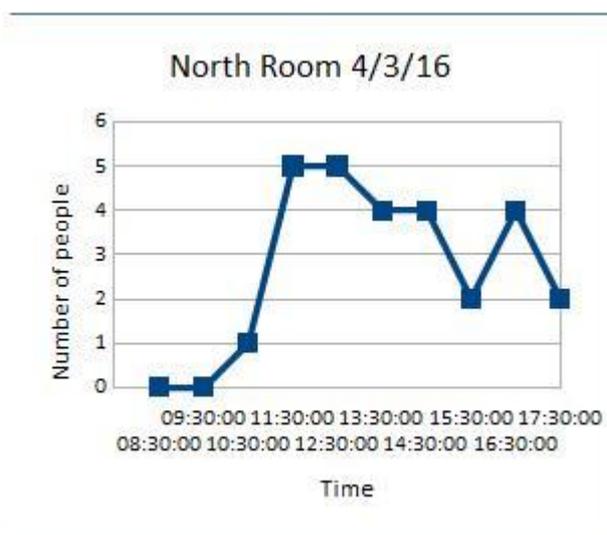
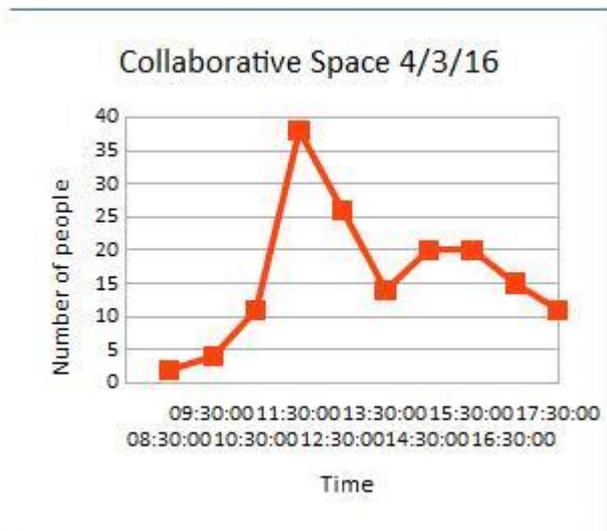
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Appendix 1: Hourly headcount figures, Friday 4 March, 2016





Appendix 2: Furniture recommendations

The following recommendations for library furniture in the future are based on common feedback from the various studies conducted at CUED library.

- **Desks:** Desks should be deep enough to accommodate a standard sized laptop while open as well as paper notes or a book. Each individual seat or working space should provide enough room to spread out belongings to either side. The depth and height of desks should accommodate people with long legs and wheelchair users.
- **Lamps:** Individual lamps are a positive thing, but should be far enough away from the edge of the desk to accommodate laptop use and designed in a way that users will not hit their heads when leaning over their work.
- **Chairs:** The chairs provided are generally considered comfortable, but there has been some suggestion that people would prefer adjustable chairs and/or tables.

- **Plug sockets:** The prevalence of plug sockets in the library has been commented on in a positive light (PS, TT). However, there are a few tables without nearby plug sockets and a few have suggested that adding them would be an improvement (PS). It is therefore advisable that any available work space would ideally have its own adjacent plug sockets.

Appendix 3: Methodology

UX research is a methodology with growing popularity in library user research. Its flexible approach appeals to professionals with limited resources who wish to gain a better insight about their users in order to design better services and addresses the gap left by the ubiquitous usage statistics and surveys. Quantitative methods show what library users do and how many of them do it, but leave the researcher guessing as to why.

The mixed methods employed in this study were intended as an inductive look at how people were using the newly refurbished CUED library and the motivations underlying their behaviours. The methods employed included observations, interviews, cognitive mapping and contextual interviews. As much as possible this study was designed to give users a chance to describe how they use the library in their own words. These insights could then be mapped with the behaviours observed at a distance. Conducting this study intensively over a two month period led to a deeper understanding of users' motivations and needs by embedding the researchers in the context. While this ethnographic approach does have weaknesses – researcher subjectivity being chief among these – it is understood to be a positive way to gain a deeper understanding of people in a particular context (Priestner 2014).

The design of this study was heavily influenced by work done at Cambridge by Andy Priestner, Futurelib and the Information and Library Service at Judge Business School, as well as the work of Andrew Asher, Donna Lanclos at London School of Economics, Nancy Fried Foster at University of Rochester and the UXLibs conferences. Methods employed by these researchers have been adapted to the context and research questions at CUED library and the key sources used in developing this study are listed in the Further Reading section.