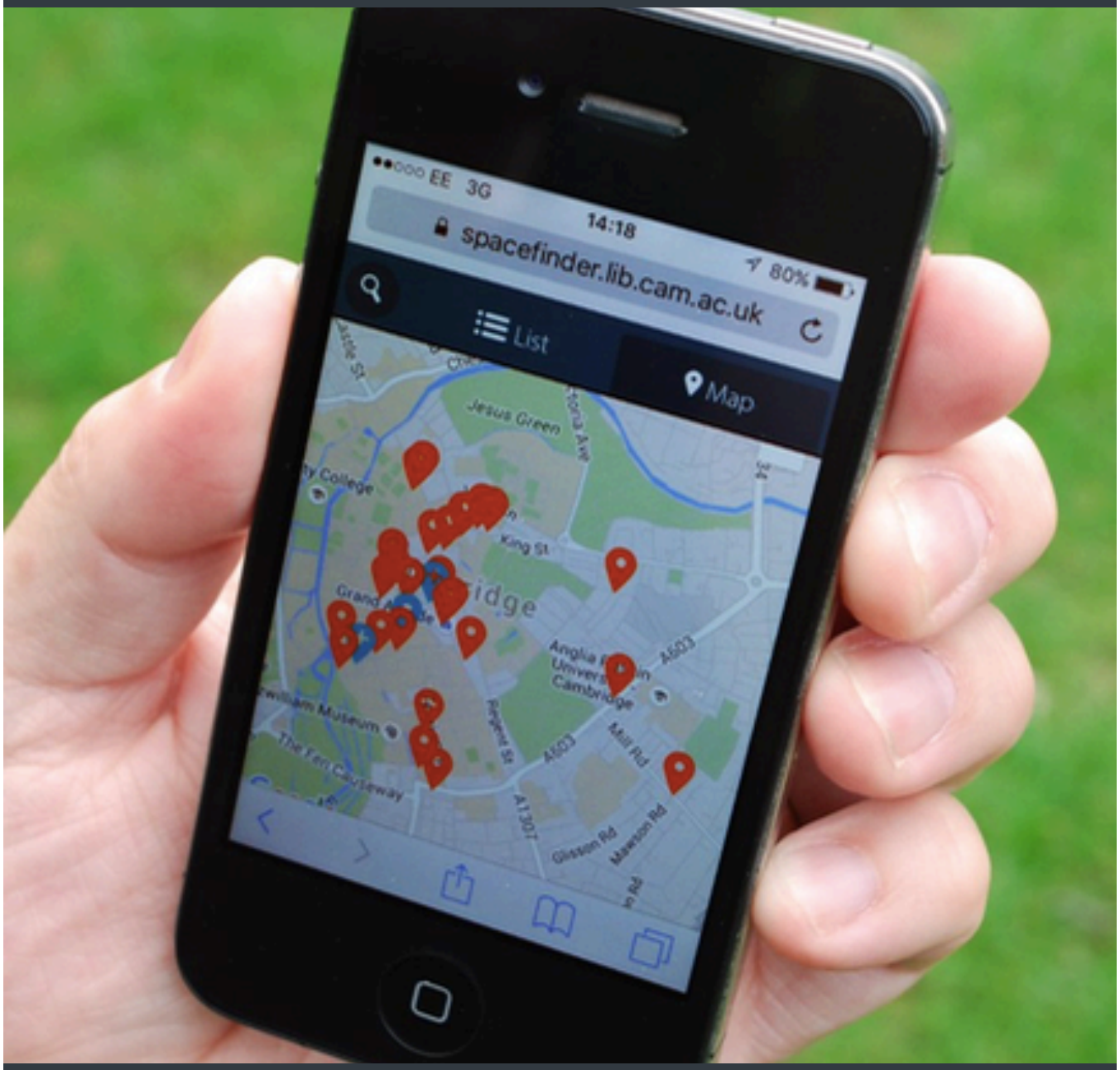
Futurelib

UNIVERSITY OF CAMBRIDGE

Imagining the future of library services at University of Cambridge.



Spacefinder

Illuminating study spaces at the University of Cambridge and matching them to user need and activity

Andy Priestner, David Marshall and Modern Human – June 2016

THE FUTURELIB PROGRAMME

Futurelib is an innovation programme exploring the future role of academic libraries within the University of Cambridge. It employs ethnographic research methods and human-centred design techniques to examine the current user experience (UX) of libraries and draws on the skills of librarians from around the institution to test new service concepts. It is funded by the University Library and supported by design and innovation consultancy Modern Human. The programme is managed by Andy Priestner and led by Sue Mehrer, Deputy Librarian, Cambridge University Library.

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1. INTRODUCTION

Spacefinder was the second project undertaken as part of Cambridge University Library's Futurelib Programme. In keeping with Futurelib's fast pace and rapid prototyping brief, the bulk of the project was conducted over just 6 months, between April and September 2015. Spacefinder was the name given both to the project and to the pilot product that was the end result of our research phase. As with other Futurelib projects, a team of library staff was formed to work in close collaboration with our design partner Modern Human. The result was a web-based pilot service that launched in early October 2015, to coincide with the start of a new academic year and a fresh intake of students. Since then a project team has been responsible for maintaining and adding to the service and has collaborated with Modern Human on a second version of Spacefinder. This was released at the start of Cambridge's Easter Term in 2016 and incorporated both suggestions from users, and findings from usability tests.

The project arose out of ethnographic research conducted at Cambridge University Library before the Futurelib programme was launched, which explored the study lives of Cambridge students. This research revealed that students were not always finding the right study spaces to suit their needs, and that these needs were almost as diverse as the number of libraries in Cambridge. We already knew that when it comes to study spaces Cambridge has a 'problem of hidden abundance', having a multitude of spaces but no real means (beyond our existing websites) of promoting them. The idea behind Spacefinder therefore was that it might address these issues all at once, by showing students exactly where spaces were relative to their current location in the University, and also detailing their attributes and their suitability for different study activities and preferences.

In part, the Spacefinder project sought to solve the problem of Cambridge University's particular terrain: boasting over 100 libraries and a complex tripartite system, students are expected to navigate a landscape of libraries that incorporates their departmental/faculty library, college library and the main University Library, all of which possess relevant and complementary resources for their studies. The project also actively recognised that the study landscape of Cambridge's students stretched beyond these many libraries, to café's, common rooms and other spaces. If Spacefinder could surface the availability of these spaces too, it could potentially provide highly tangible benefits to its users.

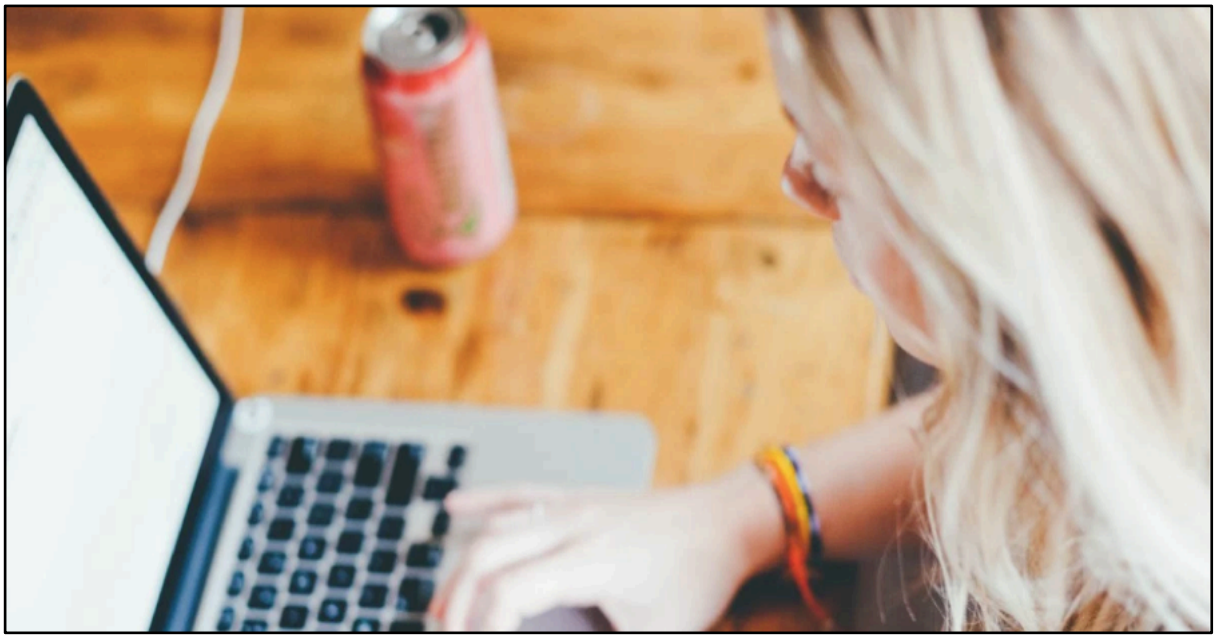
2. INITIAL RESEARCH

Prior to the commencement of Futurelib, the initial concept for Spacefinder arose out of user experience research with 162 Cambridge University students. Most of these were undergraduate students from a range of disciplines, but predominantly STEM (Science, Technology, Economics and Maths) subjects. The research techniques employed included diary studies alongside in-depth and *ad hoc* interviews. The diary studies were conducted using dScout – a smartphone based research tool – combined with tracking using a running app. Together they yielded valuable geo-spatial data.

2.1 Workspace preferences

One of the main findings of the research was that students have a wide variety of preferences in terms of the spaces in which they choose to work. These preferences were found to be very different across the students who took part in the study. Common choices included: their bedrooms in colleges or student houses, college libraries and other libraries in the University system. However there were a significant number of students who were looking to work in alternative spaces to these.

Those students who chiefly worked in libraries did so because they felt that they were more focused and effective in such an environment and encountered fewer distractions. They also found that libraries offered a valuable change of setting that helped them to differentiate their study activities from the rest of their lives. For some students going to a library was not unlike the routine of to going to work in an office each day.



Naturally, traditional library environments were not found to be conducive for studying for everyone. Students who preferred to study in their rooms valued the familiarity, quiet and convenience that went along with this, and also appreciated the ability to be able to stop for breaks for hot drinks and to eat their own food. These students primarily used libraries to collect books and journals, and occasionally to study for short periods of time between their lectures.

Many students found that neither their accommodation, nor libraries were conducive to study. These students were looking for quiet spaces that had an inherently different *feel* to libraries, and therefore often ended up working in common rooms or other quiet areas around their college, department or faculty. Students throughout the research were also actively looking for group working spaces in which they could talk and collaborate with others. On many occasions, these types of study sessions ended up being held in local cafés, or rooms in colleges.

Some of the student comments from this research are reproduced below:

"I use Sidney Sussex College Library because there are lots of other people working, it's quiet, there are no distractions, all my textbooks are there, and I can leave my stuff there overnight if I want to."
Undergraduate Medicine student

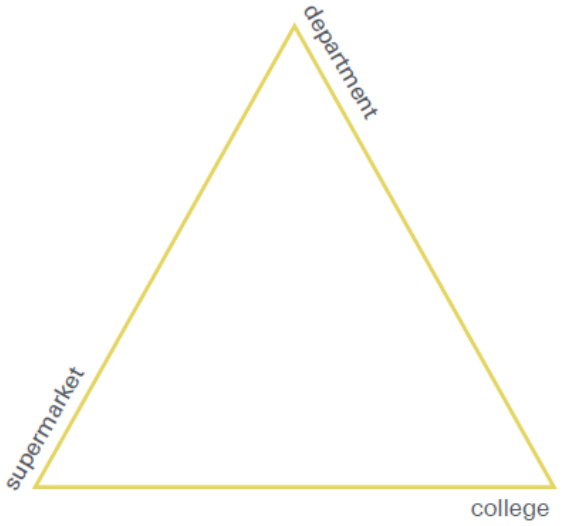
"I love working in the Alison Richards Building. I work there when I have lectures at Sidgwick. It's spacious, bright, very lovely, has plug sockets, is near sofas, has Wi-Fi and it's possible to eat and drink. I also like the Grads Café because it has a lovely view, there are sockets all around the edge and there is good food available at a reasonable price."
Undergraduate Politics and International Relations student

"I like Newnham College Library. I can see people I know and I have my favourite spot. The big, old, round table in Newnham Library is the best thing in the world! It's a nice size so you can sit with your friend opposite and a chocolate bar in the middle!"
Undergraduate Psychology and Behavioural Science student

2.2 The 'Student Triangle'

Another key finding of this initial research was that the study lives and behaviours of students took place inside geographical triangles. An individual's student triangle was found to consist of 3 points: their college, their department, and their preferred supermarket. The area between these points was where the students spent the large majority of their time.

Students at colleges situated close to their departments perceived other locations as being a considerable distance away, and the prospect of having to travel to these destinations was therefore seen as disruptive. This was due to the fact that most of their daily routines took place inside relatively small geographic areas. This outlook contrasted with that of students from colleges such as Girton and Homerton, further away from most departments and other University buildings and facilities. These students did not consider similar distances as being inconvenient in the same way.



Many students were seen to resent having to leave their student triangle, and would plan occasions when they had to visit locations outside of their immediate area in advance. Tasks that led to journeys outside of their student triangle included visits to libraries, handing in work to supervisors at other college, department or faculty buildings, and attending supervisions at other colleges.

2.3 Expert interviews

Alongside the ethnographic research with students described above, a series of interviews were conducted with a total of 30 library experts both in Cambridge and beyond. These interviews, which lasted between one and two hours sought views on the Cambridge library system and its services. The interviews focused on the following themes:

- The purpose of the library
- The role of librarians
- Perceptions users have of libraries
- How libraries might change in the future

Of particular relevance to the planning of Spacefinder was the experts' view that Cambridge's diversity of libraries, library collections and library spaces was almost unique, and that this variety should be celebrated and preserved. It was also noted however that navigating this variety of services, resources and spaces was not always easy, and that library staff could do a lot more to improve both people's knowledge of what is available to them, and the process of finding these spaces and resources. It was felt that more innovative easy-to-use services and software could do a great deal to improve the user experience of libraries at the University of Cambridge.

3. PROTOTYPING SPACEFINDER

The Spacefinder project began in earnest at the end of April 2015, with a newly-formed project team attending a 'Kick-Off meeting' in which Modern Human revealed the concept behind the proposed product and a range of initial design ideas.

At this point in the journey the proposed benefits of Spacefinder were as follows:

- Most library users are unaware of the richness and choice of working environments available to them. Spacefinder will help the library user navigate this variety of choices and intuitively find the perfect space for a study or work activity.
- Spacefinder will help to communicate that different library spaces exist, and therefore maximise their usage.
- Spacefinder may also allow its users to book collaborative working spaces.

3.1 Early concept validation

As well as the period of initial research, we received early validation of the Spacefinder concept via two other sources. The need for the service had been backed up in timely fashion by two stories in one of Cambridge's student newspapers, 'The Cambridge Student', on 14 March and 2 April 2015. The first, *Library Crawl: A Saturday on the Sidgwick Site* documented Cambridge undergraduate student Yema Stowell's quest to find her perfect library space on the Sidgwick Site. The second *Library Crawl Redux: What makes the perfect library?* featured a conversation between Yema and English Faculty librarian Libby Tilley (who had corresponded with Yema after the first article was published) in which Yema described her ideal library space. It is also worth noting that a month before, the first international 'User Experience in Libraries' conference had taken place in Cambridge. Involving ethnographic fieldwork as part of its schedule, teams of librarians were required to pitch ideas for improving the experience of Cambridge libraries based on the data they had gathered. One team that made it through to the final round presented on the value of an app called 'Get-A-Room', which might enable students to more easily find spaces for group work and meetings, thereby validating in part the need for the project on which we were about to embark.

3.2 Minimum viable product

The human-centred design process involves designing a prototype version of a product, testing it on users, and then iterating on the prototype based on the feedback received. This process continues until a product is arrived at which fulfils the majority, but crucially not all, of people's needs. The goal is a 'minimum viable product' (MVP for short): a product that has enough features gathered via research to ensure its deployment and use, ahead of continued development and updates. A key advantage of taking this approach is the ability to test the product hypothesis with minimal resources, while also making the product itself available to users at the earliest opportunity. The 'Spacefinder pilot' would be built following these principles and was therefore set to launch just five months after the first project team meeting.

3.3 Scope, features and user stories

It was agreed that the scope of the Spacefinder pilot would include entries in the product for the main University Library and all faculty and departmental libraries, but only for those spaces with no access restrictions currently in place. This meant that college libraries would not be included in the service as they are provided almost exclusively for their members only. Cafés would also be added,

with the aim of supporting the needs of students who had declared them to be an important part of their study landscape. Anticipated features of Spacefinder included: a basic catalogue of spaces; a mechanism for capturing, storing, querying and displaying user generated data about spaces; and a mechanism for gathering user written reviews of spaces and a way of showing them to other potential users. This final aspect led to much interest in the potential for Spacefinder to be a kind of TripAdvisor for Cambridge libraries. As compelling as this idea sounds, the product would not ultimately be used in this way, thereby underlining the importance of not second guessing user behaviour when launching new services. This proposed review feature was also reflected in four 'user stories' that were presented as potential uses of Spacefinder:

- As a student or researcher I would like to find a space that meets my needs for a particular activity.
- As a member of library staff I would like to supply data about spaces in my library.
- As a student or researcher I would like to provide a review of the space I have used.
- As a member of library staff I would like to see the reviews of my spaces and be able to respond appropriately to these reviews.

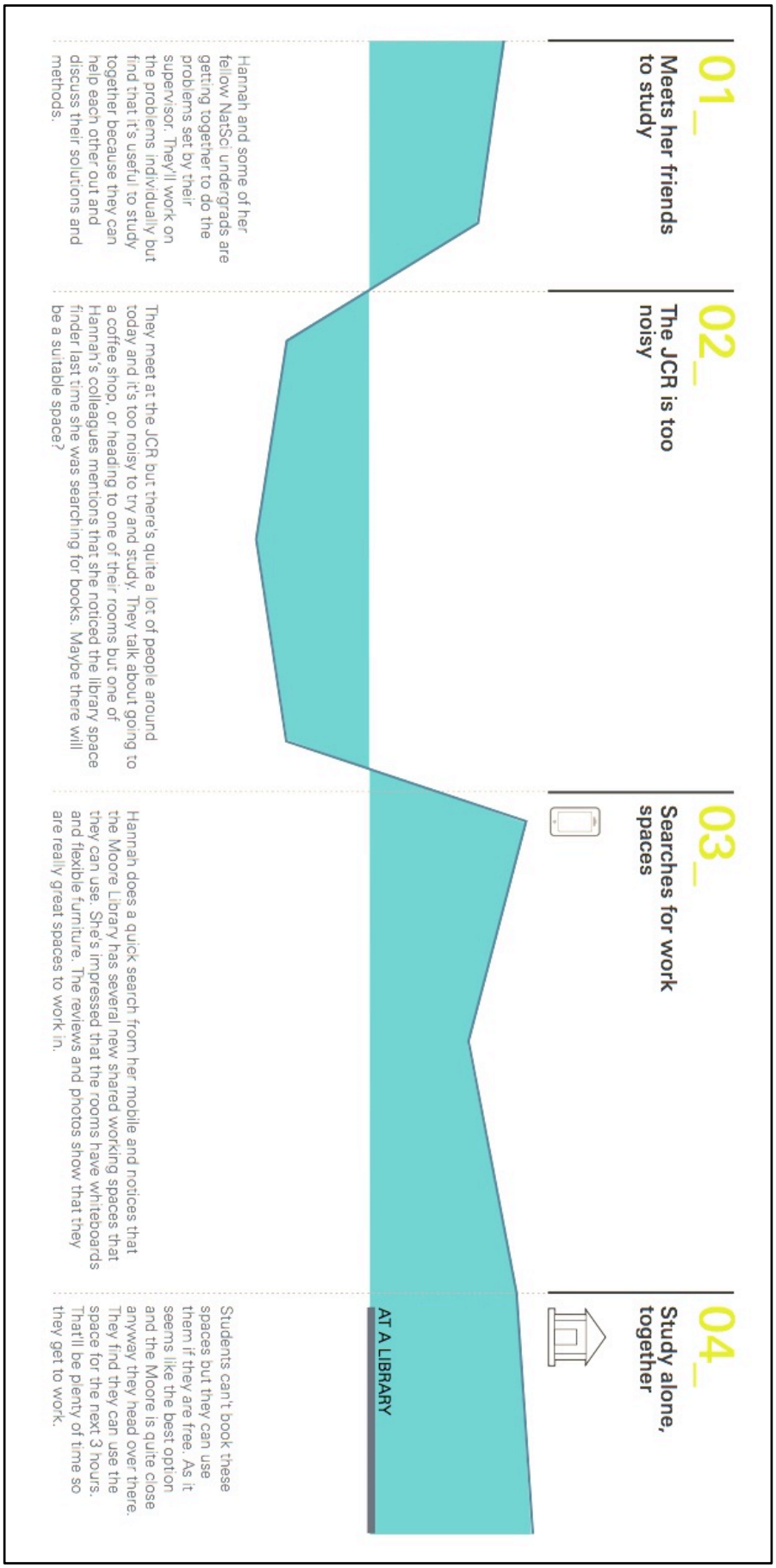
Examples of how Spacefinder might fit into the lives of Cambridge students were also created for illustrative purposes (see the 'Natural Sciences undergraduate example' on the following page). These speculative user journeys proved to be a useful way of visualising Spacefinder's potential value, as well as a useful tool for discussion.

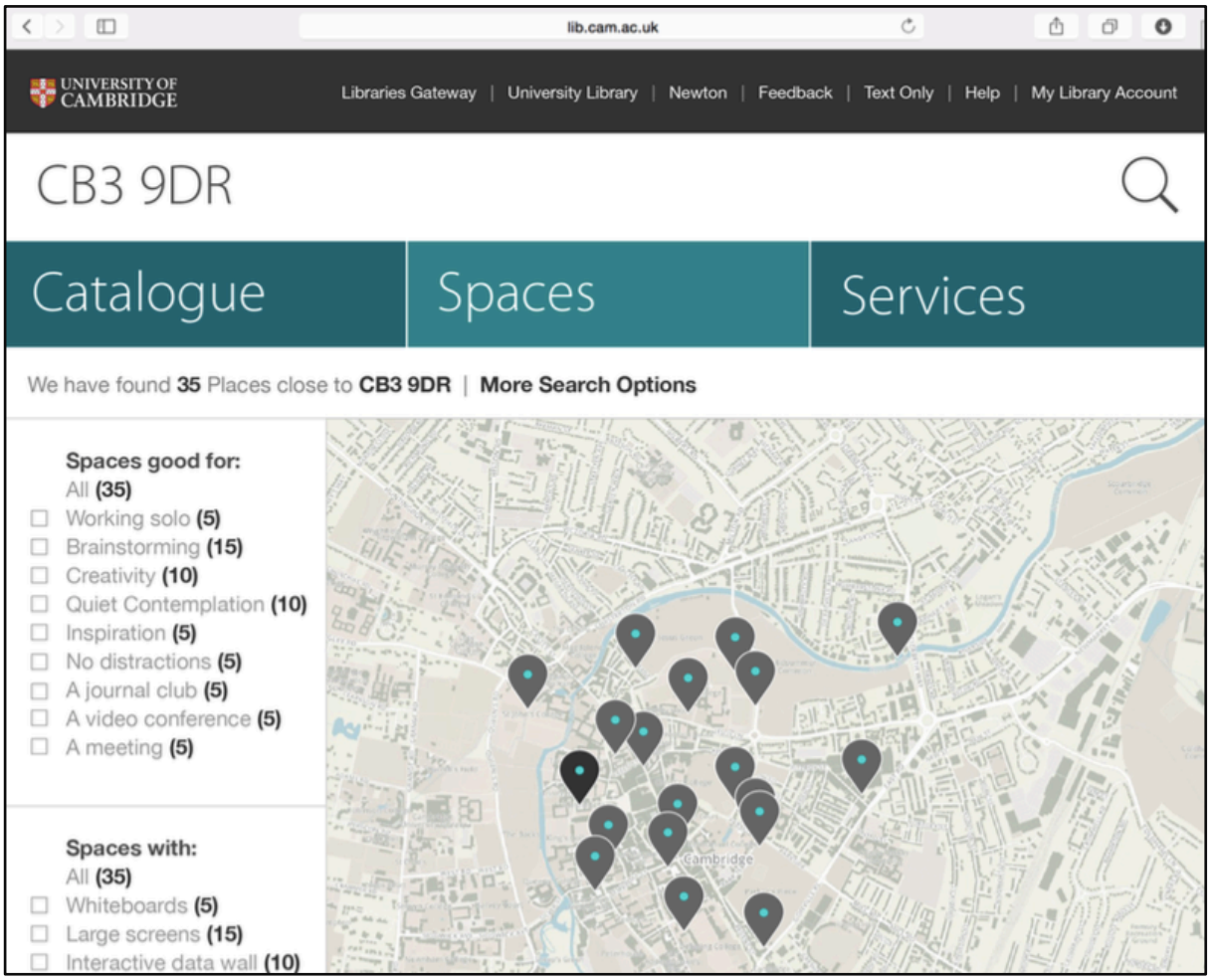
3.4 Original designs

A range of concept visuals had been created ahead of the start of the project to show how Spacefinder might look and how it might work. These mock-ups also showed Spacefinder as part of a suite of services, for instance showing it integrated with Cambridge's library catalogue (see page 9), the idea being that users could link to the Spacefinder listing for the library where items they needed were held. This remains as yet an unexplored avenue.

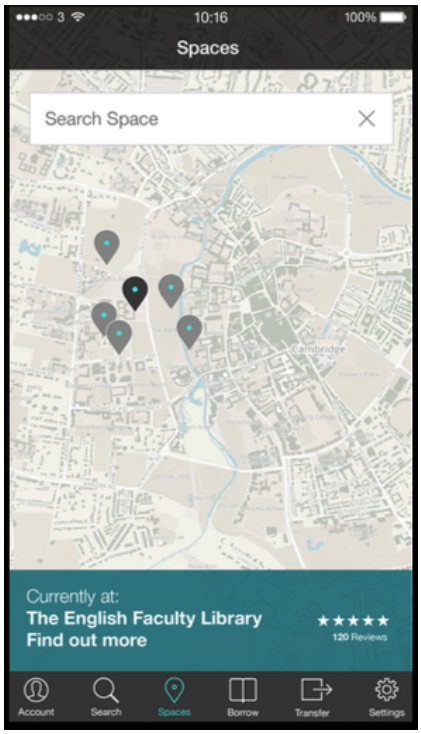
These initial designs also demonstrated how Spacefinder would be 'location aware', using GPS functionality to show spaces near to their current location that matched their preferences. This feature was based on the assumption that most users would access Spacefinder on a mobile device. Basic search categories at this stage included: 'Spaces good for' different activities and 'Spaces with' specific facilities. These categories would both evolve during the design process.

User journey map for a Natural Sciences student using Spacefinder





Above and below right: Desktop and mobile concept designs for Spacefinder



From its conception it was intended that the Spacefinder user interface would be responsively designed to make the most of available screen size and to optimise the user experience across mobiles, tablets, laptops and desktops. In this way people using Spacefinder on mobile phones would see one view (either a map or a list of spaces) at a time, enabling them to quickly and easily find the right space to work at a point when they were between lectures or when they found their preferred space to be full. People using larger devices or a desktop would see both the list and the map view simultaneously, as it was assumed that they would be more likely to be using the service to plan study activities and visits in advance.

The Spacefinder interface was initially conceived as incorporating two key user 'journeys': a 'search journey' and a 'current location journey'.

- Search journey: enables the user to find a space by their intended working task, the atmosphere or noise levels of a space, the availability of particular facilities, or by tags which have been added to a space.
- Current location journey: enables the user to find a space based on their current location.

The idea was that two distinct user journeys would unfold over 3 key screens (a map view, a list view and a profile for each space) listing its details, along with images of the space. A search panel would be made available from every screen, with the panel opening out over the current screen so as to avoid the user losing their current context.

3.5 Co-design workshops

Before these original design ideas were taken any further, two collaborative design (co-design) workshops were organised, with a view to gathering more information on what students wanted from study spaces. Specifically we set up these workshops to discover if Arts, Humanities and Social Sciences (AHSS) students had different study space needs to STEM students.

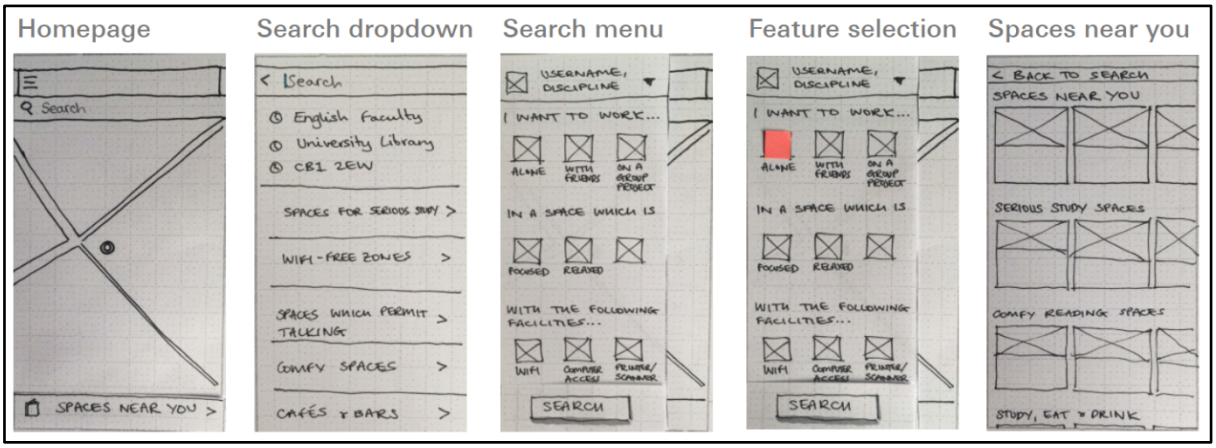
The workshops used 'affinity mapping' (also known as 'affinity diagramming') – the arrangement of sticky notes in themed categories – to elicit information about which spaces the students used, and what activities they used those spaces for. The workshops, which took place at the English Faculty and Judge Business School were also attended by library staff who worked alongside the students, allowing for exploration of how professed student needs compared with our existing expectations of their needs.

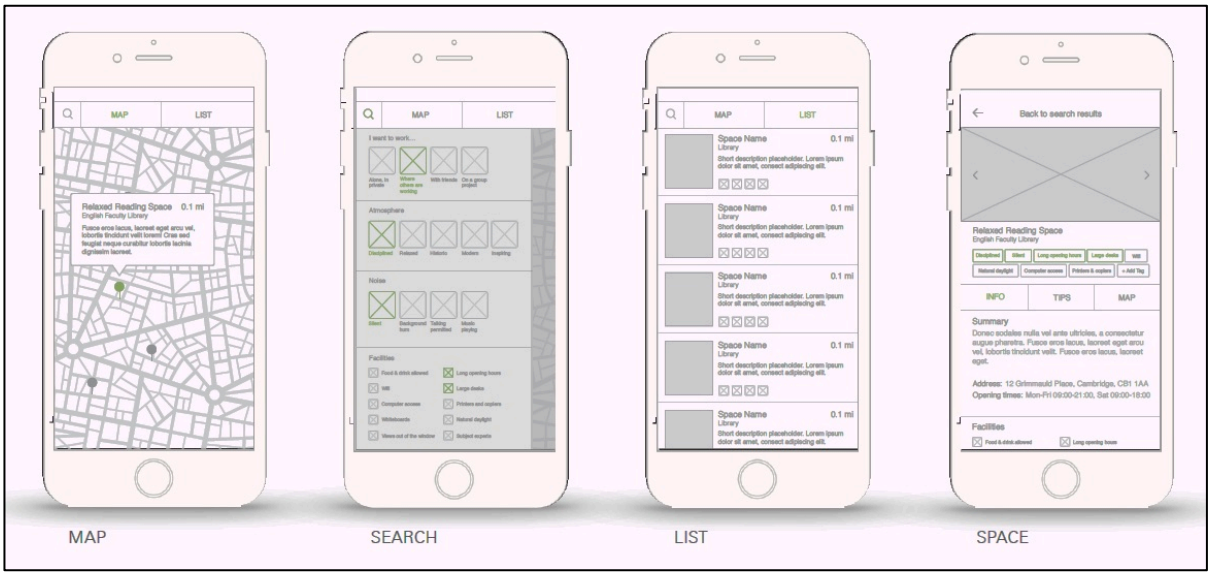
AHSS students rated atmosphere as the most important feature of a space, followed by the workspace itself and finally the location of the space. STEM students chose the same top three, although for them the workspace itself was the most important feature. They also specified that the resources/equipment available in the workspace was equally important, whereas AHSS students did not specify the need for any particular resources. The only other distinction was that STEM students were more matter-of-fact in the descriptions of their needs in respect of working spaces.

3.6 Wireframe prototypes

The findings of the co-design workshops and a range of ideas arising from several design review meetings with the project team (in which they were encouraged to lend their own experience, intuition and ideas to the ongoing design work) were incorporated into a new set of simple pen and paper drawings for Spacefinder's interface. These drawings detailed key features such as a dropdown search menu list, a feature filter (e.g. atmosphere, facilities) and a list of nearby spaces. The drawings were subsequently mocked-up as a simple wireframe prototype that could be user-tested on a smartphone, with crude hyperlinking between pages as if it were a real working app.

Below: Basic pen and paper drawings of the prototype Spacefinder mobile interface





Above: Wireframe prototypes for Spacefinder's mobile interface

3.7 User testing

Testing with this basic wireframe prototype took place at the University's Sidgwick Site (an area consisting of many University buildings, departments and libraries) and at the Central Science Library over two days. Students were asked to navigate around this first version of Spacefinder on a smartphone as if it were an app but were not told what it was for, nor that this was a library research project. Despite the fact that the app was very low fidelity, reactions to the idea were overwhelmingly positive and its purpose was immediately grasped without prompting.

Below: Students testing the first Spacefinder prototype on the Sidgwick Site.

Testers also discussed their current study preferences, and what they might like a space-finding app to do for them.

- "Oh, so this app tells you how to find study spaces – great!"
- "I spent half the day yesterday trying to find somewhere to work. This is exactly what I needed"
- "We're finalists – would loved to have had this while we were here"
- "I don't know what libraries I can access – so this would help"
- "I like to work in cafes really not libraries, so it would be good for finding those spaces"
- "Photos would be useful so you know what sort of library space you're heading for"

More general comments about library space requirements included:

- "I like libraries to be cosy, warm, light and quiet, but not too quiet"
- "Wi-Fi and large desks are the most important thing"
- "I like to work in spaces where no-one else is"

Feedback from both days fed directly into further design iterations of the service as the relative merits of front screen menu options were discussed.

3.8 Reviews, tips and authentication

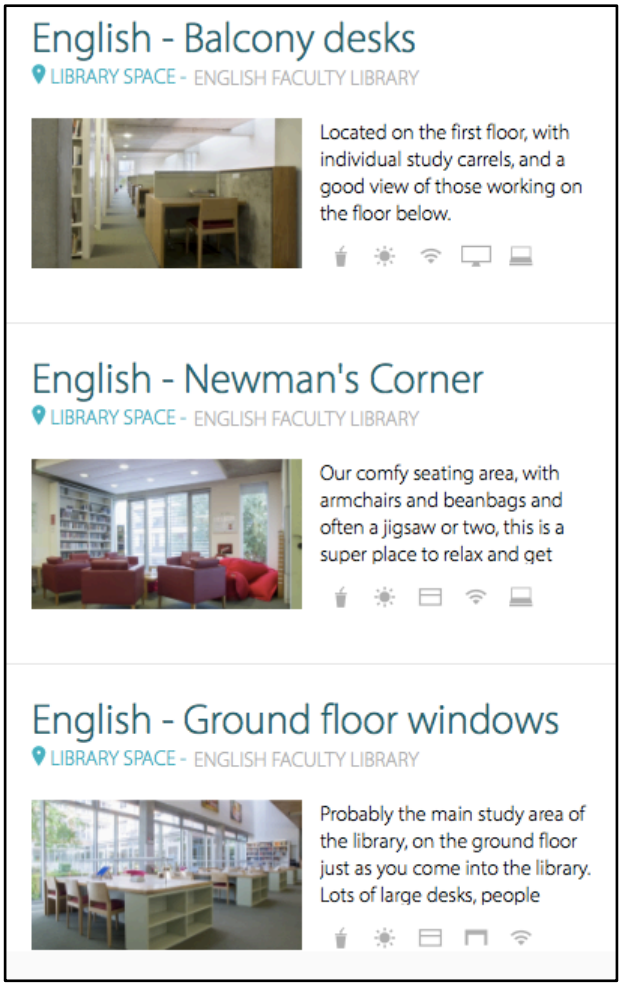
One of the most hotly debated aspects of Spacefinder was the inclusion of functionality for users to be able to review the spaces they visited. Some library staff were concerned that this feature might be misused by students and that it invited negative comments. It was also argued that one student's 'study heaven' was another's 'study hell' so reviews would be too subjective to be helpful. This concern was addressed by the decision to change the emphasis by calling user comments 'tips' rather than 'reviews', thereby accentuating the positive.

Another consideration was how these tips might be managed. It was agreed that leaving a tip should require authentication and that members of the project team would moderate these. Local authentication was also suggested as a means of including spaces with member restrictions (e.g. colleges) so that the system would show users all spaces to which they had access based on their specific privileges. This was deemed to be too complex to incorporate into the pilot. There was also concern that authentication would be a barrier to use of Spacefinder, discouraging students from engaging with the new service. At the time of writing only one tip has been left on the entire platform during its first 8 months.

3.9 Gathering an initial dataset

At the end of May 2015 the project team embarked on a data-gathering phase in order to arrive at a discrete first set of library spaces. Crucially we set about gathering data on specific spaces within libraries which would ultimately form individual entries on Spacefinder, rather than attempting to categorise an entire library as if they each constituted one space. This approach recognised that there are often many different types of spaces within one library, supporting different needs and offering different facilities. One of the first libraries to be categorised in this way was the English Faculty Library, which offers many diverse spaces within one library:

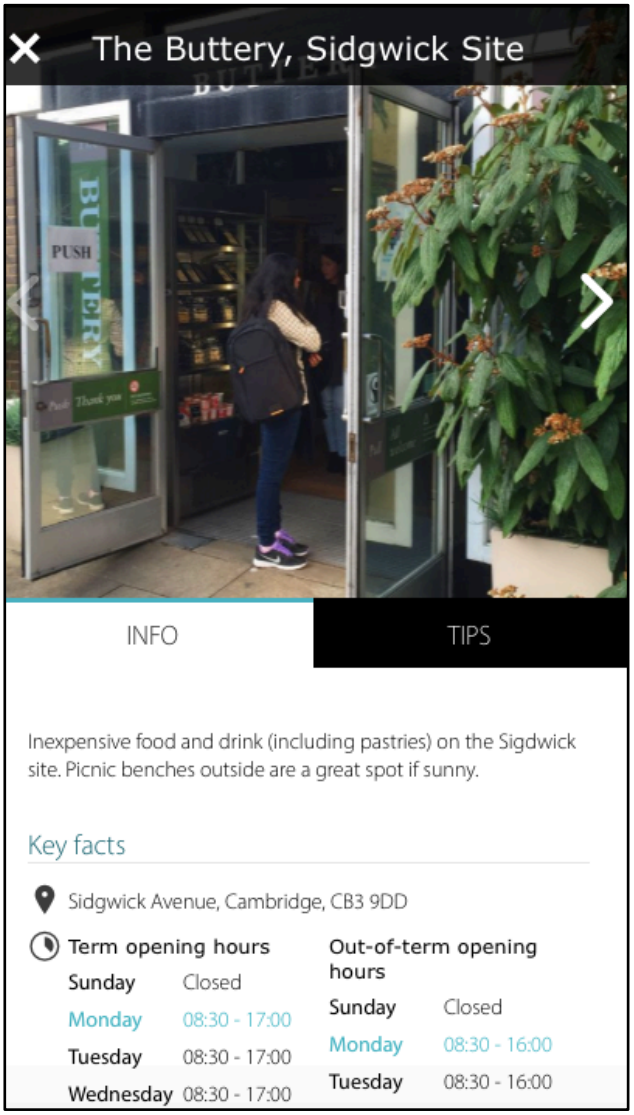
A main study area with large desks; a computer room with printing facilities; a study room beside a specific printed collection; a balcony desk area with individual study carrels; a comfy seating area with armchairs and beanbags; a quieter study desk area; an IT training suite.



The English Faculty Library would therefore be represented via 7 different space entries on Spacefinder. In addition to a basic description, each space was accompanied by an image of the space and icons detailing the different facilities that students could expect to find there. These facilities included: natural daylight, large desks, WIFI, phone signal, whiteboards, toilets, places with refreshments nearby. More subjective was the describing of each space as either 'disciplined', 'relaxed', 'historic', 'modern', 'inspiring', 'cosy', 'social' or 'friendly'. The typical noise level was also detailed for each space, ranging from 'strictly silent' to 'whispers' to 'background chatter' and 'animated discussion'. Study preferences in terms of working activity was also recorded as: 'alone, in private'; 'where others are working'; 'with friends'; 'on a group project'.

Above: Three of the English Faculty Library spaces as they currently appear in Spacefinder

There was some concern about the consistency of data between different spaces and libraries and how they were represented on Spacefinder. This was less of a concern during this initial data gathering phase when we learned together as a project team how to input spaces, but became more of an issue once we opened out wider and requested library staff from across Cambridge to start to do this themselves. We discussed how much guidance might be needed for library staff entering data and whether the sometimes subjective assigning of terms might prove problematic, but ruled out the possibility of having the project team enter all of the spaces themselves. This was partly due to lack of capacity, but mainly because we wanted library staff to buy in to the project and take responsibility for their own spaces. We also thought that it was far more appropriate for library space details to be entered by those staff actually working in them.



Cafés, common areas and other spaces were added by the project team, starting with popular University cafés such as the Sidgwick Site Buttery, the Grads Café, and the Alison Richards Café (ARC), as well as a number of coffee shops in the centre of town.

Above: The space entry for the Sidgwick Site Buttery as it currently appears in Spacefinder

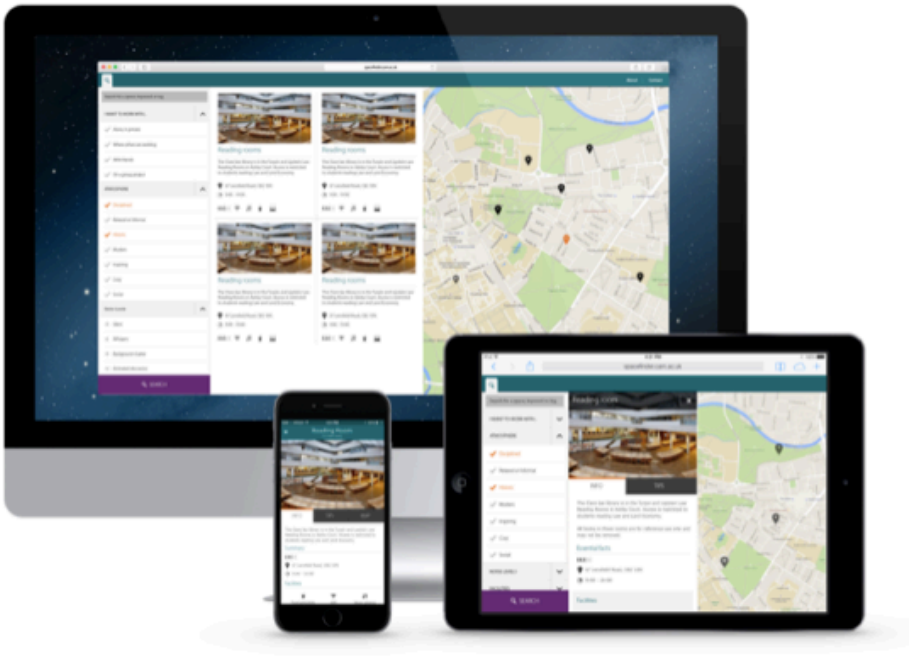
3.10 Building the product

While library staff were busy gathering the initial dataset, the Spacefinder pilot service was being developed by Modern Human, using Ruby on Rails. Ruby on Rails is an application development framework perfectly suited for rapid development and deployment of web applications. As a framework it provides a lot of commonly used functionality. Architecturally, Modern Human

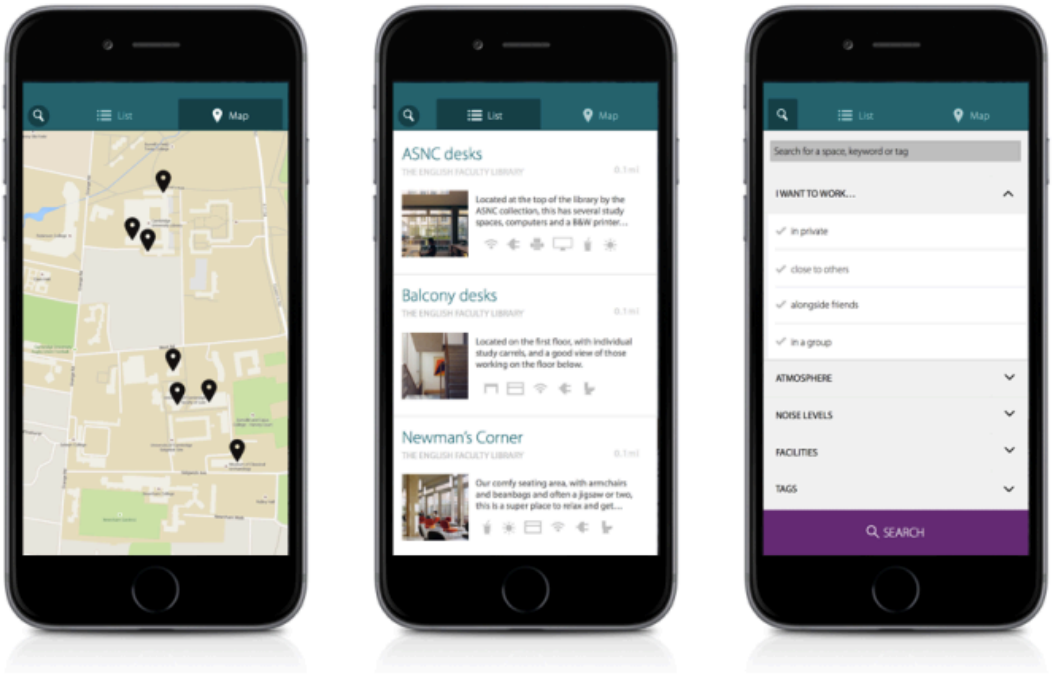
separated the front-end and server-side applications in order to maximise the pace of development, which also made it easier to make changes later. Using this architecture retains the potential to open an API in the future, so that other people at the University can use the data without the front-end. This in turn opened up the possibility of future interoperability with University systems, giving others the opportunity to create interesting applications with the data. This choice of technical architecture for the Spacefinder prototype therefore made it possible to release rapid improvements and upgrades. As a result, later in the process, an updated and improved pilot service was developed in a matter of days, rather than weeks.

3.11 Designing the UI

In mid July 2015 Modern Human were ready to unveil the user interface for Spacefinder to the project team. The earlier co-design workshops and user testing had all fed into this design: its search options, the presence of images, and also the kind of language used. The visuals adopted the University's colour palette - with teal selected as the platform's primary colour - making it feel part of the same family by using the same pared back visual elements and giving the information 'room to breathe'. Through just four panels or views – map, search, list, space - it was intended that the user interface facilitated a large variety of different searches and enabled people to express precise preferences. Above all else it was hoped that Spacefinder's user interface would appear to its users as appealing, simple and fast.



Below: A view of Spacefinder's UI for smartphone: map view, list view, search view.



As the finishing touches were made to Spacefinder's UI the initial library spaces and cafes data were entered into the back-end of the fledgling platform, having first been supplied to Modern Human on a spreadsheet. Once the UI was completed, data was added to Spacefinder directly by logging in to an admin interface reserved for 'super-users'.

Ahead of a preview of the service at two Spacefinder roadshows, a 'bug hunt' was held at which the project team and platform developers came together to test Spacefinder.

Right: Testing the new UI at the English Faculty

3.12 Roadshows

Two Spacefinder roadshows were held at the Engineering and English faculties at which the project team and Modern Human presented the Spacefinder 'story-so-far' to Cambridge library staff. As well as detailing the research and design processes, attendees were invited to join in an affinity mapping exercise on student use of library spaces. One important aspect of the roadshows was to ask staff to consider adding their library space to Spacefinder ahead of the intended October launch date. A new Spacefinder logo was also unveiled for the first time.

Above: Project team members Amy Theobald and Tom Sykes affinity mapping at the English Faculty Spacefinder roadshow

3.13 Adding and photographing spaces

During the weeks following the roadshows, while Modern Human worked on fixing interface bugs and generally stabilising the platform, Cambridge library staff were approached to see if they would be willing to add their library spaces to Spacefinder. The vast majority agreed. Those that did not were chiefly concerned that their libraries were already at capacity and might not be able to meet the demand of new visitors. In some cases it was agreed that spaces could be removed from the platform should an influx of new visitors cause problems.

A professional photographer was hired for a short period to take photos of the participating libraries as it was recognised that many Spacefinder users would be selecting spaces based on images rather than descriptive text. Another reason for this was that very few libraries had existing high-resolution photographs of all of their different spaces.

Towards the latter half of September 2015 as Spacefinder was readied for its launch, a high priority task was ensuring that the new spaces had been added coherently and consistently and that all the new photographs taken were associated with the correct spaces. Differences between the spaces that had been entered were chiefly stylistic and presented few issues. Instead, a totally unanticipated problem took up our time: inputting accurate GPS coordinates. For some time Spacefinder was showing many of the University's libraries as being located in Cambridge's Cherry Hinton Hall park and in the village of Fen Ditton! We soon discovered that the tool built into the admin interface for finding the GPS location was not always reliable. Similarly unreliable was the method of actually visiting a space and checking the GPS location with an app. By far the most effective way of ensuring the right spaces appeared in the right place was by taking GPS coordinates from a web-based service which, like Spacefinder, also used Google Maps.

Some inevitable eleventh hour technical issues aside, Spacefinder, which now boasted some 130 spaces inside and outside of libraries, was ready to go live in time for the start of Cambridge's Michaelmas Term. Although we felt confident that we had followed a robust evidence-based research process and that there was a genuine need for the tool, we could still not be certain that students would actually use it. Would Spacefinder compete with the myriad of existing digital services and platforms already vying for student attention?

4. LAUNCH AND RECEPTION

4.1 The Freshers' Fair

The Spacefinder pilot service was officially launched on Tuesday 6 October 2015 at Cambridge University Students Union's Freshers' Fair, where it was promoted with postcards, novelty keyring compasses bearing the Spacefinder logo and demos on an iPad. Although primarily intended for new undergraduates, the Fair is also frequented by many existing students, thereby presenting a great opportunity to see how Spacefinder would be received by many different user groups. Responses to the service from visitors to the University Library's stall were very encouraging indeed.

New undergraduates (many of whom were feeling a little overwhelmed) commented:

- "This is really going to help, I was beginning to feel very lost"
- "What a great idea. I love working in cafés"
- "I'm definitely going to be using this. A lot"
- "Great, I wanted to know where I could hunker down and study"

Reactions to the new service from existing students was even more enthusiastic:

- "This is exactly what Cambridge has been crying out for!"
- "I've been looking for a service like this for 3 years!"
- "This is perfect for me. I mix it up all the time and spend an hour in a library then move to another one"

A PhD business student who had taken part in one of the early co-design workshops was simply amazed to discover that the product we had talked about with him had become a reality: "I can't believe you actually made it!"

During the Fair's two days, library staff across Cambridge were also doing their bit to promote Spacefinder at induction sessions. Indeed, many students told us that they already knew about Spacefinder and thought it a great idea, and had merely come to the stall just to congratulate us. Twitter also served as a useful promotional platform during the Fair, with many tweets, retweets

and conversations. A tweet from the official Cambridge University Twitter account (below) was particularly welcome in terms of extending our reach.

Although a large number of students asked if Spacefinder was an app, when it was explained that we'd gone for a web-based service so we didn't have to design for ios, Android or Windows, all were accepting of this logic.

4.2 Student feedback

Spacefinder continued to enjoy overwhelmingly positive press throughout Michaelmas Term. The 'Cambridge Student' newspaper even went as far as describing the new pilot service as 'The website that'll change your studying life forever'. Jemima Jobling wrote: 'Spacefinder is a newly-launched website, innovative and exciting in equal measure, aiming to pair each Cambridge student with their perfect, study space match. Dabbling in the website myself this week, I have been more than impressed. The user-friendly layout and extensive list of options make for a foolproof experience. Simply choose your preferences - Do you like a modern, traditional or friendly atmosphere? Do you require plug sockets, lots of desk space or pretty views? Do you need strict silence or background noise? - and you're a mere click away from your dream location.'


The website that'll change your studying life forever

Story: Jemima Jobling **Twitter:** jemima_jobling

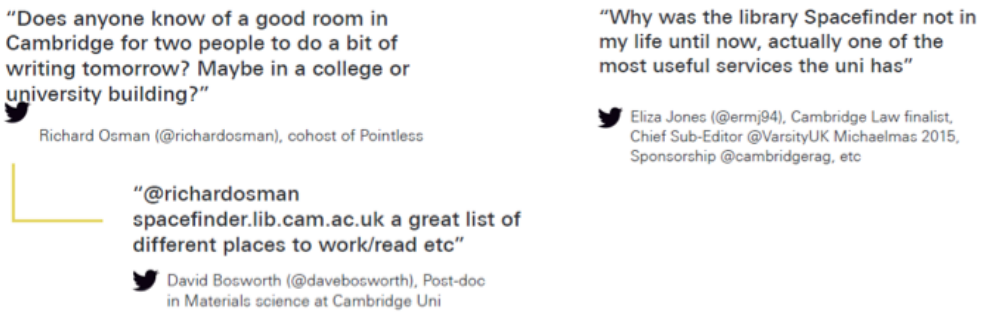
OCTOBER 21, 2015

Poppy Ellis Logan, Cambridge University Students Union (CUSU) Welfare and Rights Officer contacted Futurelib to express her gratitude for the service:

> "I wanted to write personally, to thank you for Spacefinder and tell you how useful students are already finding it. This is an achievement that shouldn't be underestimated. I thought you might be amused to know that the general response has been one of sheer astonishment that the University have helped produce something so up-to-date and relevant to student life."

This and similar communications with other reps led to the building of a strong collaborative relationship between CUSU and Futurelib. They now regularly help us to recruit students for ethnographic research, invite us to attend relevant events at which students will be present and include our materials in mailshots. Most importantly it was through collaboration with CUSU that we were able to later add improved disability information to the interface. They had already been looking into creating a platform that would provide this information, now Spacefinder has served as that vehicle.

The buzz on Twitter continued with the Chief Sub-Editor of another Cambridge student newspaper, Varsity, describing it as 'one of the most useful services the Uni has' and a Cambridge postdoc recommending Spacefinder to the co-host of the gameshow *Pointless*, Richard Osman, who was looking for somewhere to work in Cambridge!



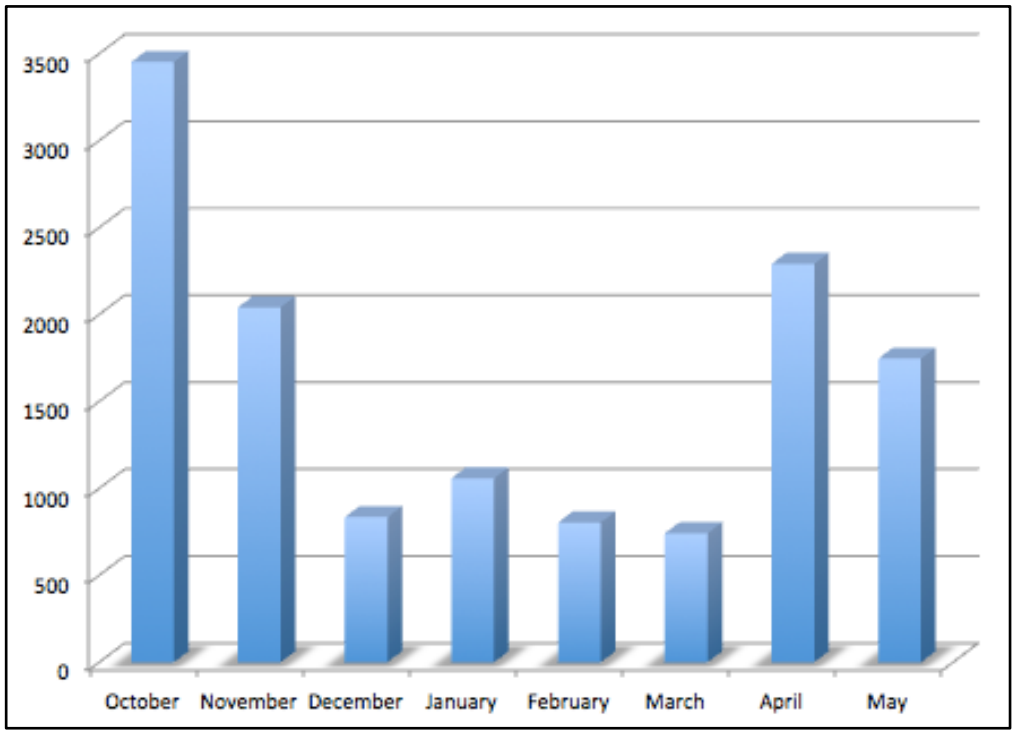
In addition to tweets and blogposts the service was most visibly promoted by a set of posters displayed across the University encouraging students to use it to find their ideal study space. There was no question that there was a palpable excitement around the launch of Spacefinder, which appeared to be winning adoption from the student community, but did the usage figures match up?

4.3 Usage figures

We gathered quantitative site usage data using Google Analytics. Although some of these statistics were in line with our expectations, others were very surprising.

Overall usage

There have been 12,968 sessions on the Spacefinder pilot service since its launch in October 2015. Broken down by month it is easy to see Spacefinder's initial popularity, with 3452 sessions in October alone. This can be attributed to its initial promotion (565 sessions were recorded on Day 1), the fact that it was a brand new service and also because the academic year's new students were busy navigating the Cambridge landscape during their first term. As Michaelmas Term continued usage inevitably decreased, before enjoying a brief upturn at the start of Lent Term as students returned from the Christmas break. As expected, the site's popularity soared in April, with 2,291 sessions as Easter Term began and students sought out new places to revise for their forthcoming examinations.



Above: Spacefinder usage figures for October 2015 to May 2016

Average sessions

The duration of an average Spacefinder session is 2 minutes 49 seconds, acknowledged to be a very long session time in relative web terms. The average number of pages viewed per session was 6.

Devices used

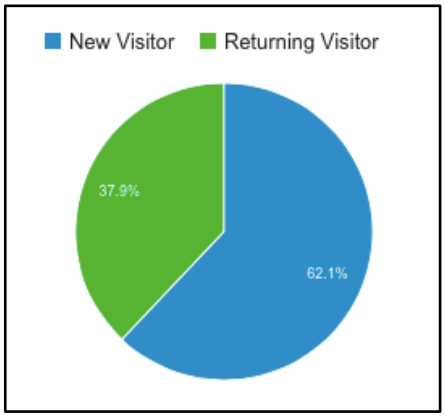
Given our assumptions about how Spacefinder would be used 'on-the-go', we were very surprised to discover, that most people elected to access the service on their laptops or a desktop. The breakdown was as follows:

- Desktop/laptop: 66%
- Mobile: 29%
- Tablet: 5%

It is also worth noting that Spacefinder has been accessed on as many as 158 different models of mobile and tablet device, thereby vindicating the decision to build the product as a web service rather than an app.

Returning visitors

38% of users come back to Spacefinder after using it once (see below).



International visitors

Unsurprisingly most visitors access Spacefinder from the UK (86%) but that leaves 14% from other countries, 5% of which are visits from the United States. This suggests potential interest in the initiative from institutions across the world.

Spaces accessed

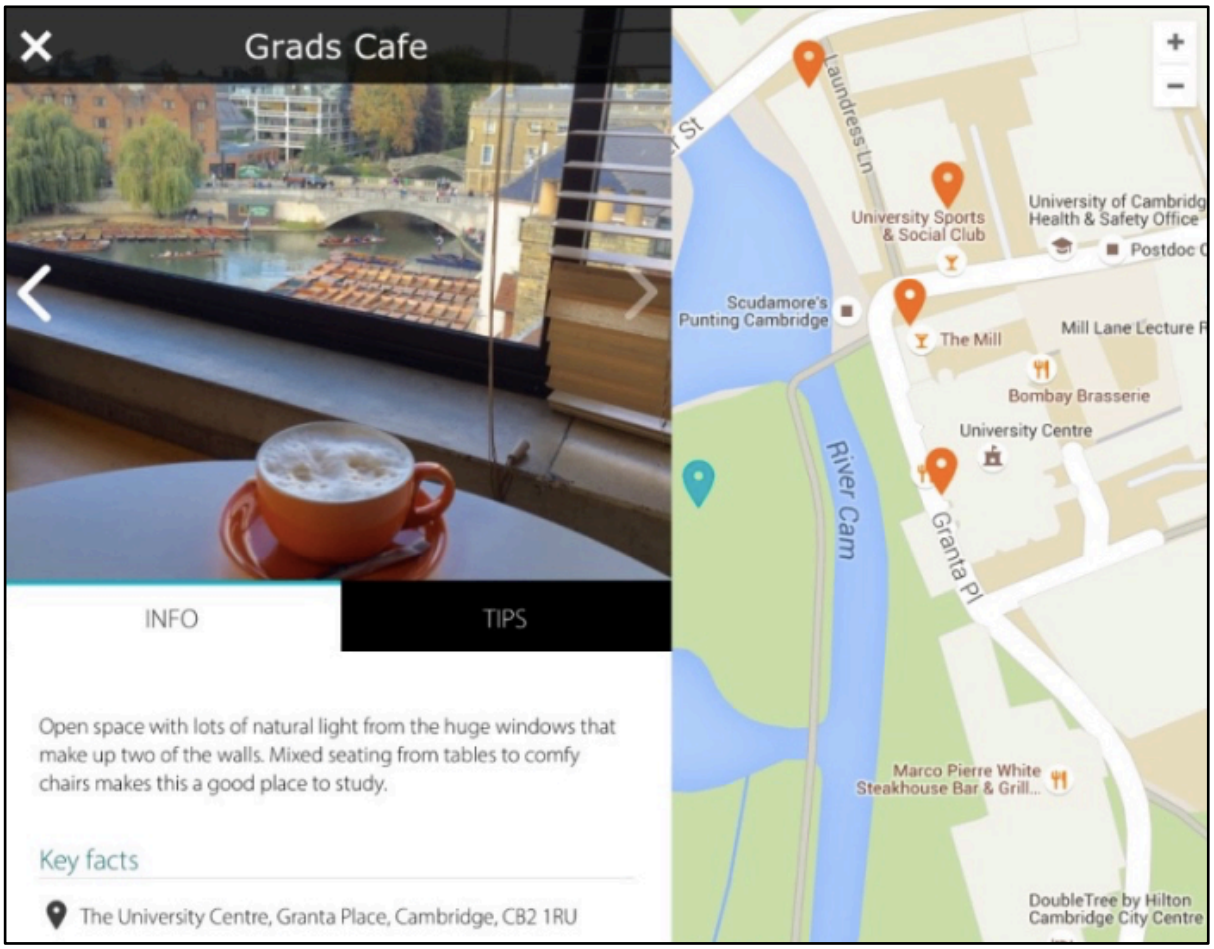
All 180 spaces added to Spacefinder since its launch have been accessed at least once. The most viewed space is the Grads café – a café in the University Centre near the centre of Cambridge. However library spaces are viewed more frequently than café's (see next page).

Top 10 spaces viewed on Spacefinder

Space	*Views*
1. Grads Café	468
2. University Library - Main Reading Room	417
3. Haddon Library - Main Reading Room	367
4. University Library - West 4	345
5. Fitzwilliam Museum Reading Room	340
6. University Library - Fourth Floor Landing	331
7. Whipple Old Library	314
8. Judge Information Centre – Ground Floor	285
9. Moore Library - Lower Ground Floor	282
10. Seeley Historical Library	282

Other café's placed 23rd and 27th in the Top 30 spaces

Below: The most popular space on Spacefinder: The Grads Café



4.4 Usability testing

Usability testing refers to evaluating a product or service by testing it with representative users. Typically, during a test, participants will try to complete typical tasks or scenarios – tasks that they would be likely to perform on the product in question – while observers watch, listen and take notes. The main goal is to identify how users navigate around the site, where they run into difficulties, any other usability problems, and their level of satisfaction or dissatisfaction with the product.

We conducted usability testing on Spacefinder in November 2015 with students who were studying a variety of STEM and AHSS subjects. Some were already Spacefinder users while others were new to the service. The sessions consisted of two parts: a 20 minute interview, and a 40 minute task in which participants were asked to find a replacement for their favourite workspace using Spacefinder.

In addition to the usability testing, ideas for improvements have been received regularly throughout this academic year by email from individual users; via meetings with Students Union representatives and the University's Disability Resource Centre (DRC); from library staff; and through the experience of the Spacefinder project team, who became familiar with a range of interface issues.

5. SPACEFINDER VERSION 2

A proposal for an enhanced second release of Spacefinder was developed between January and March 2016 and the new service was launched in April as 'Spacefinder Version 2'.

The following enhancements all appear in the new version of Spacefinder:

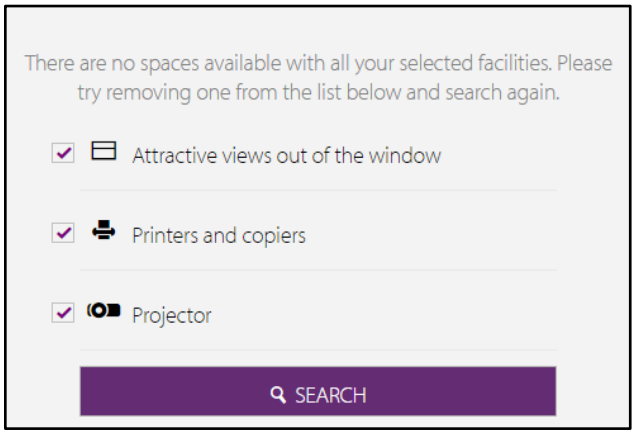
a) Greater number of search results displayed

Originally, Spacefinder only showed the first 20 spaces that matched a set of search criteria. Although this kept loading times to a minimum, usability testing highlighted the fact that some people thought these first results referred to the *only* spaces that matched their search, rather than 20 of a larger set. We increased the number of results in the initial list from a maximum of 20 to a maximum of 35, while a message was added to the top of the screen to let users know what they were seeing e.g. '35 of 134 results'. We also moved an existing 'Load more' button to the top of the display, so it was more obvious that further spaces were available that matched their search criteria.

Above: A search yielding 134 results and the 'load more' button

b) Changes to search options to aid space-finding

On those occasions when searches were too specific and no results were yielded it was agreed that it would be valuable for the user to have the option to see the 'next best' spaces available. Eventually however, we elected to have Spacefinder advise users who had received no results to reduce the number of criteria that were part of their search instead, thereby having them refocus on the most important characteristics of the spaces they were looking for.



c) More photographs added to spaces

During usability testing we observed that almost no participants used the text descriptions included in the space listings to help them decide on where they wished to work. Photos however were key to these decisions. Some students actively suggested that additional photos would make the spaces seem more attractive, and provide more of a basis for them to make decisions. Some also mentioned that it was often difficult for them to find spaces (particularly in libraries) that they had never visited before, especially if these were located inside a large building. Some students suggested that including images of the exterior of the building and the doorway to the listed space itself could help with this. The project team has added more photos of entrances and is considering adding Vines (very short video clips) to illustrate access to hard to find libraries.

d) Colour-coding different types of spaces

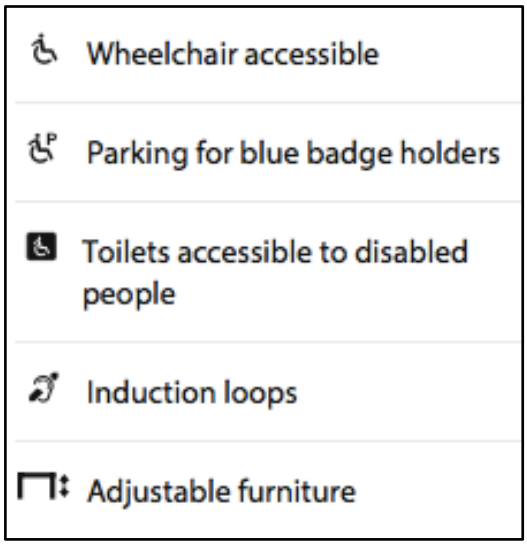
The initial design of the map view was intentionally very simple, so as to avoid users being overloaded with information. However it emerged from usability testing that providing more information on the map screen might actually simplify the user experience. Specifically, colour-coding the pins to show library and non-library spaces (e.g. cafés) would help users to gather information about different types of spaces at a glance, making it easier for them to browse the map.

e) Removing the free text search box

During usability testing Spacefinder's free text search box was not used for the large majority of searches with users preferring to search by their intended task, the atmosphere of a space, its noise levels and facilities. We also elected to remove the search box as it was not clear to the user what exactly it was searching.

f) Improved information for disabled users

When the Spacefinder pilot initially went live we already knew that we had more work to carry out on its information regarding accessibility and facilities for disabled users. A project sub-team was formed that met with the relevant Students Union reps and the Disability Resource Centre, and subsequently requested more information from library staff. Searchable facilities added as a result included: wheelchair access, wheelchair accessible toilets, parking for blue badge holders, induction loops and adjustable furniture.



g) More facilities

The Students Union also recommended adding a range of other facilities including: gender neutral toilets; prayer rooms; baby-changing facilities; bike racks; designated smoking areas; and the availability of individual study spaces. These excellent suggestions reinforced to us the importance of regularly engaging with this formal student body during Futurelib projects in order to surface important issues.

h) More spaces

Students expressed that they would like to see a more comprehensive list of spaces on the platform. They told us that if they could not find a space they already knew and used, they began to see Spacefinder as less useful, and assumed that they 'knew' more than the service. Ideally students would like to see every workspace they could possibly use in Cambridge listed. Over 50 more spaces, recommended by both its users and library staff, have been added to Spacefinder since its launch, increasing the total number of spaces to 180. These have largely been added during 'Edit-athons' at which available project team members have come together to spend time editing and entering new spaces.

Promoting Spacefinder 2

Spacefinder version 2 was launched at the start of Cambridge's Easter Term and promoted via social media channels, a Students Union event, printed flyers in student welfare packs, and a poster campaign with the new tagline 'find the right space for YOU'. The expectation, borne out by usage statistics, was that Spacefinder would be heavily used during what is colloquially known as 'Exam Term' when library spaces are at a premium and greater numbers of students are looking for new places to study.

6. CONCLUSIONS

6.1 The Future of Spacefinder

Spacefinder may not, as one student newspaper claimed, have "changed students' studying lives forever" but it has certainly made a significant impact on Cambridge University during the first 8 months of its existence. The University Library, which funds the Futurelib Programme, is currently exploring how the service can be supported beyond its pilot phase, originally envisaged as lasting one year.

This includes considering whether we need to rebuild the service on a more robust platform, where it is currently promoted and linked from, and how it might speak to other digital services such as the Cambridge University library management system and discovery layer. There are also plans to further improve the interface, including an enhancement we were unable to include in Version 2: a filter showing users which spaces are open when they are searching, especially in the evenings and at weekends. Although we have been committed to iterating Spacefinder for some time now we do have to question whether future additions to the product will really add significant value. Are they just 'nice-to-have' features rather than essential, and if so should we be concentrating our attention elsewhere instead?

6.2 What we have learned

The Spacefinder project has taught us a great deal about approaches to research, design and deployment of new services. Some key learning outcomes are as follows:

- Library services/products that recognise a wider landscape of learning and experience extending beyond our physical buildings are very highly valued.
- Minimum viable products offer incredibly quick buy-in without the cost of lengthy development time. Had we tried to design a more complete Spacefinder we might not have released it yet.

- Students have very individual needs when it comes to work spaces and we need to ensure that our services recognise this and provide a choice of environments. Through Spacefinder we met this need by offering a search platform that actively took different preferences and circumstances into account.
- Libraries offering an innovative product can transform expectations and perspectives on our values and approaches, and therefore help us build new relationships.

Perhaps more significant than any of the above is the fact that we did not arrive at Spacefinder by gathering information on professed user need, but through ethnographic research into user behaviour. Only by exploring and researching behaviour and experience can we develop products and services that are truly valuable to our users. Students would never have told us that they needed a space finding tool, but this project clearly proved that they did.

Andy Priestner & David Marshall
Futurelib Programme
Cambridge University Library
June 2016

Spacefinder is accessible at: https://spacefinder.lib.cam.ac.uk/

Contact Futurelib:
Email: futurelib@lib.cam.ac.uk
Web: http://www.lib.cam.ac.uk/futurelib
Blog: http://futurelib.wordpress.com
Twitter: @futurelib

A note about the Spacefinder code:

Spacefinder is not available open source. Although we did consider releasing the code on GitHub or equivalent we have since decided that we do not have sufficient capacity to respond to inevitable queries or produce documentation. We were also concerned as to how reliable or robust the platform might be given that it was built for the very specific context of Cambridge libraries. However, we are of course very happy to correspond with others about the experience of the Spacefinder project.